

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)**

2019/Proj./MMRDA/CBTC/30/32

New Delhi, dated 03.05.2024

Director (Project),
Mumbai Metropolitan Region Development Authority,
(MMRDA), C-14 &15,
Bandra- Kurla Complex,
Bandra (East), Mumbai - 400051

Sub:- In principle approval for adopting UTO mode of CBTC Technology for Signalling and Train control System - Mumbai Metro Line 2 & Line 7 Metro Rail Project of Mumbai Metropolitan Region Development Authority (MMRDA).

Ref: MMRDA uploaded document on RDSO's online portal on 13.07.2023, 25.08.2023, 12.10.2023, 21.11.2023, 19.12.2023 and via email dated 03.01.2024.

The Signaling & Telecommunications system architecture & sub system as submitted by MMRDA for Mumbai Metro Line No. 2 & 7 project have been evaluated in consultation with RDSO and approval of the competent authority for the same is hereby conveyed as under:

A. Signalling Systems:

SN	Description	Minimum Requirement	Proposed equipment & reference submitted
1.	Type of Signaling	Cab Signaling, CATC (ATP, ATO, ATS). ATP and ATS are essential, ATO is optional.	CBTC system including CATC (ATP, ATO/UTO & ATS) using 5.8GHz ISM band of M/s Alstom make, UEVOL system version 1.11.2.6-2 has been planned. The proposed Main CBTC System version 1.11.2.6 is already approved for Mumbai Metro line no. 3 MMRDA submitted user certificates of (i) Taichung Green Line (Taiwan) dated 07.04.22 for "Driverless (GoA4) Communication Based Automatic Train Control system with ALSTOM U-400 ATC and (ii) North West Line (Sydney) dated 21.12.2020 for URBALIS CBTC GOA4 system.
2.	Back up Signalling	Line side (CLS) at entry and exit at all interlocked stations.	Line Side Colour Light Signals conforming RDSO/SPN/153/2011 Rev 4.1 specification, provided at entry and exit of all interlocked stations.
3.	Interlocking	EI with built-in block working facilities	The Computer Based Interlocking (CBI) of M/s Alstom's make, UEVOL CBI Sub-system version 8.3.1 (based on SML400 BS platform and Smart I/O) is provided. SIL 4 Certificate for UEVOL CBI Subsystem version 8.3.1, issued by M/s Arthur D Little (Certificate Reference Alstom/P19000730/022cer dated 19.07.2019) and ISA Report by Arthur D Little for CBI subsystem version 8.3.1 dated 19.07.2019 has been submitted.

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SN	Description	Minimum Requirement	Proposed equipment & reference submitted
4.	Train Control system	CATC (ATP, ATS, ATO optional)	CATC (ATP, ATO/UTO & ATS) has been planned. i. CBTC - M/s Alstom make UEVOL system version 1.11.2.6-2 has been planned. The ISA certificate for UEVOL System ver. 1.11.2.6-2 (Certificate Reference: Alstom/P20001408/018cer issue 01, dated 23.11.20 & ISA report for SIL4 compliance by M/s Arthur D little has been submitted. ii. ATC - UEVOL ATC Subsystem version 11.4.5.2 has been planned. ISA certificate for UEVOL ATC Subsystem version 11.4.5.2 (Certificate Reference: Alstom/P20001408/015cer, dtd 18.11.2020 & ISA report no. Alstom/P20001408/014 rep.docx dated 18.11.2020 for SIL-4 by M/s Arthur D little has been submitted). iii. ATS - ATS version CF 3.7.1 RC1 has been planned which Software SSIL2 compliant as per Safety assessment report issued by M/s Certifer dtd. 31.07.20 (Ref: EC_8634_8200 _12, dated 31.07.2020) has been submitted. iv. ATO - ISA certificate for UEVOL ATO Sub System version 11.4.9 has been planned. (Certificate Reference: Alstom/P20001408/016cer, dated 18.11.2020) issued by M/s Arthur D little has been submitted. v. The UTO mode functions planned by MMRDA are attached as Annexure "A", subject to the stipulations mentioned below.
5.	Type of Track Circuits	Coded Audio Frequency Track Circuits (AFTC)	(i) The primary train detection is performed by using Radio based system working on 5.8GHz. The radio based system is integral part of the CBTC system & secondary (fall back) detection is based on digital axle counter system of M/s Frauscher make Model: ACS 2000. (ii) SIL 4 certificate of M/s Frauscher Sensortechnik GmbH, Austria (model ACS 2000) Axle counting system issued by Dr. Graband & Partner, safety assessor accredited by the German Federal Railway Authority (Certificate Assessment no. 87U/3/13, dated 28.08.2013) has been submitted.
6. Point Machine			
	i) For Main Line	i) Non-Trailable high thrust, high performance point machine	Vossloh Cogifer make, model: MCEM 91, Non-Trailable high thrust, high performance point machine shall be used. The same point machine is in revenue operation in Delhi Metro Line-8.
	ii) For Depot	ii) Trailable high thrust, high performance point machine	Non-Trailable type Vossloh Cogifer make, As per IRS S-24.

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SN	Description	Minimum Requirement	Proposed equipment & reference submitted
7.	Redundancy in cab equipment for ATP (Cab Sig.)	1+1(hot standby)	Will be single electronic structure based on reactive fail safety with diverse software with duplicated hot standby configuration (Head/Tail redundancy)

B. Telecommunication systems:

SN	Description	Minimum Requirement	Proposed equipment & reference submitted
1.	Tele communication	Integrated system with OFC, Train Radio, CCTV, Centralized clocks, PA system, with the additional provision that Train Display Boards at stations should also be integrated in the system. Regarding Train Radio system, it should be fully digital and duplex system, the standards may be chosen based on techno- economic considerations.	i. Fiber Optic Transmission System (FOTS) ii. Public Address System (PAS) iii. Passenger Information System (PIDS) iv. Master Clock System (MCS) v. Telephone System vi. Radio (TETRA) System vii. Closed Circuit Television (CCTV) viii. Centralized Digital Recording System (CDRS)
2.	Positive Train Identification	Provided with interface between ATS and Train Radio	Through CBTC Radio.

C. Platform Screen Door:

SN	Description	Minimum Requirement	Proposed equipment & reference submitted
1.	PSD system	General details	a) Half height PSD system for Mumbai Metro Line 2A: Make: M/s KTK Group, CHINA. ISA Certificate of PSD system/subsystem for Mumbai Metro Line 2A Certificate No. EC_9572- 0090 edition V01 dated 08/12/2023 by M/s Certifer has been submitted. Performance Certificate from DMRCL dtd 21.12.2023 is submitted for KTK make Half Height Platform Gates on Line 7 & 8. b) Half height PSD system for Mumbai Metro Line 7: Make: M/s CRRC, CHINA. ISA Certificate of PSD system/subsystem for Mumbai Metro Line 7 Certificate No. EC_9572-0091 edition V01 dated 08/12/2023 by M/s Certifer has been submitted. c) Half height PSD system for Mumbai Metro Line 2B: Make: M/s CRRC, CHINA. ISA Certificate of generic Product PSD system issued by M/s Bureau Veritas Quality Service (Shanghai) Co. Ltd, China (Certificate No. X95P1800301 dated 07.03.2019). Performance Certificate from Ningbo Metro, China dtd 23.10.2023 is submitted for CRRC make Platform Doors.

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The above approval is subjected to compliance of following stipulations before opening the line for passenger operation/revenue service:

- i. Before opening of the line for passenger operation/revenue service, complete assessment report and certification by ISA for achievement of required levels of safety as per latest CENELEC standards wherever applicable for train operation in Mumbai Metro Line 2 & Line 7 Metro Rail Project for complete signalling & train control System including all subsystems and platform screen door system (PSD) shall be submitted to RDSO.
- ii. The Final system hazard analysis and acceptance of its mitigation by Metro Rail Administration (MRA) shall be submitted to RDSO as well as to CMRS and any hazards which require manual intervention/special instruction shall be suitably framed, incorporated and implemented by Metro authorities.
- iii. Documents as per Annexure E1 of "Procedure for Safety Certification and Technical Clearance of Metro Systems" including EMC/EMI report related to rolling stock & PSD shall be submitted to RDSO considering all mission-critical frequencies.
- iv. Mumbai Metro Line 2 & Line 7 Project shall carry out rigorous testing of all mode of interference (both out of band and in band interferences) to prove non-susceptibility of 5.8 GHz band used for CBTC application to any kind of interference and shall align the access points for better reliability & test report shall be submitted to RDSO.
- v. In case of UTO, the reliability & resiliency (ability to automatically restore i.e. fast re-routing the communication) is another critical consideration of the entire communication network, wireless as well as wired, so that the system should not fail. Similarly provisions must be made for dependable communication between OCC and passenger (in case of train stopping due to unusual incidence/failures in tunnels to prevent them from panicking). **The details of final communication arrangement made compatible for UTO shall be submitted to RDSO before start of operation in UTO mode.**
- vi. The details of authorities responsible for maintenance of signalling system to the required level of safety during train operation shall be submitted to RDSO.
- vii. **For UTO mode of operation (GoA 4), signalling system is capable of operating the trains without driver but the issue is the compatibility of infrastructure, i.e. stations, tunnels and trains for driver less operation, especially the perceived security aspects and emergency procedures. Till these issues and procedures are compiled/ prepared, the train operation shall not be done without driver. MMRDA shall submit the details/documents/compliance to RDSO related to compatibility of infrastructures, security aspects and emergency procedures before start of operation in UTO mode.**
- viii. Details/documents/compliance related to arrangements made by MMRDA for Mumbai Metro Line 2 & Line 7 project to prevent risk of Cyber threats to Signalling, Train Controls & communication System/subsystems shall be submitted to RDSO before the start of revenue operations.
- ix. Mumbai Metro Line 2 & 7 has submitted that the ATS is SIL 2, and all potentially unsafe effects of safety related functions performed by ATS and ATO shall be mitigated by mandatory interaction with SIL 4 subsystems (ATP and CBI). However dependency of operating authorities on VDU display units to run the trains during failure situations shall require a minimum level of SIL2 for VDU. Manual running of trains during signal failure condition shall not be done relying only upon the indication by ATS & suitable instructions regarding this shall be framed and strictly implemented.



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- x. Earthing and bonding shall be implemented and ensured by the MRA before start of operation.
- xi. M/s Certifier SA, France (which is on RDSO's approved ISA panel for Metro Signalling Project), has been appointed as ISA of Mumbai Metro Line 2 & Line 7 Metro Rail Project of MMRDA.

Documents finalized duly signed by MRA as indicated in item (i) to (x) tabulated above shall be submitted to RDSO & item (ii) to CMRS as per annexure E1 before the start of revenue operations. Further, fulfillment of the "minimum requirement" described vide Annexure E1 and Annexure E2 of Metros as per "Procedure for Safety Certification and Technical Clearance of Metro Systems" shall also be ensured.

Encl: Annexure- 'A'


(F. A. Ahmad)
Director/Gati Shakti (Civil)-IV
Railway Board
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Copy to:

1. **Executive Director/UT**, RDSO, Manak Nagar, Lucknow w.r.t letter No. UTHS/MMRDA/ dated 15.01.2024
2. **OSD/UT & Ex-Officio Joint Secretary**, Ministry of Housing & Urban Affairs (MoHUA), Nirman Bhavan, New Delhi-110011
3. **ED/GS/S&T**, Railway Board

SN	Description of special UTO functionalities mentioned by the MRA	How the functionalities are performed/achieved	Exact role of Signalling to execute the functionalities	Related safety certificate
1.	Automatic Door opening/ Closing	CC knows where the train is located on the line and only enables train doors to be opened when the train is in safe situation (holding brakes applied and traction cut-off) and train is correctly docked at platform (+/- 30cm from the Service Stopping Point). DE (Door Enable) is used by CC to authorize train door opening. TDCL signal is used by CC to know the current train door status in order to allow train departure (train departure is forbidden by the ATC if passenger doors are not closed and locked).	SIG is responsible for the correct docking and door authorization on the correct side. SIG also checks that the doors are closed and locked before the train leaves the platform.	Door authorization is controlled by ATP, and it is a SIL4* functionality.
2.	Automatic Remote Evacuation	For UTO driving mode the CC shall safely compute the 'effective evacuation request' information for automatic evacuation in following case only: Detrainment Door is not locked (EDDNO=0) ZC automatically creates the evacuation zone. As a result, all CBTC trains in this affected zone apply EB and stop. All CBTC trains are prevented from entering this zone. ATS displays the setting of evacuation zone in OCC HMI. Traffic Controller has to call train operator of Non-CBTC trains falling in this zone to STOP via Radio. Train which is outside of this zone will STOP with service brake or with EB if they are close enough of the restricted zone. OCC controllers would follow the SOP for further course of action to remove evacuation secured zones.	Automatic Evacuation request is generated by SIG (CC) in case of opening of Detrainment door of the train. SIG (ZC) is also responsible for securing the Evacuation zones by stopping the CBTC trains in/approaching the secured zone.	Evacuation zone triggering / securing is done by CC (On board ATP system) & ZC (trackside ATP system)* and it is a SIL4 functionality.



SN	Description of special UTO functionalities mentioned by the MRA	How the functionalities are performed/achieved	Exact role of Signalling to execute the functionalities	Related safety certificate
3.	Auto wash mode activation	Wash table is prepared by the depot operator and on its basis ATS will route the train towards the wash plant. As soon as the wash mode is enabled, a speed restriction of 3 kmph will be applied and monitored by ATC for proper washing. After washing the train is routed to its destination.	SIG is responsible for the speed control during washing. The presence of train is detected by wash plant through the interference of beam sent by Receiver-Transmitter sensor with the train body. Hence, no interface is required between wash plant and signalling except speed control. Staff Protection Key switch has been provided for auto wash plant to secure the wash plant area in case depot, maintainer wants to access the track.	Speed control during washing is done primarily by ATO [^] and it is SIL2. However, ATP* also keeps monitoring and controlling the speed and will trigger the EB in the unlikely event of over speeding by ATO.
4.	Automatic wake up	Wake up command from the ATS goes to the TWU which will forward this command to TCMS. TCMS sends back the awake command when the prepared battery is ready. TCMS powers on the CC and CC starts sending the CC status report to ATS completing the wake-up procedure. CC performs the self-test and RS performs its own self-tests and combined test are done by RS and SIG together	SIG forwards the request to TCMS for powering ON the on board equipment. SIG performs the self- tests for its own equipment and takes part in the combined test to check the EB and the door opening/closing.	The wakeup sequence is defined in following steps: On board equipment reset is SIL 4 The wake-up self-tests done by CC are SIL2. Combined tests done jointly are SIL 0. However please note that EB and Doors control unit are controlled by ATP* system in SIL4 level. ATO SIL2 [^] and ATP SIL4* assessment certificate are attached herewith.



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SN	Description of special UTO functionalities mentioned by the MRA	How the functionalities are performed/achieved	Exact role of Signalling to execute the functionalities	Related safety certificate
5.	Automatic sleep	When CC receives command for Sleep from ATS, then CC would check the conditions at CC level; Train in UTO / ATO mode and definitely not in ATP, RM-F and RM-R modes. Train is at Station then ATC shall detect complete Stop for more than a predefined time. Train is parked in the stabling zone After processing the above, CC would drive the this output to TCMS Output remains at status "1" until the CC loses power switched off by TCMS. ATS gets one message from CC and one from TWU TCMS link broken; Status "0"; CC-ATS Interface Train is put in sleep (through TWU); Status "0"; ATS-TWU Interface ATS, with the above information, shall confirm that the Train is in Sleep mode. If not shall raise the alarm.	SIG is responsible for checking the correct location for sleeping and for forwarding the sleep request to TCMS which actually switches OFF the power of the train.	For automatic train sleep, ATO^ checks the correct location and speed of the train before permitting automatic sleep of train.
6.	CCTV live streaming	In case of an emergency a live CCTV image streaming will be displayed in the OCC for operator to handle the situation. Based on following events received from train, an auto-popup of CCTV images via CCTV network will be displayed in OCC PAD/ Detrainment Door/ Obstacle Detection Device/ Fire/Smoke Detection Driving Console opening	SIG does not have a major role in this functionality.	Nil



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SN	Description of special UTO functionalities mentioned by the MRA	How the functionalities are performed/achieved	Exact role of Signalling to execute the functionalities	Related safety certificate
7.	Remote CC reset and EB application and reset	The signalling system will include a remote command to perform onboard equipment reset The remote onboard equipment reset shall be performed when: Train is at standstill (information Measured train speed) and onboard equipment reset request is requested by the traffic operator and train is on a Driving Mode which depends on "driverless condition" and train is on a Stabling_Location with memorized localization In all other locations except Stabling if CC is reset it will lose its location (will not know what is its position on the line) On-board ATC subsystem shall request the emergency braking to the rolling stock when the Remote_EB_request control is received from the ATS. This emergency braking shall be released when the Remote_EB_reset_request control is received from the ATS, train is at standstill no other EB cause is present.	SIG will ensure that the CC reset can be given only in the designated stabling areas and if CC reset is given at any other place it will delocalise the train. Remote Irrevocable EB application is done by ATP which is not reset automatically and can be reset only by the TC. Reset of EB by the TC is also not effective and is rejected in case the cause of EB is still present thus ensuring system safety.	CC reset and EB application and reset functionality is controlled by ATP*.
8.	Jog function	In UTO driving mode in case of short docking or long docking, system shall limit maximum front/reverse jog speed to 10 Km/h.	SIG system on board ATC i.e., CC decides whether jog is to be performed based on the docking of the train.	JOG functionality is controlled by ATO [^] . However, ATP* also keeps monitoring and controlling the speed and will trigger the EB in the unlikely event of over speeding by ATO.

Note:

* ATP is a SIL 4 function

[^] ATO is a SIL2 function

Signature Not Verified

Digitally Signed
Name: SACHIN JAIN
Date: 25-Aug-2023 17:08:44

Arthur D Little

Independent Safety Assessment Certificate

This certificate is granted to:

ALSTOM | **Transport**
Information Solutions

The UEVOL ATO subsystem software (CC-NV-ATO version 11.4.9), as supplied with ATC version 11.4.5.2 (as defined in section 1.2 of the ATC Subsystem Safety Case UEVOL-0887, version FS) has been subject to an independent review to establish the degree to which it complies with the development requirements of Safety Integrity Level (SIL) 2 as defined in CENELEC 50128:2011. Subject to the scope noted in our assessment report, the conclusion of this assessment is that the ATO software is considered as compliant with the requirements of SIL 2, noting the following:

- An alternative approach has been proposed by Alstom for Software module testing and Software-Software module integration testing. Alstom has proposed that transparent traceability between software requirements and the software itself, demonstrating a one-to-one correspondence between:
 - each functional software requirement and a single code module
 - each interface software requirement and a single module interfacecombined with complete coverage of requirements in testing, means that these activities are not necessary. This approach has been accepted by the ISA. However, corrective actions have also been identified by the ISA which need to be undertaken to provide the necessary level of traceability proposed; as there are no safety requirements implemented by the ATO software, these corrective actions are not considered to be a blocking issue.
- Clauses of CENELEC 50128:2011 relating specifically to the verification of safety requirements have not been addressed by Alstom, owing to the fact that the ATO software does not fulfil any safety requirements.
- All tools associated with the ATO, including NVESG, have been excluded from this assessment.

Dan Boult 18/11/20
ISA ASSESSOR

Dan Boult 18/11/20
LEAD ISA

CERTIFICATE REFERENCE: (Alstom/P20001408/016cer)

For further details concerning the assessment results, and the conditions that apply to approval for revenue service, please see the associated ISA report Alstom/P20001408/014rep

Arthur D Little

Independent Safety Assessment Certificate

This certificate is granted to:

ALSTOM | **Transport**
Information Solutions

The UEVOL ATC subsystem version 11.4.5.2 (as defined in section 1.2 of the ATC Subsystem Safety Case UEVOL-0887, version FS) has been subject to an independent review and is judged suitable for revenue service, subject to observation of and adherence to :

- the restrictions and safety related application conditions identified in Sections 4.5 and 6 of the aforementioned safety case.
- the restrictions identified in section 8 of our ISA Report, reference P20001408/014rep

The UEVOL ATC subsystem has, where required, software developed in compliance with the SIL4 requirements in CENELEC 50128:2011 and the ATC safety case shows that an appropriate level of compliance with the other CENELEC safety standards 50126:1999 and 50129:2003 has been achieved in accordance with the requirements for SIL4.

Dates of Assessment: November 2020

Dani Boult 18/11/20

LEAD ASSESSOR

Dani Boult 18/11/20

ISA PROJECT MANAGER

CERTIFICATE REFERENCE: (Alstom/P20001408/015cer)

For further details concerning the assessment results, and the conditions that apply to approval for revenue service, please see the associated ISA report Alstom/P20001408/014rep



Independent Safety Assessment of UEVOL: ATC Sub-System I I.4.5.2

Summary Report

Version 4.7

Report to
Alstom Transport

November 2020

Arthur D. Little Limited
Merlin Place
Milton Road
Cambridge CB4 0DP
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Reference P20001408/014rep.docx



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Change History

The table below summarises the evolution of this report since version 2.6, issued in September 2010.

Version	Date	Comment
2.6	14/09/10	ISAR aligned with ATC baseline 4.1.1-3
2.7	01/12/10	ISAR aligned with ATC baseline 2.5.2-1
3.0	05/11/10	ISAR aligned with ATC baseline 4.1.2-2
3.1	22/11/10	ISAR aligned with ATC baseline 5.1.1-3
3.3	11/01/11	ISAR aligned with ATC baseline 4.2.2-1
3.4	11/02/11	ISAR aligned with ATC baseline 5.2.1-2
3.5	24/5/11	ISAR aligned with ATC baseline 7.1
3.6	24/05/11	ISAR aligned with ATC baseline 7.2.2.4 to 7.2.2.6
3.7	22/06/11	ISAR aligned with ATC baseline 7.2.2.10
3.8	18/07/11	ISAR aligned with ATC baseline 7.2.2.11
3.9	19/07/11	ISAR aligned with ATC baseline 7.2.2.12
3.10	21/7/11	Updated version of version 3.9, modified following client comment
3.11	29/11/11	ISAR aligned with ATC baseline 7.2.2.13
3.12	16/3/12	ISAR aligned with ATC baseline 7.2.2.14
3.13	18/4/12	ISAR aligned with ATC baseline 9.2.3
3.14	19/4/12	ISAR aligned with ATC baseline 9.2.1.3 (corrected baseline reference from 3.13)
3.15	29/5/12	ISAR aligned with ATC baseline 9.2.1.3 updated to include assessment of Middleware version 2.1.7
3.16	8/6/12	ISAR aligned with ATC baseline 7.2.2.15
3.17	14/9/12	ISAR aligned with ATC baseline 10.2.2.3 (ZC/LC assessment only)
3.18	21/9/12	ISAR for ATC baseline 10.2.2.3 (ZC/LC assessment), updated with removal of restriction following corrective action by Alstom
3.19	22/11/12	ISAR aligned with ATC baseline 10.2.3.2
3.20	17/12/12	ISAR aligned with ATC baseline 9.3.3.2
3.21	21/12/12	ISAR aligned with ATC baseline 9.3.4.1
3.22	28/01/13	ISAR aligned with ATC baseline 10.2.3.3
3.23	25/02/13	ISAR aligned with ATC baseline 7.2.2.16
3.24	14/03/13	ISAR aligned with ATC baseline 9.3.5
3.25	28/03/13	ISAR aligned with ATC baseline 7.9.0.3
3.26	16/05/13	ISAR aligned with ATC baseline 10.2.4.1
3.27	19/09/13	ISAR aligned with ATC baseline 10.2.5.1
3.28	10/12/2013	ISAR aligned with ATC baseline 10.2.6.2
3.29	14/04/2014	ISAR aligned with ATC baseline 7.2.5.1-1
3.30	30/04/2014	ISAR aligned with ATC baseline 10.2.7.1-1
3.31	09/05/2014	ISAR aligned with ATC baseline 10.2.7.1-1, corrected following comment from Alstom
3.31a	23/05/2014	ISAR aligned with ATC baseline 9.3.6.2
3.32	14/11/2014	ISAR aligned with ATC baseline 9.3.6.6



Version	Date	Comment
3.33	20/11/2014	ISAR aligned with ATC baseline 10.5.4.3
3.34	25/08/2015	ISAR aligned with ATC baseline 11.3.0.7
3.35	25/08/2015	ISAR aligned with ATC baseline 9.3.6.7
3.36	27/08/2015	ISAR aligned with ATC baseline 11.3.0.7, updated with addition of restrictions concerning ATC tools
3.37	16/09/2015	ISA aligned with ATC baseline 11.3.0.7, updated with addition of a restriction concerning incorrect document versions referenced in the delivery sheet
3.38	9/10/15	ISAR aligned with ATC baseline 10.5.5.3
3.39	17/11/15	ISAR aligned with ATC baseline 10.5.5.4
3.40	20/11/15	ISAR aligned with ATC baseline 11.3.0.8
3.41	07/01/16	ISAR aligned with ATC baseline 9.4.2.1-1
3.42	11/03/16	ISAR aligned with ATC baseline 10.5.5.5
3.43	14/3/16	ISAR aligned with ATC baseline 10.5.5.5 – re-issued with modification
3.44	18/06/16	ISAR aligned with ATC baseline 11.3.2.1-1
3.45	24/6/16	Re-issue of ISAR for ATC baseline 11.3.2.1-1 with minor corrections
3.46	3/08/2016	ISAR aligned with ATC baseline 10.5.5.6-1
3.47	15/06/17	ISAR aligned with ATC baseline 11.4.1.1-1
3.48	19/06/17	ISAR aligned with ATC baseline 11.4.1.1-1 re-issued with modification
3.49	27/10/17	ISAR aligned with ATC baseline 10.5.5.7-2
3.50	11/07/18	ISAR aligned with ATC baseline 11.3.3.2
3.6bis	15/08/18	ISAR aligned with ATC baseline 11.4.3.4
3.7bis	07/09/18	ISAR aligned with ATC baseline 11.4.3.4 that includes ATO
3.80	25/10/2018	ISAR aligned with ATC baseline 12.4.1.2
3.90	29/03/19	ISAR aligned with ATC baseline 11.4.3.5
4.0	29/07/19	ISAR aligned with ATC baseline 10.5.5.8
4.1	31/07/19	Report aligned with ATC baseline 10.5.5.8-4 taking into account Alstom comment
4.2	09/09/2019	Report aligned with ATC baseline 11.4.4.1
4.3	11/9/19	Updated report for ATC baseline 11.4.4.1, following Alstom comment
4.4	09/03/20	Updated report for ATC baseline 12.5.1.2-1
4.5	-	ISAR aligned with ATC baseline 10.5.6.1-3 (note: report not issued as superseded by 4.6)
4.6	07/08/20	ISAR aligned with ATC baseline 10.6.1.3-1
4.7	18/11/2020	ISAR aligned with ATC baseline 11.4.5.2

Authorisation for issue			
	Electronic signature	Electronic signature	Electronic signature
	François Kassel	David Boulton	David Boulton
18 November 2020	Written	Checked	Authorised
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Executive Summary

Background

Alstom has redeveloped its Urbalis metro train command, control and protection system. The redevelopment covered all elements of this system, including ATC, ATS, system functions, DCS, interlocking and maintenance equipment. Key aims of the redevelopment were to provide a more competitive solution and to minimise application deployment costs. The project is known as Urbalis EVOLution (UEVOL) and also more recently as U400. First deployments of UEVOL took place in Beijing, where two lines were fitted initially. All deployments in China use China-specific ATS and interlocking subsystems. The version of UEVOL developed for this market is called 888 and is now deployed on numerous metros across China. The generic version that is used for the majority of other markets is known as the Regular system and it is now deployed on metros in Milan, Sao Paulo, Santiago and many others.

Alstom has divided the ISA activity associated with this development into a series of packages, denoted ISA 1 to ISA 6. The main work package, ISA 1, relates to the role of System ISA in combination with the assessment of the Automatic Train Control (ATC) sub-system. Alstom has appointed Arthur D. Little as ISA 1. This role is applicable to the assessment of the Regular system.

This document is the ISA Report (ISAR) for the ATC sub-system (forming part of the scope of ISA 1). The assessment is based on ATC baseline 11.4.5.2 as defined in the ATC sub-system safety case [18].

Aims of this Report

The aims of this summary report are to:

- Describe the independent safety assessment approach.
- Present the current status of this assessment.
- Identify key outstanding actions.
- Review the main findings of the assessment to date and detail how they have been addressed by Alstom.

Assessment Scope

The scope of the work undertaken by the UEVOL ISA 1 in respect of the ATC sub-system has been to review the development of this sub-system in order to determine whether it is appropriate for revenue service. The assessment assumes that all restrictions given in the ATC sub-system safety case are fulfilled. The current assessment is based on a review of ATC baseline 11.4.5.2.

Detailed activities carried out include:

- Review and cross acceptance of safety certificates and safety audit reports (SARs) for the:
 - ZC platform (2003)
 - LC platform (2003)
 - CC platform (UNIVIC)
- Independent safety assessment in accordance with the standards specified in section 5.10 of:
 - All aspects of the ATC software development.
 - Automatic Train Operation (Alstom have defined this as a SIL-2 sub-system, though it is noted that it does not contain or fulfil any safety requirements).
 - ATC data preparation process and the associated tools used in this process.
 - DSU and DMI, noting that these elements are not expected to have any safety requirements.
 - The safety-related application conditions exported by the other platforms (noted above) and checking that they are respected.
 - The exporting of the necessary safety-related application conditions to system level.
- All stages of the associated generic project development.



More generally, subject to the exclusions and cross-acceptance activities noted above, our assessment considers the correctness of all the arguments and assertions made in the ATC sub-system safety case [18]. The list of all items that are excluded from assessment in this report is given below:

- Use of the Lineside Electronic Unit (which relates to the 888 system baseline only).
- Test and commissioning procedures.
- The correctness and completeness of the ADDP (Adapt Design Deployment Procedure) has not been considered in this assessment.

Assessment Approach

In order to help Alstom deliver a generic UEVOL system that is acceptably safe, the ISA has carried out assessment/audit of Alstom's processes and the outputs from these processes. These assessments/audits aimed to verify, for the safety-critical elements of the system:

- How necessary system and application engineering, and safety management activities are carried out.
- The techniques and processes being used, including an evaluation of their adequacy.
- The technical adequacy of the results of such processes and techniques.

Cross Acceptance

Cross acceptance activities have been carried out for the 2003 platform and the UNIVIC platform. No new cross-acceptance has been performed for this release.

Assessment Progress

Following the project kick-off meeting which took place in September 2006, twenty nine audits have been completed at Alstom premises. The last of these took place in November 2016.

Conclusions

Following the assessment activities carried out by the ISA, the main conclusion arising is that the ISA endorses use of the UEVOL ATC subsystem baseline 11.4.5.2 in revenue service operation in CBTC mode of operation, subject to the following conditions:

- All safety-related application conditions and restrictions in Alstom's ATC Safety case [18] including sections 4.5 and 6 are observed.
- Application projects should discuss all restrictions identified in section 6 of Alstom's ATC Safety case [18] with the UEVOL project team, to ensure that they are properly understood.
- The configuration and subdivision rules linked to ATC 12 and 13 are not assessed for the current baseline.
- With respect to the application conditions ([AC]'s) defined in section 6.1 of the safety case, the application condition defined for CR879944 takes precedence over that defined for CR882326 (i.e. projects shall not use the functions « PSD override » and « Automatic Evacuation » at the same time).
- By its generic nature, the UEVOL ATC sub-system can be deployed in a diverse range of operational configurations and scenarios. It is therefore an application project responsibility to ensure that sufficient analysis and testing of its application (with its specific data) have been conducted, in its representative environment. Such analysis and testing should also give specific consideration to any late design changes applied by the project to enable the system to meet its intended specific operational configuration and use.
- It should also be noted that the ISA has always indicated in the assessment reports that application projects must not wholly rely on testing at U400 level but must undertake their own tests, considering their particular data, configuration and operational use etc. We are aware that some application projects appear to consider that no project level functional testing is necessary for a safety purpose which, as stated earlier, is not a position supported by the ISA. The current approach to specification and validation of safety requirements by U400 further undermines the position of application projects.



- We also recommend that projects thoroughly test their ZC_ZC border functionalities, including consideration of all applicable degraded modes, to be satisfied that these borders have been implemented safely.
- We have previously noted that safety analyses in general have been updated such that safety requirements are identical to design requirements. This approach has meant that safety requirements can be changed even when there is no change to any safety issue, simply to maintain consistency when a functional requirement, which also serves as a safety requirement, changes.

The ISA's view is that such matching of safety requirements, word for word, to design requirements (even if a design requirement is much broader than the necessary safety requirement) is essentially a convenience to simplify validation of a safety requirement by "simply" relying on test coverage of design requirements to ensure test coverage of safety requirements. The ISA would normally expect safety requirements to include only what is necessary for safety. We would then expect the coverage of the safety requirements by test to be critically reviewed for completeness. We would expect succinct safety requirements to facilitate validators to more readily identify positive, negative and "break it" tests against such safety requirements.

These issues have been taken into account for the evolution from ATC 11.4.4.1 to ATC 11.4.5.2, resulting in the identification in a number of corrective actions that have been undertaken. However, the consideration was applied only to modified and new safety requirements. We note that the previous recommendation remains applicable to future baselines, and that consideration should be given to expanding this recommendation to include legacy requirements. The original recommendation raised by the ISA was to consider all safety requirements and it remains the view of the ISA that such consideration would be beneficial.

- We recommend that application projects activate the ghost recovery function. Should they choose not to do so they are entirely responsible for the associated risks.

We also note the following points:

- As some ATC level hazards are mitigated at system level, this ATC endorsement must be considered in conjunction with the corresponding system level assessment, which is that for baseline Reg 1.11.2.6-2.
- Projects are to rely on the Safety Case (UEVOL-0887-FS) and V&V Report (UEVOL-1171-ES) for the identification of project specific validation activities and not the VAT, which is incorrect.
- Projects should be aware of memo UEVOL-4158, concerning unexpected TSR removal, and whilst the original issue has been corrected on this release through the implementation of the CR atvcm01069656, projects should take into account the following mitigation to avoid potential safety issues associated with the non-education of ZC variables.
 - “First, restart all ZC on all projects with impacted BSL currently in operation (to ensure they do not have latent failure on some of their channels). The objective of this action is to ensure that any future ZC channel reboot will be the first one. It will then be possible to wait end of commercial service to apply the restriction.
 - Secondly, forbid single channel restart: if for any reason (channel failure, maintenance action, etc) a restart of one ZC Channel is needed, the whole ZC cubicle needs to be restarted instead.”

We note that Alstom has agreed to the following activities:

- Alstom have agreed to undertake a longer-term action to review the completeness of the scenarios in the AP SSS, progressively from the next release. We note that such revisions have taken place with each baseline evolution but that this activity remains ongoing.

With specific reference to the ATO subsystem, (CC-NV-ATO version 11.4.9), it has been subject to an independent review to establish the degree to which it complies with the development requirements of Safety Integrity Level (SIL) 2 as defined in CENELEC 50128 [2]. Subject to the scope noted in our assessment report, the conclusion of this assessment is that the ATO software is considered as compliant with the requirements of SIL 2, noting the following:

- The ATO-MSS interface is excluded from our ATO SIL2 demonstration assessment.



- An alternative approach has been proposed by Alstom for Software module testing and Software-Software module integration testing. Alstom has proposed that transparent traceability between software requirements and the software itself, demonstrating a one-to-one correspondence between:
 - each functional software requirement and a single code module.
 - each interface software requirement and a single module interface combined with complete coverage of requirements in testing, means that these activities are not necessary.
 This approach has been accepted by the ISA. However, corrective actions have also been identified by the ISA which need to be undertaken to provide the necessary level of traceability proposed; as there are no safety requirements implemented by the ATO software, these corrective actions are not considered to be a blocking issue.
- Clauses of CENELEC 50128 [2] relating specifically to the verification of safety requirements have not been addressed by Alstom, owing to the fact that the ATO software does not fulfil any safety requirements.
- All tools associated with the ATO, including NVESG, have been excluded from this assessment.
- We have not considered the appropriateness of the Coding Rules for use in a SIL2 application and assume that this has been assessed by Bureau Veritas in their previous assessment of Alstom's Modal safety process.
- The following actions are to be undertaken by Alstom for the next ATO baseline:
 - The demonstration of traceability between code and software requirements is to be improved so that such traceability is transparent in all cases.

It is Arthur D. Little's independent professional opinion that the UEVOL System as defined in [18] and subject to the issues identified in this report being addressed (as identified above):

- By design protects against a wrong side failure to deliver the functionality given in [19] commensurate with a safety integrity level of SIL4 (as defined in [3]) subject to compliance with the restrictions of use detailed in the corresponding Alstom safety case [18].
- Has software developed in compliance with the:
 - SIL4 requirements in CENELEC 50128 [2], with respect to the ATP.
- Shows that an appropriate level of compliance with the other CENELEC safety standards 50126 and 50129 [1], [3] has been achieved in accordance with the requirements for SIL4.

We confirm that we have considered all of the arguments presented in the corresponding safety case [18]. We support such arguments, subject to the open (but non-blocking) issues identified in our ISA Log of Findings [17] and issues lists [21]-[138].

It should be noted that Alstom have appointed:

- Altran (formerly known as Praxis High Integrity Systems) as independent safety assessor of the 2oo3platform upon which the ZC and LC subsystems are based.

Our opinion above is therefore based, in part, upon the independent professional opinion reached by Praxis concerning such platform. We have not performed independent safety assessment of such platform ourselves. Nevertheless, our assessment has considered Alstom's compliance with those restrictions raised by Praxis in their assessment report, as well as Alstom's compliance with those restrictions and safety-related application conditions contained within the platform safety case; it is our opinion that an appropriate level of compliance has been demonstrated.

I. Introduction

I.1 Background

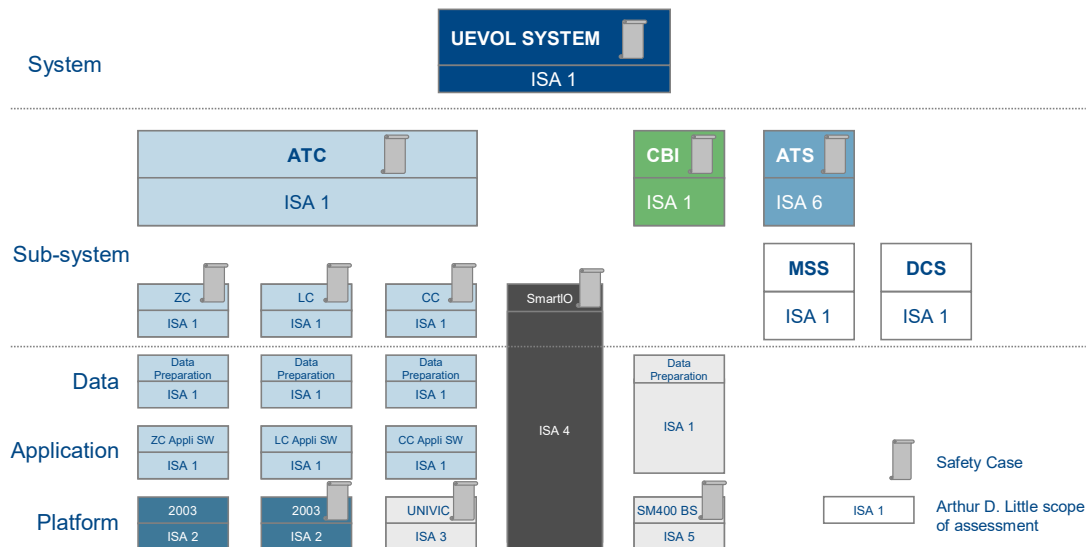
Alstom has redeveloped its Urbalis metro train command, control and protection system. The redevelopment covered all elements of this system, including ATC, ATS, system functions, DCS, interlocking and maintenance equipment. Key aims of the redevelopment were to provide a more competitive solution and to minimise application deployment costs. The project is known as Urbalis EVOLution (UEVOL) and more recently also as U400.

The UEVOL system is generic, and includes:

- A new automated data preparation process, involving two data preparation ‘channels’ to ensure adequate diversity.
- The ability for moving block operation.
- The facility for centralised architecture, reducing the amount of equipment needed.

Alstom has divided the ISA activity associated with this development into a series of packages, denoted ISA 1 to ISA 6 (see Figure I). The main work package, ISA 1, relates to the role of System ISA in combination with the assessment of the Automatic Train Control (ATC) system. Alstom has appointed Arthur D. Little as the ISA for this work package, which is subsequently referred to in this document as ISA 1.

Figure I: Scope of Independent Safety Assessments



Source: Alstom

This document is the ISA Report (ISAR) for the ATC sub-system (forming part of the scope of ISA 1). The assessment is based on ATC sub-system baseline 11.4.5.2 (as defined in the ATC sub-system safety case given in [18]). Full details of what has and has not been assessed as part of this baseline review are given in sections 4.3 and 4.4.



1.2 Aims of this ISA Summary Report

The aims of this summary report are to:

- Describe the independent safety assessment approach.
- Present the current status of the assessment.
- Identify key outstanding actions.
- Summarise the main findings of the assessment to date and detail how such findings have been addressed by Alstom.

1.3 Abbreviations

The following abbreviations are used within the report:

ADL	Arthur D. Little
AP	Automatic Protection
ATC	Automatic Train Control
ATO	Automatic Train Operation
ATP	Automatic Train Protection
ATS	Automatic Train Supervision
CBI	Computer Based Interlocking
CBTC	Communications Based Train Control
CC	Carborne Controller
DCC	Depot Control Centre
DCS	Data Communications System
DP	Data Preparation Engineer
DSU	Data Storage Unit
DV	Data Verification and Validation Engineer
EOA	End Of Authority
ERTMS	European Rail Traffic Management System
FMEA	Failure Mode and Effects Analysis
GfPD	Guidelines for Project Deployment
ISA	Independent Safety Assessment
ISAR	Independent Safety Assessment Report
IXL	Interlocking
LC	Line Controller
LEU	Line-side Electronic Unit
MSS	Maintenance Support System
OCC	Operating Control Centre
PSAM	Project Safety Assurance Manager
PSD	Platform Screen Doors
RTI	Real Time Issues
SAR	Safety Audit Report
SER	Signalling Equipment Room
SIL	Safety Integrity Level
SSS	Specific Safety Study
STDE	Secondary Train Detection Equipment
SwHA	Software Hazard Analysis
UEVOL	Urbalis Evolution
V&V	Validation and Verification
ZC	Zone Controller

2. Description of Signalling System

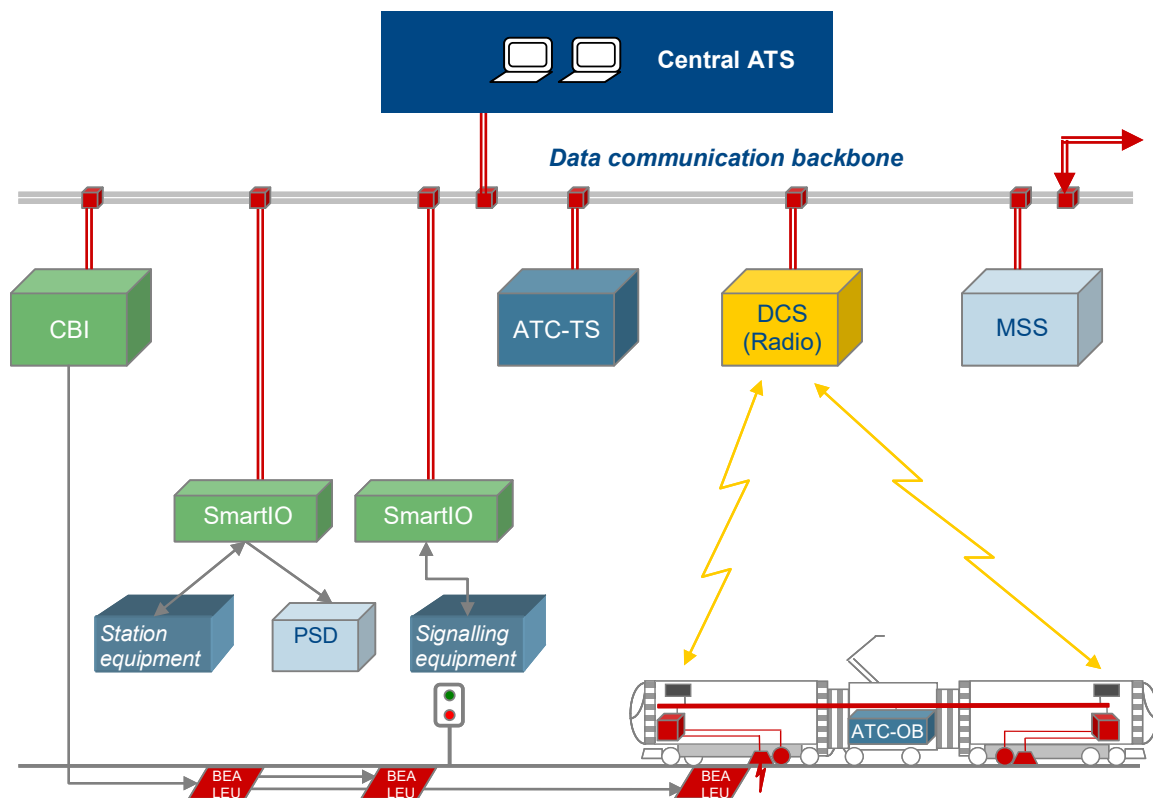
2.1 Overview

The UEVOL system is composed of the following sub-systems:

- Automatic Train Supervision (ATS).
- Computer Based Interlocking (CBI).
- Automatic Train Control (ATC).
- Data Communication System (DCS).
- Maintenance Support System (MSS).

A schematic of the system and sub-system architecture is shown in Figure 2 below.

Figure 2: Schematic of the Signalling System Architecture



Source: Alstom – UEVOL System SV&V Plan

The system is intended to operate using a centralised architecture, but can also operate using a distributed one if necessary. The main sub-systems are summarised below.

2.2 Subsystems

Automatic Train Supervision (ATS)

The ATS equipment is located in Operating Control Centres (OCC) or in Depot Control Centres (DCC) and is a centralised sub-system that ensures traffic supervision through management of the line and its resources. This includes route setting, managing timetables and providing train information to operators and passengers.



Computer Based Interlocking (CBI)

The CBI equipment is in localised Signalling Equipment Rooms (SER) and is also a centralised sub-system, controlling and commanding trackside equipment in accordance with the ATS route setting commands. The CBI communicates directly with the ATS and to the ATC, providing information such as traffic direction, position of points and signal status.

Automatic Train Control (ATC)

The ATC sub-system consists of trackside (TS) equipment located in Signalling Equipment Rooms (SERs) and of trainborne equipment. It determines the position of each train, ensures train protection and safe operation and consists of further sub-systems. The safety-critical (SIL4) ones are outlined below:

- *Zone Controller (ZC)*, responsible for monitoring train position, movement protection through providing trains with End Of Authority (EOA) movement limits, passenger and staff protection and communicating real time status of trackside signalling equipment (such as position of points, signal aspect etc.) to the trainborne equipment.
- *Line Controller (LC)*, delivering authorisation data, managing temporary speed restrictions, external interfaces and synchronisation with the ZC and CC.
- *Carborne Controller (CC)*, which operates trains according to run profiles, monitors train speed, energy and spacing and provides on-train protection through controlling train entry and departure at stations and operation of platform screen doors (PSD).

Data Communication System (DCS)

The DCS sub-system manages bi-directional communication between trackside and trainborne equipment. It consists of a communication backbone, which links together all trackside equipment, and also connects to radio units which then support trackside to trainborne communications. The DCS carries out no safety related functions and so is classified as SIL 0.

Maintenance Supervision System (MSS)

The MSS is a centralised sub-system located in an OCC or DCC, and manages maintenance of the system. It carries out no safety related functions and so is classified as SIL 0.



3. About Arthur D. Little

3.1 About Arthur D. Little

For over forty years, Arthur D. Little has been a world-leader in safety and risk management consulting. Most noteworthy is the fact that our professional staff that are responsible for key conceptual in-roads in the fields of safety and risk management, pride themselves in a practical hands-on approach.

Specific attributes that make us uniquely qualified to undertake this assignment are detailed below:

- **Working relationship with Alstom.** We have developed a close working relationship with Alstom. In particular, we are currently acting as the independent safety assessor for the GATC system and the SBB SA-NBS application. We are therefore familiar with Alstom's design, development and safety management approaches, avoiding any "learning curve". Alstom are also familiar with our ISA approach.
- **Reputation.** We have an established reputation in safety work, with particular strengths in systems for rail application. We have undertaken assignments for railway operators throughout the world, including most of those in Europe.
- **Established approach.** Arthur D. Little has a well-established approach to conducting ISA work in the railway industry. We have developed much of the original methodology and techniques now used in such work.
- **Open and pragmatic assessment.** We offer an open and pragmatic approach to Independent Safety Assessment. Our open approach better ensures that all key safety risks are identified and addressed. We also add value to our clients by providing a pragmatic assessment that avoids unnecessarily rigid adherence to industry standards where alternative approaches are equally effective.
- **Balance of independent assessment and guidance.** We ensure that the value of an ISA is maximised by providing an appropriate balance of independence and guidance in addressing safety requirements, based upon good practice.
- **A wealth of previous experience.** We can bring significant additional value through our experience gained from many other recent assignments with railways and other clients. These include:
 - ISA since 1991 for the following Hong Kong MTRC signalling projects:
 - LAR
 - ATCR
 - driverless turnaround
 - QBR
 - TKE
 - 4-tracking
 - Penny's bay
 - ISA for Hong Kong KCRC signalling and ATP replacement projects.
 - ISA for the Delhi Metro signalling system.
 - Assisting many signalling suppliers with the identification and development of solutions to address the requirements of the latest system development standards.
 - Advising Railtrack on a more business-focused approach to the use of ISAs.
 - Assisting Railtrack's strategic resignalling project teams with the approval of existing technologies for use in the UK.
 - ISA to SNCB on TBL 2/3 system to be supplied for L96N.
 - ISA for Alstom on generic ERTMS system and SBB SA-NBS application.
- **Continuity of team members.** Arthur D. Little is committed to providing continuity of our team members throughout each ISA assignment. This enables us to:
 - Develop and maintain our own understanding of the system under development, in the most cost-effective manner.
 - Build a shared vision and a long-term relationship with our clients.



3.2 ISA Experience

Arthur D. Little has over 15 years' experience in independent safety assessment of signalling systems, and did much of the early work in this field. We still maintain most of the team of people who have done this work. We believe that the experience of the company and of the staff carrying out ISA reviews demonstrate our strong ability to deliver effective ISA services.

See Table 1 and Table 2 below for a list of the ISA work and similar projects that the company has carried out on signalling systems.

Table 1: Completed Projects

Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Westinghouse FS2000 ATP	MTRC/LUL. (ATCR project and Central line project)	6 person-week on site pre-tender safety audit	1992	1.5
	MTRC/LUL. (ATCR project and Central line project)	Detailed 8 person-week on site hazard analysis	1992	2
	MTRC. (ATCR project)	Study of safety implications of adapting the system to the MTRC railway	1992	2
	KCRC. ATP project	Study of safety implications of adapting the system to the KCRC railway	1994	1
	LUL. Central line	Assessment against Interim Def-Stan 00-55	1993	2
Westinghouse Westrace Interlocking	LUL. Central Line project	6 person-week on site safety audit	1993	1.5
	LUL. Central Line	Two projects, each 2-3 person weeks on site follow-up audits, including assessments against RIA 23 and Cenelec EN 50126/8/9	1994	1.5
Westinghouse Fixed block brake assured version of transmission based ATP system	MTRC. ATCR project	6 person-week on site pre-tender safety audit	1993	1.5
	MTRC. ATCR	Study of safety implications of adapting the system to the MTRC railway	1993	1
SEL Alcatel (Canada) SELTRAC ATP and interlocking	MTRC/LUL. (ATCR project and Docklands project)	6 person-week on site pre-tender safety audit	1992	1.5
	MTRCL. Penny Bay Line	ISA for the signalling system for the new Penny Bay Line	2003-2005	12
SEL Alcatel (Germany) LZB ATP	KCRC. ATP project	6 person-week on site pre-tender safety audit	1994	1.5



Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Alstom SACEM ATP	MTRC/LUL. ATRC project	6 person-week on site pre-tender safety audit	1992	1.5
	MTRC. ATRC project	Study of safety implications of adapting the system to the MTRC railway	1992	1
	KCRC. ATP project	Study of safety implications of adapting the system to the KCRC railway	1994	1
	MTRC. ATRC project	Independent safety assessor on the contract to re-signal the existing lines	1994-1999	22
	MTRC. Lantau and Airport Railway	Independent safety assessor on the contract for the signalling of the new railway	1995-1998	9
	MTRCL. YAM O station	ISA for the new YAM O signalling system	2003-2005	5
Alstom SSI interlocking	MTRC. Lantau and Airport Railway	Independent safety assessor on the contract for the signalling of the new railway	1995-1998	5.5
	KCRC. ATP project	Independent safety assessor on the contract for the re-signalling of the existing railway	1995-1999	7
Alstom TBL ATP	KCRC. ATP project	6 person-week on site pre-tender safety audit	1994	1.5
	KCRC. ATP project	Study of safety implications of adapting the system to the new railway	1994	1
	KCRC. ATP project	Independent safety assessor on the contract for the re-signalling of the existing railway	1995-1998	11
Siemens/Matra LZB 700	MTRC/LUL. ATRC project	Full 6 person-week on site pre-tender safety audit	1992	1.5
	MTRC. ATRC project	Study of safety implications of adapting the system to the existing railway	1992	1
Various systems	Siemens/Matra	Independent assessment of the rail signalling technology of each partner as part of the joint venture due diligence	1995	1
Ansaldo Fail-safe microcomputer ATP systems	LUL. No project	3 person-week on site safety audit of existing systems	1994	.75
Proposed system for the TAV lines	TAV (Italy)	Technical risk assessment of the development and installation of the systems involved	1994	6
Interlocking	Railtrack. Manchester south re-signalling	Brief review into the safety of mainline interlocking systems	1997	0.25



Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
CSEE TVM 430 ATP	KCRC. ATP project	3 person-week on site pre-tender safety audit	1994	0.75
	KCRC. ATP project	Study of safety implications of adapting the system to the railway	1994	1
Other items	Railtrack. Nuneaton-Peterborough project	Study into the safety of a number of items of French signalling equipment (track circuits, point machines, etc.)	1998	2
	Railtrack. Nuneaton-Peterborough project	On-going assistance with gaining approval of French signalling equipment	1998-2000	2
Union Switch and Signal Microlok II	Railtrack. Nuneaton-Peterborough project	3 person-week safety review of Microlok II interlocking	1998	0.75
	Railtrack. Nuneaton-Peterborough project	On-going assistance with gaining approval of Microlok I	1998-2000	2
GETS VHLC interlocking	Railtrack. Norwich-Cromer project	2 person week safety review of VHLC interlocking	1998	0.5
GETS HXP-3 level crossing controller	Railtrack. Norwich-Cromer project	2 person week safety review of the HXP-3 level crossing predictor	1998	0.5
GRS Transport Management System for Control Room	KCRC. ATP project	On-going assessment as part of independent safety assessor activity (see Alstom TBL)	1995-1998	2
Westinghouse Westrace Interlocking	Iarnrod Eireann. HACM project	Independent safety assessor on the re-signalling project	2000-2001	1
Alstom SACEM	MTRC. Driverless Turnaround modification to the ATCR system	Independent safety assessor for modification to system	1999-2001	4.5
Alstom TBL2/3	SNCB. L96N project	Independent safety assessor on the L96N project	2000-2001	7.5
GETS VHLC interlocking	Railtrack. Norwich-Cromer project	On-going assistance with gaining approval of VHLC interlocking	1998-2001	6
GETS HXP-3	Railtrack. Norwich-Cromer project	On-going assistance with gaining approval of HXP-3	1998-2001	6
Bombardier	SBB. ERTMS pilot line	Independent project reviewer of the Swiss ERTMS level 2 pilot line	2001-2002	3
Alstom Tilt authorisation and speed supervision (TASS)	Railtrack/Virgin. TASS project	Independent project reviewer of the West Coast Main Line TASS system	2000-2003	6.5
Siemens Sacem ATP and Sicas Interlocking	MTRC. Tsueng Kwan O line	Independent safety assessor on the contract for the Tsueng Kwan O line	1999-2003	17.5
Alstom, Sacem	MTRC. 4 tracking project on LAR	ISA for 4-tracking of the LAR line	2001-2003	5
Westinghouse, new Interlocking	Next generation SSI	Independent project reviewer of the development	2002-2003	2.5



Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Alstom, Sacem ATP and ASCV interlocking	Delhi Metro	ISA for the new signalling system for the metro and rail lines of the Delhi Metro systems	2002-2006	25
Alstom, TBL ATP and SSI interlocking	KCRC. East Rail extension	ISA for the upgrade to the East Rail signalling system	2002-2003	10
Alstom ERTMS	Alstom, Belgium, Swiss ERTMS system	Independent safety assessor on the Swiss application of the ERTMS project	2003 – 2007	10
Alstom ERTMS	Alstom. Betuwe Route	New freight line linking Rotterdam with Germany	2002-2007	5
Siemens Sirius	Singapore DTL Assessment	Assessment of application engineering for Down Town Line development in Singapore	2009-2013	10
Alstom U400	Amsterdam Metro assessment	Assessment of the application of Alstom's U400 CBTC system on the five lines of Amsterdam metro	2014-19	5

Table 2: On-going Projects

Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months to be Deployed
Alstom ERTMS	Alstom, Belgium, Swiss ERTMS system	Independent safety assessor on the Swiss application of the ERTMS project	2003 – 2020	10
	GATC	Independent safety assessor of Alstom's development of the EVC and RBC ERTMS products	2000 – 2020	28
Alstom U400	Generic UEVOL assessment	Assessment of Alstom's Urbalis Evolution metro CBTC system	2006-2020	14
Siemens LZB 700M	Assessment of Signalling and PSD system for Chennai Metro Rail Limited	Assessment of development, application engineering and IT&C associated with the signalling and PSD system to be supplied for the first three stages of the metro in development in Chennai	2012-2020	12

4. ISA Objectives and Scope

4.1 ISA Objectives

The ISA is responsible for assisting Alstom in safe delivery of the UEVOL signalling system, by carrying out independent safety reviews and audits throughout the project.

4.2 Relationship with Third Party Assessments

Table 3 details:

- Those applications and product safety cases that are in the scope of our assessment (ISA 1).
- Those third party independent safety assessments relevant to such scope and which are relevant to the ATC sub-system.

Table 3: Relationship between ISA1 and Third Party Assessments

Safety Case	Independent Safety Assessor
ATC Safety Case, including: ■ ZC Safety Case ■ LC Safety Case ■ CC Safety Case	ISA 1
2003 Platform Safety Case	ISA 2
UNIVIC ATC Safety Case	ISA 3

Cross-acceptance activities to date have been limited to the 2003 platform. However, as the UEVOL ISA 1 is also the ISA for the UNIVIC platform, this platform has also in effect been cross-accepted, as no additional assessment by the UEVOL ISA 1 has been needed.

We fully support the principle of cross-acceptance and the need to avoid unnecessary duplication or repetition of independent safety assessment effort. We have not therefore sought to repeat any of the assessment activities undertaken by the other ISAs involved. We have, however, sought to fully understand:

- The scope of the assessments undertaken by such parties.
- The extent of completion of their assessments and any restrictions that such parties may have placed on the scope of any safety case endorsements that they have provided.

It should be noted, however, that we have assumed that Alstom have satisfied themselves as to the competency of the third-party organisations undertaking the assessments concerned. Our assessment scope has made little provision for review of the adequacy of those product assessments undertaken by third parties and we cannot therefore accept any liability associated with any potential deficiencies that may exist within such assessments.

4.3 Scope of Our Assessment

The scope of the work undertaken by the UEVOL ISA 1 in respect of the ATC sub-system has been to review the development of this sub-system in order to determine whether it is appropriate for revenue service. The assessment assumes that all restrictions given in the ATC sub-system safety case are fulfilled. The current assessment is based on a review of ATC baseline 11.4.5.2.



In carrying out the above scope of work, the following activities have been undertaken:

- Review and cross acceptance of safety certificates and SARs for the:
 - ZC platform (2003)
 - LC platform (2003)
 - CC platform (Univac)
- Independent safety assessment in accordance with the standards specified in section 5.10 on:
 - All aspects of the ATC software development.
 - Automatic Train Operation (Alstom have defined this as a SIL-2 sub-system, though it is noted that it does not contain or fulfil any safety requirements).
 - ATC data preparation process and the associated tools used in this process.
 - DSU and DMI, noting that these elements are not expected to have any safety requirements.
 - The safety-related application conditions exported by the other platforms (noted above) and checking that they are respected.
 - The exporting of the necessary safety-related application conditions to system level.
- Assessment of all stages of the associated generic project development including:
 - Specifications, design, software development and the data preparation process.
 - The associated verification and validation at subsystem level, where the sub-systems are the ATC, ZC, LC and CC (in other words, the verification and validation that is associated with integration of sub-systems).

This assessment is limited to consideration of a generic product, therefore review of installation, testing and commissioning beyond its planning is not included in the scope of work.

Assessment has been carried out using the approach summarised below:

- *Offsite Document Review:* Review of key Alstom deliverables relating to the subsystems' development, undertaken at our offices in Cambridge. While many documents have been reviewed in this way, key aspects of off-site review have been the examination of:
 - *Safety Analyses and Studies* – those produced by Alstom in the course of the UEVOL ATC sub-system development have been reviewed in detail.
 - *Review of ATC Sub-system Safety Case* – the ISA has commented on the associated ATC sub-system safety case [18].
- *ISA Audits* – carrying out audits of Alstom's engineering and safety management processes for design, development and testing of the software and data preparation. These are undertaken on-site at Alstom premises and aim to assess the adequacy of and verify the extent to which Alstom is complying with:
 - The sub-system requirements, including comments on the adequacy of any alternative approaches proposed by Alstom.
 - Processes for specification and design, integration, validation, and testing.
 - Processes for data preparation.
 - Processes for safety management and delivery of safety cases.
 - Relevant parts of key external safety standards and "good management practice".
- *Project Management, Liaison and Reporting.* Management of all UEVOL ISA I audits and other activities, including preparation of the following reports:
 - Safety Audit Reports: detailing the results of each audit visit.
 - ISA Project Management and Safety Audit Plan.
 - Regular progress reports.
 - Technical coordination meeting minutes.
 - Independent Safety Assessment Reports (ISARs) supporting each safety case.

The scope of work also includes other communication, liaison and management activities as required, and ensuring that adequate resources and competent staff are assigned to all of the above activities. The ISA scope is limited to system safety only and does not include occupational health and safety issues.



4.4 Areas Excluded from this Report

The list of all items that are excluded from assessment in this report is given below:

- Use of the Lineside Electronic Unit (which relates to the 888 system baseline only).
- Test and commissioning procedures (such procedures are to be considered as part of the ISAs system-level review activities).
- The correctness and completeness of the ADDP (Adapt Design Deployment Procedure) has not been considered in this assessment.

5. Overview of the ISA Approach and Programme

This section details the ISA's key activities and approaches for carrying out the work.

5.1 General Approach

Our approach has been based on what we consider to be an appropriate balance of off-site document review and on-site audit visits. Audit visits are a key aspect of our assessment, providing us with an opportunity to understand the expertise of the development team and to identify the real processes being applied (not necessarily exactly those that may be formally documented). We believe that this also provides a more efficient means to discuss potential concerns that we have; it often allows issues to be satisfactorily resolved between us, without the need to raise formal findings (avoiding the consequent effort involved by both parties to formally document the response to, and closure of, such findings). For this reason we have not generally provided formal comments on documents initially reviewed off-site. Rather, we have discussed these documents first during the audit visits and raised formal findings as necessary.

Through our work we have assessed:

- How all essential development is carried out, including design, coding, testing, verification and validation.
- What techniques are used, including evaluation of their adequacy and how they respond to the standards.
- The compliance of Alstom with their own proposed procedures and techniques.
- The adequacy of the documentation of the results of Alstom's work from the point of view of traceability and assurance.

Key issues considered include:

- The architectural safety analysis.
- The sufficiency of the arguments for the SIL0 status of subsystems, modules and sub-assemblies.
- Demonstration of the appropriate integrity of the data preparation processes and, in connection with this, the demonstration of the appropriate integrity for those tools used in data preparation.
- Adequate demonstration that the generic development process supports the level of on-site testing that will follow for subsequent applications.

5.2 Launch Meeting

The launch (kick-off) meeting took place on 13–14 September 2006 at Alstom's premises in Saint Ouen. The results of the meeting are documented in the minutes dated 28 September 2006 [20].

5.3 Document Reviews

This activity was undertaken prior to each audit visit and included detailed review of key procedures, the results of their application and safety analyses.

5.4 ISA Audits

ISA audits have been undertaken according to the ISA's general methodology for safety audits (Attachment I in ISA Project Management and Safety Audit Plan [6]). The aims of the ISA audits have been to:

- Understand the technical and managerial measures taken by Alstom to ensure the safety of the system.
- Review the results of Alstom's activities, including their technical adequacy.
- Assess and verify any weaknesses or areas of non-compliance.
- Develop general recommendations for remedial action.



For each audit an audit protocol has been prepared and an audit plan submitted. Following the audit at Alstom's offices a Safety Audit Report (SAR) has been prepared, although in some cases the reports from several audits have been presented together. The programme of audits is given in Annex A.

In common with all audit methodologies, sampling techniques have been used to make assessments and verify evidence; we have not reviewed 100% of all safety-related documentation.

The audits have recorded findings based on the ISA's judgment of good safety management practice. Each audit has been conducted by a team of three people, ensuring completeness by allowing the team to verify that the understanding gained is complete and justifiable. At the end of each audit we have briefed Alstom on the results and our recommendations whilst still on-site. Any remarks made by Alstom at this time have been taken into account prior to preparation of the relevant SAR.

5.5 Audit Reports

Following each audit visit a Safety Audit Report (SAR) has been prepared² [7]-[16]. These briefly describe the work undertaken, understanding gained and any findings or remarks on the documents reviewed.

5.6 Log of ISA Findings

It is important that an accurate log of all ISA findings and their current status is maintained. In the past, the Findings Log has formed the central mechanism for the management of ISA findings, and the most up-to-date release is Version 5.3 [17]. The Findings Log provides:

- Details of the original finding and ISA recommendation.
- Actions taken to address the recommendation, with cross-references to relevant documentation.
- The current status of the finding.
- Dates of relevant actions concerning the finding.

However, for expediency, ISA findings have for some time now been managed using issues lists. For the current baseline (ATC 11.4.5.2) the applicable documents are P20001408/012[139], P20001408/011[140], P20001408/021[141].

5.7 ATC Independent Safety Assessment Report (ISAR)

An Independent Safety Assessment Report (ISAR) is provided to give a summary of the assessment position at key stages in the project. This document collates and summarises the findings of relevant audits, comments on the safety case and identifies those findings that block the application of the safety case (i.e. those that we consider so important that we cannot agree to the use of the system before their closure), if any. The report also provides our assessment of the adequacy of the overall development highlighting the strengths as well as the weaknesses. Separate ISARs are developed for the UEVOL System and each Subsystem. This document is the ATC ISAR.

5.8 ISA Project Management and Safety Audit Plan

The ISA has developed and updated an ISA Project Management and Safety Audit Plan. Following the first audit, the Project Management and Safety Audit Plan was updated to include a detailed work schedule – the latest issue at the time of writing this report is version 1.1 [6]. The Project Management and Safety Audit Plan will be updated as required throughout the project.

² No reports have been produced for audits 11 to 28. Results from each of these audits were incorporated into the relevant ISARs and individual audit reports were not seen to provide any additional benefit.



For the most recent phase of the assessment that has been undertaken (October – November 2020), the work carried out is described in Arthur D. Little proposal reference Alstom P20001408/009prp, dated September 2020. This work was carried out in accordance with the processes described in the ISA Project Management and Safety Audit Plan.

5.9 ATC Safety Case

The ATC Safety Case [18] has been assessed by the ISA. All comments made in this report are on the understanding that restrictions in the ATC Safety Case and the associated Safety Related Application Constraints (SRACs) will be fulfilled i.e. those identified in sections 4.5 and 6.

5.10 ISA Organisation

Project and ISA / Authority, Lead Assessor

The Lead Assessor with responsibility for managing the project continues to be David Boulton.

Audit Team Leader

The Lead Assessor acts as Audit Team Leader on the audits and has responsibility for planning and resourcing each audit, leading the conduct of the audit on-site and for preparing Safety Audit Reports.

ISA Auditors

The Audit Team Leader was supported by ISA auditors from Arthur D. Little as appropriate:

- Wenwen Li, Arthur D. Little (Manager)
- Clive Adams, Arthur D. Little (Associate Director)
- François Kassel, Arthur D. Little (Consultant)
- Ben Hansen, Arthur D. Little (Analyst)

Administration

The ISA work is managed from Arthur D. Little's Cambridge, UK offices. The ISA Project Manager is assisted in administration by a Project Secretary, who maintains filing and document registration systems.

5.11 Applicable Standards

The relevant standards (with version details) are as follows:

- [EN 50126] Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS), 1999.
- [EN 50128] Railway applications – Communications, signalling and processing systems – Software for railway control and protections systems, 2011.
- [EN 50129] Railway applications – Communication, signalling and processing systems – Safety related electronic systems for signalling, 2003.
- [EN 50159-1] Railways applications – Communication, signalling and processing systems, Part 1: Safety related communication in closed transmission systems, 2001.
- [EN 50159-2] Railways applications – Communication, signalling and processing systems, Part 2: Safety related communication in open transmission systems, 2001.
- [Yellow Book 3] Application Note 4 – Independent Safety Assessment, Issue 1.0.

6. Summary of ISA Audits

The following section summarises the key conclusions of each ISA audit visit completed as part of Phases A, B, C and after. The following table summarises the audits undertaken in these phases.

Table 4: Summary of Phase A, B, C and Post-C ISA Activities

Phase	Activity	Date	Days/Staffing
A	Launch meeting	13–14/09/06	2 days, 1 staff
	Process definition audit (3 days Saint Ouen, 2 days Meudon)	08–12/01/07	5 days, 3 staff
B	Specification and design audit – Software	06–08/03/07 (Meudon)	3 days, 3 staff
	Specification and design audit – System	21–23/03/07 (Saint Ouen)	3 days, 3 staff
C	Specification and design audit – Software	4–6/07/07 (Meudon)	3 days, 3 staff
	Specification and design audit – System	11–12/9/07 (Saint Ouen)	2 days, 2 staff
	Specification and design audit – Software	19–21/9/07 (Meudon)	3 days, 2 staff
	Specification and design audit – System	17–19/10/07 (Saint Ouen)	3 days, 2 staff
	Design and verification audit – Software	19–20/11/07 (Meudon)	2 days, 3 people
	Design and verification audit – System	28–30/11/08 (Saint Ouen)	3 days, 3 people
	Design and verification audit – Software	6–8/2/08 (Meudon)	3 days, 2 people
	Design and verification audit – Software	15–17/7/08 (Meudon)	3 days, 3 people
	Design and verification audit – System	22–24/7/08 (Saint Ouen)	3 days, 3 people
Post C	Specification, design and verification audit – System and ATC	27–29/5/09 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	8–10/6/09 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	12–14/8/09 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	8–10/9/09 (Saint Ouen)	3 days, 2 people
Baseln 1.6.2–2	CBI and System audit	5–6/5/10 (Saint Ouen)	2 days (1 day 2 people, 1 day 3 people)
Baseln 1.6.6	Main focus on 1.6.6 but consideration of 1.6.2 residual issues	12–15/7/10 (Saint Ouen)	3 days, 3 people
ATC 5.1.1–3	Specification, design and verification audit – ATC	8–10/11/10 (Saint Ouen)	3 days, 3 people
ATC 7.1.1–2	Specification, design and verification audit – ATC	10–11/3/11 (Saint Ouen)	2 days, 3 people
Clasico + ATC 722-14, System 166-22	Specification, design and verification audit – System and ATC	29/2/12 – 2/3/12 (Saint Ouen)	3 days, 3 people
Clasico	Specification, design and verification audit – ATC and CBI	21–23/3/12 (Saint Ouen)	3 days, 3 people
Clasico	Specification, design and verification audit – ATC and CBI	14/6/12 (Saint Ouen)	1 day, 2 people
CBI Reg 6.1.X, ATC 10.2.3.2	Specification, design and verification audit – ATC and CBI	22–23/10/12 (Saint Ouen)	2 days, 2 people



Phase	Activity	Date	Days/Staffing
Clasico	Specification, design and verification audit – System and CBI	16-17/4/13	2 days, 2 people
Regular	Specification, design and verification audit – System and CBI	17-18/12/2013	2 days, 2 people
Regular	Specification, design and verification audit – CBI and ATC	15-16/05/2014	2 days, 2 people
Regular	Specification, design and verification audit – ATC	16-18/06/2015	3 days, 3 people

The key personnel interviewed and documents considered or reviewed in each audit are summarised in Annex B.

6.1 First Audit, January 2007

The main conclusion arising from the Phase A process definition audit was that Alstom is using a competent, experienced team that is undertaking work in a controlled manner.

The main areas of concern raised during the audit were:

- It was unclear whether there was sufficient validation, for a SIL 4 process, of CBI data in the data preparation process.
- It was unclear if there was sufficient end-to-end validation, for a SIL 4 process, of the ATC data preparation process.

6.2 Second Audit, March 2007

The main conclusion of the second audit, held in the Alstom offices in Meudon, was that Alstom has a team with appropriate expertise and competence in place for the development of the UEVOL application software and that the development work was being supported by appropriate safety analysis.

The main concerns raised during the audit were:

- The timescales of the project were having an impact on the development leading to a concern with respect to concurrent development activities. There was insufficient evidence of additional controls being put in place or of a reconciliation activity being planned in order to manage the extra complexity that arises from such a development approach.
- The traceability verification between software and sub-system level requirements appeared incomplete since child requirements did not always match the corresponding parent requirement, and vice versa.

6.3 Third Audit, March 2007

The conclusion from the third audit, held in Alstom offices in Saint Ouen, was that Alstom was using a competent and experienced team to undertake UEVOL system development and that this development work was being supported by appropriate safety analyses.

The main concern was of the analysis and corresponding safety requirements in the PHA that related to the odometry behaviour, especially in the detection of slip/slide.

6.4 Fourth Audit, July 2007

A significant number of findings arose in this audit, held in Meudon, the majority of which were classified as 'A'. These findings raised a concern in respect of delivering UEVOL in time for commencement of revenue service in December 2007. Other specific concerns raised included:

- A lack of a well-defined set of operating principles for UEVOL, concerning both block mode and CBTC.
- The mismatch in ATP specifications between sub-system level and software level, where there appeared to be significant areas that did not agree.
- Lack of a clear strategy for achieving delivery for revenue service.

6.5 Fifth Audit, September 2007

The report from the fifth audit was combined with that from audit six, given the closeness in dates of the two. Please see the section below for a summary of the corresponding audit results.

6.6 Sixth Audit, September 2007

The main conclusion arising from audits five and six, looking at both system and subsystem issues, was that significant corrective actions were still required from Alstom in order to address outstanding findings. The feasibility of addressing necessary outstanding findings in time for the proposed commencement of revenue service also remained a concern. The most important outstanding issues were:

- The mismatch in ATP specifications between sub-system level and software level, where there appeared to be significant areas that did not agree.
- The lack of completeness of two-way requirements traceability between sub-system and software level specifications respectively.
- Requirements that were still untagged preventing the effective resolution of traceability issues.
- As a result of the above points, an overall concern regarding the specification and consistency of the principles to be used for block mode and CBTC operation.

6.7 Seventh Audit, October 2007

The main conclusion arising from this system level audit was similar to the previous audit, in that a significant amount of work remained to be completed in advance of the December 2007 commissioning to address ISA findings and to complete development activities.

The area where the most significant amount of work was needed was still the specifications and in particular the link between sub-system and software level specifications.

6.8 Eighth Audit, November 2007

This audit considered subsystem issues only. Alstom staff were unavailable to support a system level audit. From this point on, the assessor was no longer considering the state of preparedness for the block mode commissioning in December 2007 but only the CBTC mode commissioning scheduled for February 2008. However, this change in consideration did not change the overall conclusion of the audit, which remained that a significant amount of work remained to be completed in advance of CBTC commissioning to address ISA findings and to complete development activities. The specific areas of concern had also not changed.



6.9 Ninth Audit, January 2008

The main conclusion arising from this audit, held in Saint Ouen, was that evidence was available that at system level, work was proceeding to address outstanding ISA findings. However, most of the major findings remained open. The reconciliation between subsystem and software level requirements specifications for the CC was underway in order to resolve the current lack of traceability between these levels. The ISA noted it would be necessary to review progress in more detail at the software level before concluding on the overall position with respect to UEVOL development.

6.10 Tenth Audit, February 2008

By the time this audit took place, the commissioning date for CBTC mode had moved to April 2008. The main conclusion arising from this subsystem level audit was that significant work still remained outstanding prior to commencement of CBTC revenue service and it was not clear how all necessary work would be completed by this date. Key concerns related to incomplete specification development and associated reconciliation and the need then to have a robust set of safety analyses to support final functionality.

It is further noted by the ISA that ATC subsystem software development activities were dependent on specification and analysis work at system level. At that time such system level activities remained incomplete.

6.11 Eleventh Audit, July 2008

By the time of this this system level audit, the commissioning date for CBTC mode had moved to July 2008. The main conclusion arising from this audit was that significant work still remained outstanding prior to commencement of CBTC revenue service. Progress had been made, particularly in the key area of specification completion and reconciliation, but this and many other areas still required work to close issues.

6.12 Twelfth Audit, July 2008

The main conclusion arising from this subsystem level audit was that significant work still remained outstanding prior to commencement of CBTC revenue service, reinforcing the results of the recent audit 11.

6.13 Thirteenth Audit, May 2009

The main conclusion arising from this audit was that significant work remained to be completed in order to demonstrate an appropriate level of safety prior to the Milano commissioning, scheduled for autumn 2009.

6.14 Fourteenth Audit, June 2009

The results of the fourteenth audit further reinforced the conclusions of audit thirteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to commissioning in Milano.

6.15 Fifteenth Audit, June 2009

The results of the fourteenth audit further reinforced the conclusions of audit fourteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to the requested endorsement date of mid-October 2009.

6.16 Sixteenth Audit, September 2009

The results of the sixteenth audit were the same as those of audit fifteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to the requested endorsement date of mid-October 2009.



6.17 Seventeenth Audit, May 2010

This audit focused mainly on CBI related matters and some system level issues as part of the assessment of baseline 1.6.2-2. Progress was made with respect to addressing issues preventing a generic endorsement and also with including the CBI subsystem within the endorsement. Further progress was needed to reach a point where endorsement could be provided but no major obstacles were identified.

6.18 Eighteenth Audit, July 2010

This audit addressed the assessment of baseline 1.6.6 but residual points regarding baseline 1.6.2 were also considered. In particular, the latent error discovered in relation to VESG and the calculation of compensated gradients was discussed. Agreement was reached on the actions needed for all open points.

6.19 Nineteenth Audit, November 2010

This audit addressed the assessment of ATC 5.1.1-3. The main purpose of the audit was to complete assessment of the principal documents of the baseline, which was largely achieved although several documents were still to be reviewed by the end of the audit. A number of queries remained at the end of the audit although none of these was considered to be likely to affect the target endorsement date of 19 November 2010. Agreement was reached on the actions needed for all open points. Subsequent to the audit all documents were reviewed and all necessary actions completed by Alstom.

6.20 Twentieth Audit, March 2011

This audit addressed the assessment of ATC baseline 7.1.1-2 but considered only the modifications to the CC. The audit was of two days duration and the majority of the corresponding documentation had been reviewed in advance of the audit. All significant issues were closed out in the course of the audit enabling the operation of the CC in block mode to be endorsed shortly after the end of the audit.

6.21 Twenty First Audit, February/March 2012

The main purpose of this audit was to review ATC issues relating to the Clasico baseline 9.2.1.2. By the end of the audit, many of the functional modifications associated with the Clasico baseline were understood by the ISA although as there were documents still to review, it was not possible to draw any firm conclusions in respect of this baseline.

One day was spent looking at system baseline 1.6.6-22 and the matching ATC baseline 7.2.2.14. Preliminary review of documentation was undertaken and an overview of the functional changes was provided by Alstom. Again, by the end of the day, given the documents still to be reviewed it was not possible to reach any firm conclusions in respect of this baseline. However, during the subsequent assessment all issues were resolved.

6.22 Twenty Second Audit, March 2012

This audit considered ATC 9.2.1.2 and Clasico CBI 1.2.3. Significant progress with open issues was made during the audit. Following the audit, with respect to ATC, review of all necessary documents was completed as were all the associated actions Alstom was required to complete.

6.23 Twenty Third Audit, March 2012

This audit considered Clasico CBI baseline 1.2.4. The changes involved in this baseline were discussed and the documents that could only be reviewed on site were also examined by the ISA.



6.24 Twenty Fourth Audit, October 2012

This audit considered ATC 10.2.3.2 and Clasico CBI 6.1.2. CBI documents that need to be examined at Alstom's offices were reviewed. Significant progress with reviewing the CBI baseline was made and some aspects of the ATC baseline were considered too.

6.25 Twenty Fifth Audit, April 2013

This audit considered Clasico CBI 1.3.3 and Clasico system 1.2.2. The changes involved in these baselines were discussed and all CBI documents that require to be examined at Alstom's office were reviewed.

6.26 Twenty Sixth Audit, December 2013

This audit concentrated mainly on CBI baseline 7.3.1, leading on to the assessment of 7.3.2, which was a minor evolution of this earlier baseline. In particular, documentation available only on site at Saint Ouen was examined (ticked control tables and principles, as well as the principles themselves). Time was also spent looking at the remaining issues on system baseline 1.10.1.15, which were successfully resolved.

6.27 Twenty Seventh Audit, May 2014

This audit also concentrated mainly on CBI issues, looking at baseline 8.1. In particular, documentation available only on site at Saint Ouen was examined (ticked control tables and principles, as well as the principles themselves). Time was also spent looking at the remaining issues on system baseline 9.3.6.2, which were successfully resolved.

6.28 Twenty Eighth Audit, June 2015

The main purpose of this audit was to review ATC issues relating to the Regular baseline 11.3.X. By the end of the audit, many of the functional modifications associated with the baseline were understood by the ISA although as there were documents still to review, it was not possible to draw any firm conclusions in respect of this baseline. One day was also spent reviewing the ATO with a view of understanding how well its development aligned with the requirements of SIL 2. Some corresponding issues were raised for Alstom's attention.

6.29 Twenty Ninth Audit, November 2016

This audit concentrated on CBI baseline 12.1, which is essentially a porting of CBI baseline 8.1 to the Moon platform. In particular, it considered the changes to the data and principles verification and validation processes which have led to the removal of manual ticking activities from these processes.



7. Outstanding Issues

Outstanding issues, all of which are non-blocking, are detailed in our ISA Findings Log [17] and issues lists [21]-[141].

8. Conclusions

Following the assessment activities carried out by the ISA, the main conclusion arising is that the ISA endorses use of the UEVOL ATC subsystem baseline 11.4.5.2 in revenue service operation in CBTC mode of operation, subject to the following conditions:

- All safety-related application conditions and restrictions in Alstom's ATC Safety case [18] including sections 4.5 and 6 are observed.
- Application projects should discuss all restrictions identified in section 6 of Alstom's ATC Safety case [18] with the UEVOL project team, to ensure that they are properly understood.
- The configuration and subdivision rules linked to ATC 12 and 13 are not assessed for the current baseline.
- With respect to the application conditions ([AC]'s) defined in section 6.1 of the safety case, the application condition defined for CR879944 takes precedence over that defined for CR882326 (i.e. projects shall not use the functions « PSD override » and « Automatic Evacuation » at the same time).
- By its generic nature, the UEVOL ATC sub-system can be deployed in a diverse range of operational configurations and scenarios. It is therefore an application project responsibility to ensure that sufficient analysis and testing of its application (with its specific data) have been conducted, in its representative environment. Such analysis and testing should also give specific consideration to any late design changes applied by the project to enable the system to meet its intended specific operational configuration and use.
- It should also be noted that the ISA has always indicated in the assessment reports that application projects must not wholly rely on testing at U400 level but must undertake their own tests, considering their particular data, configuration and operational use etc. We are aware that some application projects appear to consider that no project level functional testing is necessary for a safety purpose which, as stated earlier, is not a position supported by the ISA. The current approach to specification and validation of safety requirements by U400 further undermines the position of application projects.
- We also recommend that projects thoroughly test their ZC_ZC border functionalities, including consideration of all applicable degraded modes, to be satisfied that these borders have been implemented safely.
- We have previously noted that safety analyses in general have been updated such that safety requirements are identical to design requirements. This approach has meant that safety requirements can be changed even when there is no change to any safety issue, simply to maintain consistency when a functional requirement, which also serves as a safety requirement, changes.

The ISA's view is that such matching of safety requirements, word for word, to design requirements (even if a design requirement is much broader than the necessary safety requirement) is essentially a convenience to simplify validation of a safety requirement by "simply" relying on test coverage of design requirements to ensure test coverage of safety requirements. The ISA would normally expect safety requirements to include only what is necessary for safety. We would then expect the coverage of the safety requirements by test to be critically reviewed for completeness. We would expect succinct safety requirements to facilitate validators to more readily identify positive, negative and "break it" tests against such safety requirements.

These issues have been taken into account for the evolution from ATC 11.4.4.1 to ATC 11.4.5.2, resulting in the identification in a number of corrective actions that have been undertaken. However, the consideration was applied only to modified and new safety requirements. We note that the previous recommendation remains applicable to future baselines, and that consideration should be given to expanding this recommendation to include legacy requirements. The original recommendation raised by the ISA was to consider all safety requirements and it remains the view of the ISA that such consideration would be beneficial.

- We recommend that application projects activate the ghost recovery function. Should they choose not to do so they are entirely responsible for the associated risks.

We also note the following points:

- As some ATC level hazards are mitigated at system level, this ATC endorsement must be considered in conjunction with the corresponding system level assessment, which is that for baseline Reg 1.11.2.6-2.
- Projects are to rely on the Safety Case (UEVOL-0887-FS) and V&V Report (UEVOL-1171-ES) for the identification of project specific validation activities and not the VAT, which is incorrect.
- Projects should be aware of memo UEVOL-4158, concerning unexpected TSR removal, and whilst the original issue has been corrected on this release through the implementation of the CR atvcm01069656, projects should take into account the following mitigation to avoid potential safety issues associated with the non-education of ZC variables.
 - “First, restart all ZC on all projects with impacted BSL currently in operation (to ensure they do not have latent failure on some of their channels). The objective of this action is to ensure that any future ZC channel reboot will be the first one. It will then be possible to wait end of commercial service to apply the restriction.
 - Secondly, forbid single channel restart: if for any reason (channel failure, maintenance action, etc) a restart of one ZC Channel is needed, the whole ZC cubicle needs to be restarted instead.”

We note that Alstom has agreed to the following activities:

- Alstom have agreed to undertake a longer-term action to review the completeness of the scenarios in the AP SSS, progressively from the next release. We note that such revisions have taken place with each baseline evolution but that this activity remains ongoing.

With specific reference to the ATO subsystem, (CC-NV-ATO version 11.4.9), it has been subject to an independent review to establish the degree to which it complies with the development requirements of Safety Integrity Level (SIL) 2 as defined in CENELEC 50128 [2]. Subject to the scope noted in our assessment report, the conclusion of this assessment is that the ATO software is considered as compliant with the requirements of SIL 2, noting the following:

- The ATO-MSS interface is excluded from our ATO SIL2 demonstration assessment.
- An alternative approach has been proposed by Alstom for Software module testing and Software-Software module integration testing. Alstom has proposed that transparent traceability between software requirements and the software itself, demonstrating a one-to-one correspondence between:
 - each functional software requirement and a single code module.
 - each interface software requirement and a single module interface combined with complete coverage of requirements in testing, means that these activities are not necessary.

This approach has been accepted by the ISA. However, corrective actions have also been identified by the ISA which need to be undertaken to provide the necessary level of traceability proposed; as there are no safety requirements implemented by the ATO software, these corrective actions are not considered to be a blocking issue.

- Clauses of CENELEC 50128 [2] relating specifically to the verification of safety requirements have not been addressed by Alstom, owing to the fact that the ATO software does not fulfil any safety requirements.
- All tools associated with the ATO, including NVESG, have been excluded from this assessment.
- We have not considered the appropriateness of the Coding Rules for use in a SIL2 application and assume that this has been assessed by Bureau Veritas in their previous assessment of Alstom's Modal safety process.
- The following actions are to be undertaken by Alstom for the next ATO baseline:
 - The demonstration of traceability between code and software requirements is to be improved so that such traceability is transparent in all cases.

It is Arthur D. Little's independent professional opinion that the UEVOL System as defined in [18] and subject to the issues identified in this report being addressed (as identified above):



- By design protects against a wrong side failure to deliver the functionality given in [19] commensurate with a safety integrity level of SIL4 (as defined in [3]) subject to compliance with the restrictions of use detailed in the corresponding Alstom safety case [18].
- Has software developed in compliance with the:
 - SIL4 requirements in CENELEC 50128 [2], with respect to the ATP.
- Shows that an appropriate level of compliance with the other CENELEC safety standards 50126 and 50129 [1], [3] has been achieved in accordance with the requirements for SIL4.

We confirm that we have considered all of the arguments presented in the corresponding safety case [18]. We support such arguments, subject to the open (but non-blocking) issues identified in our ISA Log of Findings [17] and issues lists [21]-[138].

It should be noted that Alstom have appointed:

- Altran (formerly known as Praxis High Integrity Systems) as independent safety assessor of the 2oo3platform upon which the ZC and LC subsystems are based.

Our opinion above is therefore based, in part, upon the independent professional opinion reached by Praxis concerning such platform. We have not performed independent safety assessment of such platform ourselves. Nevertheless, our assessment has considered Alstom's compliance with those restrictions raised by Praxis in their assessment report, as well as Alstom's compliance with those restrictions and safety-related application conditions contained within the platform safety case; it is our opinion that an appropriate level of compliance has been demonstrated.

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Report Attachments



A. Personnel Interviewed and Documents Reviewed or Considered

A.1 Personnel Interviewed

The key personnel interviewed during our ISA audit visits are detailed below.

Brice Ah-Tiane	System Data Preparation V&V
Victor Andritoïu	FIVP Testing
Jean-Paul Arcanjo	System Engineer
Eric Aubertin	System Data Preparation
Arneau Bercegeay	System specifications
Alain Blas	Site safety officer Meudon and Saint Ouen
Julian Le Bot	Site measurement/testing
Josiane Bouby	Test Line and V&V
Catherine Bouchut	System Data Preparation V&V
Phillipe Bozoian	System Parameter Validation
Christian Brix	Verification and Validation Manager
Christine Brizec	System parameters configuration rules safety analysis
Robert Capel	Safety Assurance Management
Lionel Carneriro	ATC Tool validation
Helder Cerqueira	ATC Tool validation
Patrick Le Chatelier	Safety Engineer (ZC responsibility) and Project Safety Assurance Manager (Meudon)
Michelle Le Corre	On-site testing
Pascal Cuzange	CBI Data Preparation
Vincent Decanter	Validation Manager
Jean-Charles Didier	VESG safety analysis
Laurent Dissez	Quality Manager (Meudon)
Nicolas Drouet	ATC safety analyses
Christophe Evariste	Quality Manager (Saint-Ouen)
Gerard Frenisy	Change Control
Gilles Gabard	System Work Package Owner
Jean-Charles Glinkowski	Sub-contractor verification,
Marie-Laure Gnemmi	VESG safety analysis
François Hadacek	Project Software Safety Assurance Manager (Meudon) and System Work Package leader (Saint Ouen)
C Hardion	System safety engineer
Eric Hautot	Project Safety Assurance Manager (Saint-Ouen)
Jeremie Houdan	Safety Engineer (LC responsibility)
Jean-Rene Hulot	Software Work Package Owner
Eric Huvé	Design Engineer (CC)



Abderrahmane Kettani	Software safety engineer
Jean-Michel Kluth	System Engineer
Frederic Mazabraud	System safety analysis
Mohammed Medjoub	B Development
Fernando Mejia	B Development and Validation
Jeremie Messeca	V&V Manager
Muiri Miabala	Safety Engineer (Parameters Hazard Analysis)
Luciano Milano	Signalling Safety Manager
Abdelkrim Mous	Design Authority and Technical Leader
Thibault Navette	System specifications
William Orsat	ATC Data Preparation
Gaelle Ovensange	ICONIS PSAM
Jocelyn Perrot	CBI Data Preparation
Michel Polvorel	Odometry
Pascal Poisson	Software verification and validation
Christophe Pruvost	Software verification and validation
M Ramondou	Safety Engineer
Ewen Raulo	Validation Manager
Leopoldo Scaglione	ATC Verification and Validation
Roberto Semprini	RAMS Department Head
Bruno da Silva	Data preparation tools
Fernando de Silva	Site safety officer Saint Ouen
Naguib Takouche	Product Engineering IDF Department Head
Valerie Torcelli	CBI Safety Assurance Manager
Jean-Christophe Van Den Hende	B development
Khalid Logerot	V&V Manager
David Basson	Verification and Validation
Hachem Yousfi	Software Safety Analysis
Aissam Hafid	Software Safety Analysis
Salim Abdelmalek	ATC Safety Analysis
Mehdi Lazmi	ATC Safety Analysis
El-Hadj-Moussa Ba	Software Safety Analysis
Tacfarinas Fayed	Software Safety Analysis



A.2 Documents Reviewed

The following section summarises the key documents reviewed or considered during each audit/visit, or during review at the ISA's premises.

Kick-Off Meeting (August 2006)

Table 5: Documents Reviewed during the Kick-off Meeting

Title of Document	Alstom Reference	Release/Date
Safety, Verification and Validation Plan	UEVOL-0219	Release B, 05/07/06
System Architecture Description	UEVOL-225	Release B, 30/06/06
System Requirements Specification	UEVOL-224	Release B, 30/06/06
System Parameters Specification	UEVOL-248	Release B, 12/07/06
ATC Data Preparation, Verification and Validation Process	UEVOL-398	Release 7A, 12/09/06
System Parameters Deployment Process	UEVOL-350	Release A, 31/08/06

Audit Visit 1 (January 2007)

Table 6: Documents Reviewed during First Audit

Title of Document	Alstom Reference	Release/Date
Requirements Management Plan	UEVOL-0273	Release A
Safety, Verification & Validation Plan	UEVOL-0219	Release B
Project Document Map	T-23 A401405	Release 2B
Development Specific Rules Requirement Management Guide	T-23 A401827	Release 1A
System Parameters Deployment Process, 6 October 2006	UEVOL-0350	Release B
Project Development Plan, 4 September 2006	T-23 A401209-	Release 1B
Software Safety, Validation and Verification Plan, 29 Nov 2006	T-A401582	Release A
Safety Requirements for Data Preparation Tools Development	UEVOL-0529	Release A, 16/10/06
Safety, Verification and Validation Plan	UEVOL-0219	Release C, 07/12/06
Kick-off meeting (11/01/07) presentations: UEVOL ATC Software ISA ADL Audit UEVOL System Overview (software) UEVOL ATC Software ISA ADL Audit Safety Processes	No references	No version number
Safety, Verification and Validation Plan, ATC Subsystem	UEVOL-0353	Release B, 12/12/06
Preliminary Hazard Analysis	UEVOL-263	Release B, 06/04/06
System Hazard Analysis	UEVOL-0421	Release A, 30/11/06
Test and Commissioning Plan	UEVOL-0566	Release A, 30/11/06
System Parameters Deployment Process	UEVOL-350	Release B, 06/10/06
Requirements Management Plan	UEVOL-0273	Release A, 06/12/06
ATC Data Preparation: Verification and Validation Process	UEVOL-398	Release A, 08/12/06
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release A, 18/12/06
Software Safety, Validation and Verification Plan	T-A401582-A	Release A, 29/11/06
Software Project Development Plan	T-23 A401209-1B	Release 1B, 04/09/06



Title of Document	Alstom Reference	Release/Date
ATC Software UEVOL: Software Quality Plan	T-23 A401468A	Release A, 27/10/06
System Parameters Process Hazard Analysis	UEVOL-0422	Release A, 22/09/06
ATC Interface Hazard Analysis	UEVOL-0431	Release A, 29/11/06
LC Subsystem: Subsystem Hazard Analysis	UEVOL-0430	Release A, 17/10/06
ZC Subsystem: Subsystem Hazard Analysis	UEVOL-0543	Release A, 05/01/07
Interface Hazard Analysis	UEVOL-0367	Release A, 16/06/06
UEVOL-CC: Subsystem Architecture Description	T-23 A401446-A	Release A, 08/11/06
UEVOL-ATO Software: Architecture Description	Y3-T A401467	Release 2A, 23/11/06
UEVOL-ZC Subsystem: Architecture Description	Y3-64 A401536	Release A, 13/10/06
UEVOL-LC Subsystem: Architecture Description	Y3-64 A40153T	Release A, 13/10/06
UEVOL-ZC Application: Architecture Description	Y3-64 A401847a	Release 1A, 24/11/06
UEVOL-LC Application: Architecture Description	Y3-64 A401848	Release 1A, 20/11/06
ATC – System Architecture Description Verification Report	Y3-64 A401803	Release A, 17/11/06
Software Configuration Management Plan	T-23 A401469	Release 1A, 29/11/06
ATC Sw Development Specific Rules Reqt. Management Guide	T-23 A401827	Release 1A, 29/11/07
UEVOL ZC: Software Hazard Analysis	A401824en	Release 1A, 29/10/06
UEVOL LC: Software Hazard Analysis	Y3-64 A401825	Release 1A, 11/12/06
UEVOL-CC: Subsystem Integration Tests Plan	A401570	Release A, 15/12/06
ZC Application: Software Requirements Specification	Y3-64 A401380	Release A, 12/10/06
LC Application: Software Requirements Specification	Y3-64 A401381	Release A, 13/10/06
UEVOL: CC ATP Software Requirements Specification (SW RS)	T-23 A401464	Release 1B, 16/11/06
ATC Software Requirements Specification Verification Report	Y3-64 A401804	Release A, 23/11/06
UEVOL-CC ATP: Software Requirements Test Plan	A401462	Release A, 14/12/06
UEVOL-ZC: Software Requirements Test Plan	A401691	Release A, 15/12/06
UEVOL-LC: Software Requirements Test Plan	A401692	Release A, 15/12/06



Audit Visit 2 (March 2007)

Table 7: Documents Reviewed during Second Audit

Title of Document	Alstom Reference	Release/Date
Safety, Verification & Validation Plan, 05/07/06	UEVOL-0219	Release B
Software safety validation and verification plan, 29/11/06	T-A401582	Release A
ATC software UEVOL: Software Quality Plan, 27/10/06	T-23 A401468	Release A
ZC Software Hazard Analysis, 6/03/07	A401824	Release B
LC Software Hazard Analysis, 11/12/06	A401825	Release A
ZC Software Requirements Specifications, 13/10/06	A401380	Release A
LC Software Requirements Specifications, 13/10/06	A401381	Release A
Project Document Plan	A401405	Release 4B, 23/02/07
Software Safety Requirement Report	Excel spreadsheet numbered 070305-SRR	
CC ATP Software Architecture Descriptions	A401466	Release 2A, 24/11/06
UEVOL-Trackside Middleware: Architecture Description	A401849	Release 1A, 26/11/06
System Architecture Description Verification Report (ATC Subsystem)	A401803	Release A, 17/11/06
Development Specific Rules Requirement Management Guide	A401827	Release 1A, 29/11/06
LC-Software Hazard Analysis	A401825	Release A, 31/01/07
UEVOL Specific Safety Study on Slip/Slide/Kinetic Location	A402218	Release 1A, 05/03/07
CC Subsystem Integration Tests Plan	A401570	Release A, 15/12/06
LC Software Requirements Specification	A401381	Release B, 15/02/07
UEVOL Middleware Software Requirements Specification	A401382	Release A, 05/10/06
UEVOL CC ATP Software Requirements Specification	A401464	Release B, 02/03/07
UEVOL CC ATO Software Requirements Specification	A401463	Release 4A, 05/03/07
UEVOL ATP Software: Requirements Specification Level 2	A401764	Release 1A, 28/11/06
ATC Subsystem: SRS Verification Report	A401804	Release A, 23/11/06
LC Architecture Description	A401848	Release 2A, 30/03/07 [sic]
ZC Software Hazard Analysis	A401824	Release B, 06/03/07
U300 Specific Safety Study – Automatic Protection	A401213	Release B, 07/09/06
Specific Safety Study on On-board ATP Parameters	83001-02-5000-SIF +374	Revision C, 17/11/06 [Singapore Circle Line]
Configuration Files Specification (UEVOL ZC Subsystem)	UEVOL-0290	Release C, 08/12/06 [Parameters Description]
Configuration Files Specification (UEVOL LC Subsystem)	UEVOL-0392	Release B, 05/12/06
Specific Safety Study on Trackside ATC Parameters	83001-02-5000-SIF + 375	Revision C, 07/07/06 [Singapore Marina Line]
ZC S/w Hazard Analysis	A401824	Release 1A, 29/10/06
LC Application Architecture Description	Y3-64 A401848	Release 1A, 20/11/06
Specific Safety Study on Slip/Slide/Kinetic/Location	A402218	Release 1A, 05/03/07
ZC Application Software Requirements Specification	Y3-64 A401380	Release B, 02/03/07



Audit Visit 3 (March 2007)

Table 8: Documents Reviewed during Third Audit

Title of Document	Alstom Reference	Release/Date
Preliminary Hazard Analysis, 06.04.06	UEVOL-0263	Release B
System Hazard Analysis, 30.11.06	UEVOL-0421	Release B
Interface Hazard Analysis, 19/01/07	UEVOL-0367	Release B
UEVOL Hazard Log_v1_ALT	n/a	Release I
ATC – LC Subsystem Requirements Test Description Verification Report, 16/03/07	UEVOL-0828	Release A
CC Sub-system Hazard Analysis, 16/03/07	UEVOL-0542	Release B
UEVOL System User Needs	UEVOL-0070	Release C, 13/10/06
Interface Hazard Analysis	UEVOL-0367	Release 1B, 19/01/07
CC Subsystem Hazard Analysis	UEVOL-0542	Release B, 16/03/07
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release A, 18/12/06
UEVOL Preliminary Hazard Analysis Block-Mode	UEVOL-0829	Release 3A, 07/03/07
UEVOL Hazard Log	HL-v1A-ALT	Excel spreadsheet, 23/03/07
ATC-ZC-Sy-Sw-Requirement Specification Verification Report	UEVOL 0264	Release C (no date)
UEVOL ATC-LC Subsystem Requirements Test Description Verification Report	UEVOL-0828	Release A, 16/03/02
CC-ATS-SyITDVR-UEVOL-0809-A	Traceability	Excel spreadsheet
System 888: System Architecture Verification Report	Appendix A – no specific reference	
UEVOL FIVP Strategy	UEVOL-0547	Release A, 20/12/06
System Requirements Specification Variant 888	UEVOL-0624	Release A, 28/02/07
System Parameters Configuration Rules	UEVOL-0286	Release B, 28/02/07
RTI: Real Time Issues	UEVOL-0212	Release A, 24/04/06
LC: Subsystem Requirements Test Plan	UEVOL-0678	Release A, 31/01/07
Configuration Management Plan	UEVOL-0232	Release 2A, 05/09/05
System Parameters Description	UEVOL-0248	Release E, 28/02/07
System Architecture Description Variant 888	UEVOL-0604	Release A, 28/02/07
UEVOL Typical Requirements Management Plan	UEVOL-0815	Release 2A, 05/03/07
Platform and Subsystem Configuration Management Process	BPGIS-0045	Rev 6A, 19/10/06
Project Management Plan	UEVOL-0068	Release B, 11/09/06,
Document Control Plan	UEVOL-0003	Release C, 02/11/06
UEVOL Quality Assurance Plan	UEVOL 0060	Release B, 02/11/06
Urbalis Platform: Platform and Subsystem Configuration Management Plan	UEVOL-0418	Release A, 03/11/06
ATC Data Preparation, Verification and Validation Process, 08/12/06	UEVOL-0398	Release A
Safety Requirements for Data Preparation Tools' Development, 16/10/06	UEVOL-0529	Release A
System Parameters Process Hazard Analysis, 22/09/06	UEVOL-0422	Release A
System Parameters Description, 17/11/06	UEVOL-0248	Release E



Audit Visit 04 (July 2007)

Table 9: Documents Reviewed during Fourth Audit

Title of Document	Alstom Reference	Release/Date
UEVOL ATC Software; Audit ADL – Delivery Plan (presentation)		
UEVOL ATC Software, Safety Presentation		4/5/6 July 2007
Specific Safety Study – Automatic Protection	A402331-3A	03/07/07
CC, Critical Code Review Analysis Report	A402598	Release 1A, 03/07/07
Software Safety, Validation and Verification Plan (SV+VP)	A401582	Release 2B, 03/07/07
Critical Code Review Analysis Report – LC	A402322	Release A, 03/07/07
Memo: Alstom answer to finding UEVOL/7	Memo-PMT07-0270en	03/07/07
Software Quality Plan	A401468	Release 1B, 22/06/07
Subsystem Integration Tests Plan – CC	A401570	Release 1B, 11/06/07
Subsystem Integration Tests Plan – ZC	A401571	Release 1B, 14/06/07
Subsystem Integration Tests Plan – LC	A401572	Release 1B, 14/06/07
UEVOL CC: Specific Safety Study on Energy	A402326	Release 2A, 03/07/07
Software Quality Plan	T23 A401460	Release 1B, 22/06/07
ZC Software Hazard Analysis	A401824	Release D, 28/06/07
ZC Application Software Requirements Specification	Y3-64, A401380	Release 1C, 24/04/07
ZC Application Architecture Description	Y3-64 A401847	Release 1A, 24/11/06
ZC Subsystem Architecture Description	Y3-64 A401536	Release 1C, 24/04/07
CC ATP Software Architecture Descriptions	Y3-TA401466	Release 2A
CC ATP Software Requirements Specifications	T-23 A401464	Release C, 02/07/07
Software Module Test Report LC ASW	T-23 A402265	Release A, 21/05/07
Software Module Test Report ZC ASW	T-23 A402291	Release A, 23/05/07
Software Hazard Analysis CC SwHA	T-23 A401823	Release 4A, 03/07/07
Software Requirements Specification CC SwRS	T-23 A401464	Release C
Software Requirements Specification CC-ATO SwRS	T-23 A401465	Release 1B, 13/11/06
Software Architecture Description CC-ATP SwAD	Y3-T A401466	Release 2A, 24/11/06

Audit Visit 05 (September 2007)

Table 10: Documents Reviewed during Fifth Audit

Title of Document	Alstom Reference	Release/Date
System Parameters Deployment Process	UEVOL-0350	Release C, 01/08/07
PHA Block Mode	UEVOL-0829	Release B, 13/06/07
Hazard Log v1A, excel spreadsheet	No ref	
ATC Interface Hazard Analysis	UEVOL-0431	Release B, 19/04/07



Title of Document	Alstom Reference	Release/Date
Compte rendu de la réunion du 10/07/07 sur les points de design entre ATC software et ATC SS (minutes of meeting on design issues arising between ATC sw and ATC subsystem)	No reference	Version 1A, 10/07/07
System Delivery Plan	No reference	03/09/07 – Draft
System Requirements Specification Variant 888	UEVOL-0624	Release C, 11/08/07
CC Subsystem Requirements Specification	UEVOL-0098	Release E, 31/05/07
ZC Subsystem Requirements Specification	UEVOL-0114	Release E, 22/05/07
LC Subsystem Requirements Specification	UEVOL-0264	Release D, 22/05/07
ATC Subsystem Requirements Specification	UEVOL-0207	Release E, 31/05/07
CC Subsystem Tests Report	UEVOL-0140	Release 2A, 27/08/07
Memo: Exigence Safety Sur Le Commentateur CBTC-BIO or Mode	UEVOL-0351	24/05/07
Block Mode Description – 5B SYRS888	UEVOL-0624-B	
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release 1A, 21/06/07
System Parameters Process Hazard Analysis	UEVOL-0422	Release A, 22/09/07
Urbalis Evolution Block Mode Description	UEVOL-0351	Release 5B, 05/04/07
UEVOL-PARAMS Evolution – System Parameters Data Entry Tool and Calculation Tool Software Module Description	UEVOL-1077	31/07/07
System Parameters Description	UEVOL-0248	Release H, 02/08/07
ZLC-LEU Correspondence Test Procedure	UEVOL-0696	Release A, 06/08/07
System Architecture Description Verification Report – Variant 888	UEVOL-0808	19/07/07
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	Release C, 04/06/07

Audit Visit 06 (September 2007)

Table 11: Documents Reviewed during Sixth Audit

Title of Document	Alstom Reference	Release/Date
Set of presentations from K-O incorporating: ATC Delivery Plan, Safety Presentations – ADL Audit 19-20-21 September 2007, V+V Presentation		
ATC Software: Global Validation Report	A402597	Release C, 10/09/07
Software Quality Plan	A401468	Release 2B, 29/08/07
ATC Subsystem Software Safety, V&V Plan	A401582	Release B, 11/09/07
Trainborne Software Assurance Report	A402620	Release C, 11/09/07
Trainborne Software Safety Assurance Report	A402621	Release A, 11/09/07
ZC: Software Safety Requirement Report	A402317	Release C, 07/09/07
LC: Software Safety Requirement Report	A402318	Release B, 19/07/07
LC: Software Safety Requirement Report (note: title should refer to 'Carborne Controller')	A402319	Release B, 10/08/07
CC: Software Hazard Analysis	A401823	Release 4C, 18/09/07
ZC: Software Hazard Analysis	A401824	Release E, 07/09/07
Specific Safety Study on Wheel and Train Movement Speed and Acceleration Estimation	A402218	Release 3A, 04/07/07



Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Energy	A402326	Release A, 20/07/07
Specific Safety Study – Automatic Protection	A402331	Release A, 12/07/07
CC Critical Code Review Analysis Report	A402598	Release 3C, 19/09/07
Specific Safety Study – Synchronization	A402602	Release A, 31/08/07
CC ATP Software Architecture Descriptions	A401466	Release 3A, 16/08/07
CC ATP Software Requirements Specifications	A401464	Release 1E, 31/08/07
LC Software Module Test Description	A402264	Release A, 27/03/07
ZC Software Module Test Description	A402290	Release A, 27/03/07
Urbalis R&D Program – Minutes of the Integration Review held 04/07/07		Revision A, 04/07/07
Urbalis R&D Program – Agenda of the Integration Review 19/09/07 – with minutes attached		Revision A, 19/09/07
ATC Delivery Plan – Integration Review, Version 2		Revision 2, 19/09/07
Questionnaire d' Audit Qualite Interne	A402302	Release A, 25/05/07
Copy of Change Request UEVOL 00003553, raised regarding finding UEVOL/04		21/09/07
CC ATP software architecture descriptions	A401466	Release 3A, 16/08/07

Audit Visit 07 (October 2007)

Table 12: Documents Reviewed during Seventh Audit

Title of Document	Alstom Reference	Release/Date
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release C, 27/09/07
System Parameters Deployment Process	UEVOL-0350	Release 1D, 11/10/07
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release 1B, 10/10/07
Memo: Slip Slide Algorithm	UEVOL-025	05/10/07
System Generic Application Safety Case Variant 888	UEVOL-0888	Release 1A
ATC Generic Application Safety Case	UEVOL-0887	Release 1A, 20/09/07
System Requirements Specification Variant 888	UEVOL-0624	Release C, 11/08/07
Memo: Safety Verification of Inputs Document for Data Preparation Activities	UEVOL-024	28/09/07
Safety Requirement for Data Preparation Tools Development	UEVOL-0529	Release A, 16/10/06
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release 1A, 21/06/07
CC Subsystem Requirements Specification	UEVOL-0098	Release F, 01/10/07
Memo: Actions Suite Verifs SyRS CC - SWRS ATP		Version A, 15/10/07
System Architecture Description Variant 888	UEVOL-0604	Release C, 10/08/07
ATC Subsystem Requirements Specification	UEVOL-270	Release F, 01/10/07
ATC Architecture Description	UEVOL-0271	Release E, 02/10/07
ATC Subsystem Requirement Specification Verification Report	UEVOL-816	Release B, 20/09/07
ATC Sub-subsystem Requirement Specification Verif. Report	UEVOL-0818	Release A, 21/09/07
ATC Subsystem Architecture Description Verification Report	UEVOL-0817	Release B, 21/09/07
System Requirements Specification Verif. Report, Variant 888	UEVOL-0807	Release C, 19/07/07



Title of Document	Alstom Reference	Release/Date
System Architecture Description (Verif.) Report - Variant 888	UEVOL-0808	Release 1D, 02/10/98
ATC Rules ATC Sub Specific Study (ATC Subdivision Rules Specific Study)	UEVOL-1027	Release 2A
Compensated Gradients Generation Manual	UEVOL-1083	Release A, 28/09/07
Project Delivery Process Implemented in ADVITIUM	BPGIS-0062	Revision A, 31/01/06
Platform and Subsystem Delivery Process Implemented in ADVITIUM	BPGIS-0063	Revision A, 30/01/07

Audit Visit 08 (November 2007)

Table 13: Documents Reviewed during Eighth Audit

Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Energy Monitoring	A402326	Release B, 08/10/07
Specific Safety Study on kinematic, (previously 'wheel and train movement speed and acceleration estimation') (98/17)	A402218	Release A, 23/10/07
Software Safety Requirement Report	Y3-64 A402319	Release C, 14/11/07
CC Critical Code Review Analysis Report	A402598	Release 3C, 19/09/07
CC - ATP B Specification Verification Report	A402882	Release B, 06/11/07
CC - ATP Formal Proof Document	A402843	Release A, 05/11/07
CC - ATP Formal Proof Verification Report	A402916	Release A, 06/11/07
UEVOL CC ATP Source Code Verification Report	T-23 A402606	Release A, 31/10/07
CC Critical Code Review Analysis Report	Y3-64 A402598	Release C, 09/10/07
CC ATP software requirements specifications SwRS	T-23 A401464	Release F, 09/11/07
CC Software Hazard Analysis	T-23 A401823	Release C, 08/11/07
Software Requirements Specification Verification Report	Y3 – 64 A401804	Release A, 23/11/06
CC SyRS/SyAD-SwRS Verification Report	T23 A403003	Release A, 07/11/07

Audit Visit 09 (January 2008)

Table 14: Documents Reviewed during Ninth Audit

Title of Document	Alstom Reference	Release/Date
System Architecture Description Variant 888	UEVOL-604	Release E, 05/12/07
System Requirements Specification Variant 888	UEVOL-0624	Release E, 04/12/07
Interface Hazard Analysis Variant 888	UEVOL-0747	Release C, 20/12/07
System Hazard Analysis Variant 888	UEVOL-0793	Release D, 29/11/07
System Hazard Analysis Variant 888	UEVOL-0793	Release E, 16/01/08
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release A, 16/11/07
Specific Safety Study Block-Mode	UEVOL-0829	Release E, 16/01/08
System Parameters Description	UEVOL-0248	Release J, 07/12/07
System Parameters Configuration Rules	UEVOL-0286	Release F, 07/12/07
ATC Subdivision Rules Specific Study	UEVOL-1027	Release 1A, 20/11/07
CC Subsystem, Subsystem Hazard Analysis	UEVOL-0542	Release D, 29/11/07



Title of Document	Alstom Reference	Release/Date
LC Subsystem, Subsystem Hazard Analysis	UEVOL-0430	28/11/07
ZC Subsystem, Subsystem Hazard Analysis	UEVOL-0543	28/11/07
Memo: Memo Safety UEVOL 026, KSlides Tests		27/02/07
System Requirements Specification Variant 888	UEVOL-0624	Release E, 04/12/07
System Architecture Description Variant 888	UEVOL-0604	Release E, 05/12/07
System Architecture Description (Regular)	UEVOL-0225	Release E, 14/12/07
CC Subsystem Requirements Specification	UEVOL-0098	Release 2G, 28/12/07
ZC Subsystem Requirements Specification	UEVOL-0114	Release E, 28/09/07
LC Subsystem Requirements Specification	UEVOL-0264	Release E, 27/09/07
ATC Subsystem Requirements Specification	UEVOL-0270	Release F, 01/10/07
ATC Architecture Description	UEVOL-0271	Release E, 02/10/07
Urbalis Evolution SV&V Plan	UEVOL-0219	Release D, 24/09/07
CC Subsystem Test Reports	UEVOL-140	Release F, 17/01/08
LC Subsystem Test Reports	UEVOL-1011	Release A, 02/07/07
ZC Subsystem Test Reports	UEVOL-1186	Release A, 07/11/07
ATC Subsystem Reqs. Specification Verification Report	UEVOL-0818	Release B, 24/10/07
ATC LC Subsystem Reqs. Test Description Verification Report	UEVOL-0828	Release C, 22/11/07
ATC ZC Subsystem Reqs. Test Description Verification Report	UEVOL-0827	Release B, 30/11/07
CC Subsystem Requirements Specification	UEVOL-0098	Release 2G, 28/12/07
CC SyRS/SyAD - SwRS Verification Report	A403003	Release A, 07/11/07
ATC Subdivision Rule and Track Data Checking Checklist	UEVOL-0395	V2A, 06/03/07
System Parameters Deployment Process	UEVOL-0350	Release D, 05/12/07
Compensated Gradients Generation Manual	UEVOL-1083	Release A, 28/09/07
BJL2 - Beacon Layout Validation Report	UEVOL-1086	Release 2A, 26/10/07
BJL2 - ATC Delivery Sheet No. 005, Delivery Date 20/12/07	BJL2-Alstom-0264	Release 1A, 20/12/07
ATC Subdivision Rule Checklist	UEVOL-0772	Release 1B, 22/01/08
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	V2D, 25/01/08
Project Delivery Process Implemented in Advituim	BPGIS-0062	Revision A, 30/01/08
Platform and Sub-System Delivery Process Implemented in Advituim	BPGIS-0063	Revision A, 30/01/08
Recommendation for the Configuration of the Input File for Compensated Gradients Calculation	V-200-D-433	V1B, 14/12/05



Audit Visit 10 (February 2008)

Table 15: Documents Reviewed during Tenth Audit

Title of Document	Alstom Reference	Release/Date
ATC Delivery Plan (excel spreadsheet)		Revision 01/02/08
UEVOL V&V Presentation (PowerPoint)		06/02/08
Memo PMT08-0015, from Brice Ah-Tiane, Subject: CR de la réunion de design du 14/01	PMT08-0015	17/01/08
Memo PR07-0413fr, from Brice Ah-Tiane, Subject: CR réunion sur la gestion des modes	PR07-0413fr	23/10/07
ATC Software Global V&V Report	A402597	Release H 10/01/08
Specific Safety Study on Wheel and Train Movement Speed and Acceleration Estimation,	A402218	Release IC, 15/01/08
Specific Safety Study on Energy Monitoring	A402326	Release C, 21/01/08
ZC Software Hazard Analysis	A401824	Release H, 14/01/08
CC Software Safety Assurance Report	A402620	Release G, 21/12/07
ZC-LC Software Safety Assurance Report	A402621	Release D, 11/01/08
Specific Safety Study on On-board Parameters	A402903	Release 2A, 31/10/07
Specific Safety Study on Trackside ATC Parameters	A402904	Release 1A, 16/01/08
Critical Code Review Analysis Report, LC	A402322	Release B, 20/07/07
LC, Critical Code Review Analysis Report	A402528	Release C, 11/01/08
CC-ATP, Critical Code Review Analysis Report	A402598	Release E, 21/12/07
CC Software Hazard Analysis	A401823	Release E, 21/12/07
ZC Application Software Requirements Specification	A401380	Release F, 21/12/07
LC Application Software Requirements Specification	A401381	Release 2D, 20/12/07
CC ATP Software Requirements Specification	A401464	Release 2I, 05/02/08
LC Software Hazard Analysis	A401825	Release 1D, 01/02/08
UEVOL CC ATP, Source Code Verification Report	A402606	Release C, 18/12/07
CC SwAD Verification Report	A402283	Release A, 21/12/07
LC Subsystem, Integration Test Description Verification Report, (SwITDVR)	A402929	Release A, 08/01/08
CC Software Module Test Description Verification Report	A402266	Release B, 09/01/08
ZC Software Module Test Description Verification Report	A402925	Release A, 09/01/08
LC Software Module Test Description Verification Report	A402926	Release A, 21/12/07
CC-ATP Requirements Test Description Verification Report	A402284	Release B, 28/11/07
ZC Requirements Test Description Verification Report	A402921	Release A, 08/01/08
LC Requirements Test Description Verification Report	A402922	Release A, 08/01/08
LC Software Module Test Report	A402265	Release C, 18/12/07
ZC Software Module Test Report	A402291	Release C, 21/12/07
CC Software Module Test Report	A402314	Release D, 09/01/08
CC Software Requirement Tests Plan	A401462	Release D, 27/12/07
ZC Software Requirements Tests Plan	A401691	Release E, 21/12/07



Title of Document	Alstom Reference	Release/Date
LC Software Requirements Test Plan	A401629	Release C, 14/12/07
CC Software Requirements Tests Report	A402285	Release G, 09/01/08
ZC Software Requirements Tests Report	A402289	Release E, 21/12/07
LC Software Requirements Tests Report	A402293	Release C, 14/12/07
LC - ASW, Formal Proof Documents	A402845	Release A, 10/01/08
UEVOL ZC, Formal Proof Documents	A402844	Release A, 08/01/08
CC-Parameters Description	UEVOL-0643	Release A, 01/10/07
CC ATP Software Architecture Description	Y3-T A401466	Release IC, 22/01/08
CC Software Hazard Analysis	T-23 A401823	Release E, 21/12/07

Audit Visit 11 (July 2008)

Table 16: Documents Reviewed during Eleventh Audit

Title of Document	Alstom Reference	Release/Date
ZC-LC Software Safety Assurance Report	HA-T-A402621EN	Release R, 26/06/08
Project Document Plan	A401405	Release U, 01/07/08
ATC Software Global V&V Report	A402597	Release L, 26/06/08
CC Subsystem Integration Tests Description Verification Report	A402282	Release B
CC-ATP Software Integration Tests Description Verif. Report	A402273	Release C
Software Module Test Report, ZC ASW	A402291	Release F, 07/05/08
ZC Application, Software Integration Test Report	A402272	Release B, 25/04/08
CC Software Requirements Test Report	A402285	Release P, 02/07/08
CC System Integration Tests Report	A402287	Release T, 02/07/08
LC Software Hazard Analysis	A401825	Release E, 12/05/08
LC Application, Software Requirements Specification	A401381	Release IE, 05/05/08
LC Software Requirement Coverage Document	A403796	Release A, 10/03/08
LC System Architecture Description and Software Requirements Specification Verification Report	A402939	Release B, 23/04/08
ZC System Architecture Description and Software Requirements Specification Verification Report	A402938	Release D, 23/06/08
ZC Software Requirement Coverage Document	A403795	Release A, 06/03/08
Specific Safety Study - Automatic Protection	A402331	Release C, 02/04/08
Specific Safety Study – Synchronisation	A402602	Release B, 21/02/08
Specific Safety Study on Wheel and Train Movement, Speed and Acceleration Estimation	A402218	Release IC, 15/01/08
CC ATP Source Code Verification Report	A402606	Release I, 25/06/08
LC SwAD Verification Report	A402936	Release A, 22/04/08
CC-ATP B Coding Rules	T-23 A403929	Release A, 30/04/08
BoBo Translator Requirements Specification Version 1.2	RS-T-A402649	Release IA, 19/07/07
CC-ATP Formal Proof Document	A402843	Release K, 02/07/08
UEVOL ZC Formal Proof Document	A402844	Release I, 20/06/08



Title of Document	Alstom Reference	Release/Date
LC - ASW Formal Proof Document	A402845	Release B, 31/03/08
CC-ATP Formal Proof Verification Document	A402916	Release J, 02/07/08
ZC Formal Proof Verification Report	A402917	Release I, 26/06/08
LC-ASW Formal Proof Verification Report	A402918	Release A, 18/02/08
LC B Specification Verification Report	A402915	Release A, 07/03/08
ZC B Specification Verification Report	A402914	Release I, 04/07/08
CC - ATP B Specification Verification Report	A402882	Release L, 02/07/08
LC Critical Code Review Analysis Report	Y3-64 A402322	Release D, 12/05/08
ZC Critical Code Review Analysis Report	T-402528EN	Release K, 26/06/08
UEVOL - CC - ATP - ASW Critical Code Review Analysis Report	T-23 A402598	Release Q, 01/07/08
LC Sub-System Architecture Description	Y3-64 A401537	Release 2C, 28/11/07
LC Application Architecture Description	Y3-64 A401848	Release 1C, 03/08/07
LC SWAD Verification Report	T23 A402936	Release A, 22/04/08
CC ATP Software Architecture Description	Y3-T A401466	Release C, 12/05/08
Specific Safety Study on Tracksides ATC Parameters	A402904	Release A, 28/04/08
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release C, 27/09/07
ATC Subdivision Rules	UEVOL-0395	Release C, 10/09/07
ATC Subdivision Rule and Track Data Checking Checklist	UEVOL-0772	Release A, 27/09/07
System Parameters Description	UEVOL-0248	Release M, 07/12/07
System Parameters Configuration Rules	UEVOL-0286	Release I, 05/02/08
LC Parameters Configuration Rules	UEVOL-0397	Release B, 06/02/08
LC Sub-system Configuration File Specification	UEVOL-0392	Release E, 01/02/08
ZC Parameters Configuration Rules	UEVOL-0396	Release D, 01/02/08
ZC Sub-system Configuration Files Specification	UEVOL-0290	Release G, 28/09/07
ATC Subsystem RTS File Description	UEVOL-0485	Release D, 10/09/07
Static Guideway Database Description (*.CSV)	UEVOL-0252	Release E, 27/09/07
Static Regulation Database Description	UEVOL-0253	Release 1C, 17/11/07
ATC Subsystem ATC Beacon Layout File Description	UEVOL-0483	Release C, 10/09/07
ATC Protection Zone File Description	UEVOL-0484	Release C, 10/09/07
ATC Subsystem ATC SCD Txt File Description	UEVOL-0484	Release D, 10/09/07
CC-Vital Setting Description	UEVOL-0643	Release C, 04/04/08
System Parameters ATC XML Files Format	UEVOL-0511	Release K, 05/02/08
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release D, 25/01/08
CC-Non Vital Setting Description	UEVOL-1209	22/07/08
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release 1C, 06/05/08
System Data Preparation Validation Rule Test Description	UEVOL-0XXX	Release 1A, 04/06/08
ATC Subdivision Rules Checklist	UEVOL-0772	Release C, 04/07/08
ATC Data Activities Recorder	UEVOL-1236	Release B, 20/05/08
ATC Data Generation and Verification Tool Requirement Specification	UEVOL-0378	Release A, 05/12/06



Title of Document	Alstom Reference	Release/Date
System Architecture Description and Software Requirements Specification Verification Report for CC Sub-system	T-23 A402937	Release A, 09/05/08
CC ATP software requirements specifications	T-23 A401464	Release M, 19/06/08
CC SyRS requirement covering report	T23 A403003	Release IE, 13/05/08
CC-Software Hazard Analysis	T-23 A401823	Release I, 14/05/08
CC Software Safety Assurance Report	A402620	Release AA, 02/07/08

Audit Visit 12 (August 2008)

Table 17: Documents Reviewed during Twelfth Audit

Title of Document	Alstom Reference	Release/Date
ATC SW - LC ASW Software Module Test Description	T-23 A402264	Release A, 27/03/07
ATC SW - ZC ASW Software Module Test Description	T-23 A402290	Release A, 27/03/07
ATC SW - CC ATP Software Module Test Description	T-23 A402313	Release A, 01/10/07
ATC SW Software Module Test Report LC ASW	T-23 A402265	Release E, 11/04/08
ATC SW - LC Software Module Test Description Verification Report	Y3-64 A402926	Release C, 15/04/08
ATC Sw - Software Module Test Report ZC ASW	T23 A402291	Release F, 07/05/08
Sw - ZC Software Module Test Description Verification Report	Y3-64 A402925	Release D, 13/05/08
ATC Sw - Software Module Test Report CC ATP	T-23 A402314	Release H, 22/05/08
ATC SW - CC ATP Software Module Test Description Verification Report	Y3-64 A402266	Release F, 23/05/08
UEVOL Trackside LC Source Code Verification Report	T-23 A402913	Release C, 03/04/08
UEVOL Trackside ZC Source Code Verification Report	T-23 A402912	Release D, 06/05/08
UEVOL CC ATP Source Code Verification Report	T-23 A402606	Release I, 25/06/08
UEVOL ZC-LC Coverage of 2003 Safety Exported Constraints	A402444	Release B, 07/05/08
Specific Safety Study on On-board ATP Parameters	A402903	Release IC, 10/07/08
LC SwAD Verification Report	T23 A402936	Release A, 22/04/08
ZC SwAD Verification Report	T23 A402935	Release C, 26/06/08
Urbalis Evolution - ZC Sub-System Architecture Description	Y3-64 A401536	Release IC, 24/04/08
Urbalis Evolution - ZC Application Architecture Description	Y3-64 A401847	Release IB, 28/11/07
CC-ATP SwAD Verification Report	T23 A402283	Release B, 22/02/08
CC Subsystem Architecture Description	T-23 A401446	Release E, 09/04/08
System Architecture Description Verification Report	Y3-64 A401803	Release A, 17/11/06
Trk Data Generator Software Requirements Specification	A402434	Release B, 24/01/07
Urbalis Evolution - LC Software, Software Impact Analysis	A403062	Release A, 20/06/08
Urbalis Evolution - ZC Software, Software Impact Analysis	A404257	Release K, 25/06/08
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	Release H, 02/07/08
CC - Vital Embedded Setting Generator Software Requirements Specification	T-23 A404129	Release C, 25/06/08
CC - Vital Embedded Setting Generator S/W Architecture Description	A404453	Release B, 12/05/08
Urbalis Evolution - ZC Software Hazard Analysis	A401824	Release 3L, 03/07/08



Title of Document	Alstom Reference	Release/Date
Vital Checksum Principles for SACEM Messages	UEVOL-0275	Release 1A, 22/02/06
Generic and Specific Signatures for SACEM Vital Checksums	UEVOL-0246	08/04/08
System Parameters Scheme Plan XML Files Format	UEVOL-0517	Release K, 05/02/08
System Parameters XML Scheme Files	UEVOL-0569	Release K, 05/02/08
System Parameters Data Entry Tool and System Parameters Calculation Tool Software Acceptance Plan	UEVOL-1298	Release A, 19/06/08
System Data Preparation Verification Rules Test Plan	UEVOL-XXXX	02/02/08
System Parameters Data Entry Tool User Manual	UEVOL-0670	Release B, 27/09/07
System Parameters Data Entry Tool Installation Manual	UEVOL-0671	Release B, 27/09/07
System Parameters Calculation Tool User Manual	UEVOL-0676	Release B, 27/09/07
System Parameters Calculation Tool Installation Manual	UEVOL-0677	Release B, 27/09/07
System Database User Manual	UEVOL-0956	Release C, 01/02/08
ATC Engineering Management Plan	UEVOL-0280	Release A, 28/04/06
Urbalis Evolution Guidelines for Project Deployment	UEVOL-0962	Release G, 05/02/08
Specification Logicielles	VESG-RED-D601	Release 1.14, 03/07/08
Document de Conception	VESG-RED-D602	V1.11, 03/07/08
User Manual	VESG-RED-D603	V1.7, 03/07/08
Validation Plan	VESG-RED-D604	Release 1.7, 03/07/08
Validation Matrix, Validation Report Version 2.6	VESG-RED	Version 3.2
ATC Architecture Description	UEVOL-0271	Release G, 4/4/08
CC – Rolling Stock Interface Description	UEVOL-0101	Release F, 5/12/07
RTI: Real Time Issues Variant 888	UEVOL-0712	Release F, 28/1/08
RTI: Real Time Issues Variant 888 Verification Report	UEVOL-0963	Release A, 22/5/07
ATC Subsystem Requirements Specification Verification Report	UEVOL 0816	Release E, 22/04/08
ATC Subsystem Requirements Specification Verification Report,	UEVOL 0818	Release D, 25/04/08
ATC Subsystem Architecture Description Verification Report	UEVOL 0817	Release E, 23/04/08
System Reqs Specification Verification Report variant 888	UEVOL 0807	Release G, 11/04/08
System Architecture Description Verification Report variant 888	UEVOL 0808	Release G, 18/04/08
ATC-CC Subsystem Sw Reqs Specification Verification Report	UEVOL 0819	Release E, 15/05/08
CC-Subsystem Hazard Analysis	UEVOL 0542	Release E, 16/04/08
CC-Subsystem Requirements Specification	UEVOL 0098	Release H, 04/04/08
ATC Generic Application Safety Cases	UEVOL 0887	Release 4A, 15/05/08
Interface Hazard Analysis, Variant 888	UEVOL 0747	Release D, 04/02/08
ATC Interface Hazard Analysis	UEVOL 0431	Version 5C
Urbalis Evolution - LC Sub-system, Sub-system Hazard Analysis	UEVOL-0430	Release E, 16/04/08
Urbalis Evolution - ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	Release D, 16/04/08
Urbalis Evolution - LC Sub-system, Requirements Specification	UEVOL-0264	Release F, 04/04/08
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	Release G, 04/04/08
Urbalis Evolution - ATC Sub-system, Requirements Specification	UEVOL-0270	Release H, 04/04/09
Urbalis Evolution - Preliminary Hazard Analysis	UEVOL-0263	Release C, 07/02/08



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution - System Hazard Analysis Variant 888	UEVOL-0793	Release E, 16/01/08
ATC1.4.3 - Sub-system V&V Report for CBTC Revenue Service	UEVOL-1171	Release E, 15/05/08
System V&V - Variant 888 - Block Mode Revenue Service	UEVOL-1172	Release C, 02/04/08
Urbalis Evolution - CC Sub-system Tests Report	UEVOL-140	Release Q, 11/07/08
Specific Safety Study UEVOL Evacuation Process	URBALIS-0960	Release C, 07/01/08
System and ATC: T&C Procedures Verification Report	UEVOL-1191	Release A, 07/11/07
Bordereau de Relecture	A402602-B	Version A
Bordereau de Relecture	A402326	Version C
Bordereau de Relecture	T-23 A402331-C	Version C
Review Comments	UEVOL-A402317-E-2C SwSRR-SGU-131207.xls	
Urbalis Evolution-ATC, Subsystem Integration Test Plan	UEVOL-0102	Release A, 23/02/07
Urbalis Evolution, Options Management	UEVOL-0987	Release E, 21/12/07
System Integration Tests Description Verification Report	UEVOL-0809	Release E, 11/04/07
System Reqs Test Description Verification Report Variant 888	UEVOL-0810	Release F, 15/05/08
System Validation Allocation Table	UEVOL-1044	Release B, 30/03/08
System: Exported Constraint Verification Report	UEVOL-1147	Release A, 15/11/07
System: User's Constraints Verification Report	UEVOL-1148	Release B, 23/11/07
System and ATC: T&C Procedures Verification Report	UEVOL-1191	Release A, 07/11/07
Safety Verification and Validation Plan	UEVOL-0219	Release D, 28/09/08
Urbalis Evolution, CC-ZC Interface Description	UEVOL-0185	Release F, 14/03/08
Urbalis Evolution, ZC-ZC Interface Description	UEVOL-0192	Release G, 14/03/08
Urbalis Evolution, LC-CC Interface Description	UEVOL-0205	04/04/08
Urbalis Evolution, LC-ZC Interface Description	UEVOL-0223	06/02/08
ATC Sub-system ; Safety, Verification & Validation Plan	UEVOL-0353	Release C, 15/10/07
Urbalis Evolution, ATC Interface Hazard Analysis	UEVOL-0431	Release 5C, 07/01/08
Hazard Log , Baseline System 1.4.5.17	UEVOL-888-1188	Version 5B
Urbalis Evolution - ATC System: System Hazard Analysis	UEVOL-0831	Release B, 17/04/08
ATC-ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821	Release B, 7/5/08
ATC Subsystem Reqs Test Description Verification Report	UEVOL-0824	Release D, 15/5/08
ATC-CC Subsystem Reqs Test Description Verification Report	UEVOL-0826	Release E, 13/5/08
ATC-ZC Subsystem Reqs Test Description Verification Report	UEVOL-0827	Release E, 15/5/08
ATC-LC Subsystem Reqs Test Description Verification Report	UEVOL-0828	Release E, 13/5/08
ATC User's Constraints Verification Report	UEVOL-1175	Release A, 23/10/07
ATC: Exported Constraints Verification Report	UEVOL-1176	Release A, 23/11/07
CC Subsystem Integration Tests Plan	A401570	Release E, 25/06/08
CC Subsystem Integration Tests Description	A401880	Release L, 02/07/08
CC ATP Software Integration Tests Plan	A402308	Release A, 20/02/08
CC Software Integration Test Description	A402309	Release D, 19/05/08



Title of Document	Alstom Reference	Release/Date
CC - ATP Software Integration Tests Report	A402310	Release D, 19/05/08
CC - ATP Software Reqs Tests Description	A401878	Release J, 11/07/08
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	Release I, 26/06/08
CC - Software Safety Requirement Report	A402319	Release I, 06/06/08
ZC - Subsystem Integration Tests Plan	A401571	Release C, 23/04/08
LC - Subsystem Integration Test Plan	A401572	Release C, 23/04/08
ZC - Subsystem Integration Tests Report	A402288	Release O, 26/06/08
LC - Subsystem Integration Tests Report	A402292	Release H, 24/06/08
LC - Application Software Integration Tests Report	A402271	Release C, 11/04/08
ZC Subsystem Integration Tests Description Verification Report	A402930	Release C, 10/06/08
ZC ASW, Software Requirements Tests Report	A402289	Release H, 26/06/08
LC ASW, Software Requirements Tests Report	A402293	Release E, 04/04/08
ZC ASW, Requirements Tests Description Verification Report	A402921	Release F, 20/06/08
LC ASW, Requirements Tests Description Verification Report	A402922	Release C, 09/04/08
ZC - Software Safety Requirement Report	A402317	Release IK, 01/07/08
LC - Software Safety Requirement Report	A402318	Release E, 12/06/08
Vital Embedded Settings Generator - Software Requirements Test Plan	A404217	Release B, 02/07/08

Phase 2 Review (January – June 2009)

Table 18: Documents Considered during Post-Phase C Review

Title of Document	Alstom Reference	Release/Date
CC ATP Software Architecture Descriptions, (CCSwAD)	A401466	Release 4E
CC Vital Software – Software Module Design	A406966	Release B, 20/03/09
ZC Software Requirements Coverage Document	A403795	Release C
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	Release F
LC Software Requirements Coverage Document	A403796	Release D
LC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402939	Release D
LC Software Requirements Specification	A401381	Version G, 03/03/09
Urbalis Evolution Options Management	UEVOL - 0987	Release I, 16/09/08
Urbalis Evolution, Guideline for Project Deployment	UEVOL - 0962	Release J, 22/10/08
Specific Safety Study UEVOL Evacuation Process	URBALIS - 0960	Release D, 06/06/08
Specific Safety Study on Standstill Initialisation	UEVOL-1040	Release 4B
System Hazard Analysis	UEVOL-0421	Release D, 23/01/09
Systems Requirements Specification	UEVOL-0224	Release G, 21/10/08
ATC Engineering Management Plan	UEVOL-0280	Release A, 28/04/06
System Safety Verification and Validation Plan	UEVOL-0219	Release C, 07/12/06
ATC Subsystem Safety, Verification and Validation Plan	UEVOL-0353	Release C, 15/10/07



Title of Document	Alstom Reference	Release/Date
LC System Hazard Analysis	UEVOL-430	Release H, 19/01/09
LC Subsystem Requirements Specification	UEVOL-0264	Release IH, 01/12/08
ZC SHA	UEVOL-0543	Release H, 17/03/09
Specific safety study on wheel and train movement speed and acceleration estimation	A402218	Version IC
Specific safety study on energy	A402362	Release ID
Specific safety study on automatic protection	A402331	Release 2D
Specific safety study on synchronization	A402602	Release B, 21/02/08
ATC Subsystem: System requirement specification verification report	UEVOL-0816	Release I, 30/01/09
VESG Safety Verification – Object Code Diversification	Study_PR09_0020	Release A, 13/05/09
CC VESG Software Hazard Analysis	A406391	Release A, 11/05/09
CC-ATP Software Architecture Description	A401466	Release 7E
CC-ATP Software Requirements Specification	A40464	Release Q
CC-ATP Software Module Description	A406966	Release C, 21/04/09
VESG Critical Code Review Analysis Report	A406392	Release A
CC-ATP Software: Architecture Description	A401466	Release 7E, 18/05/09
CC Vital Software: Software Module Design	A406966	Release C, 21/04/09
CC VESG: Critical Code Review Analysis Report	A4063921	Release A, 11/05/09
Specific Safety Study on Energy Monitoring	A402326	Release ID, 20/04/09
ZC-CBI Interface Description Variant Regular	UEVOL-0220	Release E, 02/10/08
LC Application, Software Requirements Specification	A401381	Release G, 03/03/09
ZC, Software Safety Requirements Report	A402317	Release P, 13/05/09
CC-ATP Software Integration Test Description Verification Report	A402273	Release F, 01/10/08
CC-Vital, Software Integration Test Plan	A402308	Release D, 07/04/09
CC-Subsystem, Integration Test Description Verification Report	A402282	Release L, 14/05/09
CC-ATP Software Requirements Test Description Verification Report	A402284	Release O, 15/5/09
CC-ATP Software Impact Analysis	A403516	Release U, 6/5/09
LC Software Impact Analysis	A405062	Release F, 29/4/09
CC-ATP Software Requirements Tests Description	A401878	Release Q, 13/5/09
Specific Safety Study on Automatic Protection	A402331	Release D, 4/5/09
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release G, 21/01/09
System Hazard Log	UEVOL-1188-IC	Release IC, 01/09/08
ATC Generic Application Safety Case	UEVOL-0887-2B	Release 2B, 29/01/09
Critical Code Review Analysis Report	T-402528 EN-R	04/02/09
Coverage of 2003 Safety Exported Constraints	A402444-C	Release C, 21/01/09
CC Software Safety Assurance Report	HA-T-A402620en-AR	18/02/09
ZC-LC Software Safety Assurance Report	HA-T-A402621-AA	18/02/09
UEVOL CC ATP Source Code Verification Report	T-23 A402606-N	13/02/09
UEVOL Trackside LC Source Code Verification Report	T-23 A402913-D	Release D, 16/09/08
UEVOL Trackside ZC Source Code Verification Report	T-23 A402912-F	Release F, 08/10/08



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257-S	Release S, 29/01/08
Urbalis Evolution – LC Software, Software Impact Analysis	A405062-E	Release E, 30/01/09
Urbalis Evolution – CC-ATP Software, Software Impact Analysis	A403516-T	Release T, 13/02/09
Urbalis Evolution – CC-ATP B Specification Verification Report	A402882-R	Release , 06/02/09
Urbalis Evolution – CC-ATP Formal Proof Document	A402843-P	Release , 28/01/09
Urbalis Evolution – LC-ASW Formal Proof Document	A402845-D	Release , 10/12/08
UEVOL ZC Formal Proof Document	A402844-Q	Release , 27/01/09
Urbalis Evolution - ZC Formal Proof Verification Report	A402917-O	Release , 24/10/08
Urbalis Evolution – LC – ASW Formal Proof Verification Report	A402918-B	Release , 26/09/08
Urbalis Evolution – CC ATP Formal Proof Verification Report	A402916-O	Release , 09/12/08
Urbalis Evolution – ZC Software Hazard Analysis	A401824en-Q	Release , 03/02/09
Urbalis Evolution – CC – ATP B Specification Verification Report	A402882-R	Release , 06/02/09
Urbalis Evolution – LC B Specification Verification Report	A402915-C	Release , 13/02/08
Urbalis Evolution – ZC B Specification Verification Report	A402914-O	Release , 16/02/08
Urbalis Evolution – ZC Software Hazard Analysis	A401824-Q	Release , 03/02/09
System Parameters Deployment Process	UEVOL-0350-G	Release , 21/10/08
Safety Requirements for Data Preparation Tools Development	UEVOL-0529-C	Release , 10/09/08
System Parameters Process Hazard Analysis	UEVOL-0422-B	Release , 16/09/08
System Parameter Configuration Rules Safety Study	UEVOL-1038/B	Release , 03/03/09
System Parameters XML Scheme Files	UEVOL-0569-Q	Release , 22/10/08
System Parameters ATC XML File Format	UEVOL-0511-Q	Release , 22/10/08
Urbalis Evolution – LC – ASW Formal Proof Document	A402845-F	Release , 01/03/09
UEVOL ZC Formal Proof Document	A402844-R	Release , 20/03/09
Urbalis Evolution – CC – ATP Formal Proof Document	A402843-IQ	Release , 25/03/09
Urbalis Evolution – ZC Application Software Requirements Specification	Y3-64 A401380-O	Release , 20/03/09
Argumentation to Justify that the Safety Requirement of Platform 2003 are Fulfilled without Selection of Potential Data Slice	Memo-ST09-011fr	27/04/09
Coverage of 2003 Safety Exported Constraints	A402444en-D	Release D, 11/05/09
UEVOL Trackside LC Source Code Verification Report	T-23 A402913-E	Release E, 28/03/09
UEVOL Trackside ZC Source Code Verification Report	T-23 A402912-G	Release G, 31/03/09
Generic and Specific Signature for SACEM Vital Check Sums	UEVOL-0246-G	Release G, 02/12/08
Compensated Gradients Generation Manual	UEVOL-1083-C	Release C, 05/12/08
Project Name – LC Parameters Validation Report	UEVOL-1084-A	Release A, 28/09/07
Project Name – ZC Parameters Validation Report	UEVOL-1085-A	Release A, 28/09/07
Project Name – Beacon Layout Validation Report	UEVOL-1086-A	Release A, 28/09/07
Project Name – Compensated Gradients Validation Report	UEVOL-1087-A	Release A, 28/09/07
Project Name – SGD Validation Report	UEVOL-1088-A	Release A, 28/09/07
Specific Subdivision Rules for Beacons	UEVOL-1089-A	Release A, 01/10/07
LC Parameters Configuration Rules	UEVOL-0397-H	Release H, 21/01/09
ZC Parameters Configuration Rules	UEVOL-0396-L	Release L, 21/01/09



Title of Document	Alstom Reference	Release/Date
ATC Subdivision Rules	UEVOL-0395-I	17/03/09
ATC Subdivision Rules Checklist	UEVOL-0772-D	Release D, 15/09/08
ATC Configuration Rules Safety Study	UEVOL-1574-OR	23/03/09
Urbalis Evolution – CC – ATP Formal Proof Document	A402843-Q	Release Q, 12/05/09
Urbalis Evolution – CC – ATP Formal Proof Verification Report	A402916-P	Release P, 14/05/09
Urbalis Evolution – ZC Formal Proof Verification Report	A402917-P	Release P, 12/05/09
Urbalis Evolution – LC – ASW Formal Proof Verification Report	A402918-C	Release C, 12/05/09
UEVOL CC-Vital Software Source Code Verification Report	T-23 A402606-O	Release O, 12/05/09
Urbalis Evolution – LC B Specification Verification Report	A402915-D	Release D, 20/04/09
Urbalis Evolution – CC – ATP B Specification Verification Report	A402882-T	Release T, 18/05/09
Urbalis Evolution – ZC B Specification Verification Report	A402914-P	Release P, 10/04/09
Urbalis Evolution – LC Critical Code Review Analysis Report	Y3-64 A402322-G	Release G, 12/05/09
Urbalis Evolution – ZC Critical Code Review Analysis Report	T-A402528en-S	Release S, 06/05/09
UEVOL-CC-ATP-ASW Critical Code Review Analysis Report	T-23 A402598-Y	Release Y, 15/05/09
CC-Vital Setting Description	UEVOL-0643-G	Release G, 12/02/09
RTI: Real Time Issues Variant Reg	UEVOL-0212-D	Release D, 21/10/08
ATC GenPar Module Evolution Software Requirements Test Description	No formal reference	10/04/09
ATC GenPar Module Evolution Software Requirements Test Plan	No formal reference	10/04/09
ATC GenPar Module Evolution Software Requirements Test Report	No formal reference	10/04/09
ATC GSD Gen SGD Module Software Requirements Test Description	No formal reference	10/04/09
ATC GSD Gen SGD Module Software Requirements Test Plan	No formal reference	10/04/09
ATC GSD Gen SGD Module Software Requirements Test Report	No formal reference	10/04/09
ATC GSD Gen RTS Module Software Requirements Test Description	No formal reference	10/04/09
ATC GSD Gen RTS Module Software Requirements Test Plan	No formal reference	10/04/09
ATC GSD Gen RTS Module Software Requirements Test Report	No formal reference	10/04/09
RTI: Real Time Issues Variant Reg, Verification Report	UEVOL-1504/B	Release B, 27/03/09
ATC Data Preparation, Verification and Validation Process	UEVOL-0398-2H	Release 2H, 14/04/09
ATC Parameters Process Hazard Analysis	UEVOL-0544-D	Release D, 18/05/09
SW Urbalis Evolution – ZC Software Module Test Description Verification Report	Y3-64 A402925-F	Release F, 06/05/09
Software Module Test Report ZC ASW	T-23 A402291-I	20/03/09
Urbalis Evolution - ZC Application Architecture Description	Y3-64 A401847-B	Release B, 18/12/08
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257-T	Release T, 29/04/09
Urbalis Evolution – ZC Sub-system Architecture Description	Y3-64 A401536-C	Release C, 21/11/08
ATC SW Urbalis Evolution – LC Software Module Test Description Verification Report	Y3-64 A402926-E	Release E, 12/05/09
Urbalis Evolution – ZC Application Software Requirements Specification	Y3-64 A401380-0	Release D, 20/03/09
Urbalis Evolution – ZC Software Hazard Analysis	A401824-S	Release S, 05/05/09
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114-J	Release J, 02/12/08



Title of Document	Alstom Reference	Release/Date
ATC Subdivision Rules Specific Study	UEVOL-1027-A	Release A, 05/05/09
ZC-LC Software Safety Assurance Report	Ha-T-A402621len-AB	18/05/09
CC Software Safety Assurance Report	Ha-T-A402620-AS	18/05/09
ATC Generic Application Safety Case	UEVOL-0887-3B	Release 3B, 19/05/09
ATC SW Urbalis Evolution – CC ATP Software Module Test Description Verification Report	Y3-64 A402266-H	Release H, 29/09/08
Urbalis Evolution – LC Subsystem Architecture Description	Y3-64 A401537-D	Release D, 22/02/09
Urbalis Evolution – LC Application Architecture Description	Y3-64 A401848-ZC	26/02/09
System Architecture Description	UEVOL-0225	Release G
ATC Driver Interface description	UEVOL-0244	Release H
System Exported Operational Constraints regular variant	UEVOL-1436	Release A
Urbalis Platform SBS/PBS	UEVOL-0715	Release 7A
Preliminary Hazard Analysis	UEVOL-0263	Release 2D
Interfaces Hazard Analysis	UEVOL-0367	Release D
ATC Interface Hazard Analysis	UEVOL-0431	Release G
ATC Safety Hazard Analysis	UEVOL-0831	Release F
ATC: System Architecture Description Verification Report	UEVOL-0817	Release J
ATC: System Requirement Specification Verification Report	UEVOL-0818	Release I
ATC-CC: System Software Requirement Specification Verification Report	UEVOL-0819	Release H
ATC-ZC: System Software Requirement Specification Verification Report	UEVOL-0821	Release E
ATC-LC: System Software Requirement Specification Verification Report	UEVOL-0823	Release G
ATC: System Requirement Test Description Verification Report	UEVOL-0824	Release G
ATC: System Integration Test Description Verification Report	UEVOL-0825	Release F
ATC-CC: System Requirement Test Description Verification Report	UEVOL-0826	Release I
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	Release I
ATC-LC: System Requirement Test Description Verification Report	UEVOL0828	Release I
ATC Design Verification Plan	UEVOL-1170	Release B
ATC Exported Constraints verification report	UEVOL-1176	Release B
ZC Sw Requirement Specification	A401380	Release O
CC Sy Architecture Description	A401446	Release H
ZC Sy Architecture Description	A401536	Release C
LC Sy Architecture Description	A401537	Release D
ZC Sw Architecture Description	A401847	Release B
LC Sw Architecture Description	A401848	Release C
ZC SW Architecture Description Verification Report	A402935	Release F
ZC Sw Architecture Description Verification Report	A402936	Release C
ZC Sw Integrated Test Description Verification Report	A402928	Release D
LC Sw Integrated Test Description Verification Report	A402929	Release D



Title of Document	Alstom Reference	Release/Date
ZC Sy Integrated Test Description Verification Report	A402930	Release G
LC Sy Integrated Test Description Verification Report	A402933	Release D
ZC Sw Requirement Test Description Verification Report	A402921	Release K
LC Sw Requirement Test Description Verification Report	A402922	Release F
ATC Sw Requirement Specification Verification Report	A401804	Release B
ZC Sy Architecture Description/Sw Requirement Specification Verification Report	A402938	Release G
LC Sy Architecture Description/Sw Requirement Specification Verification Report	A402939	Release E
CC Sy Integrated Test Description	A401880	Release S
ZC Sy Integrated Test Description	A401883	Release O
LC Sy Integrated Test Description	A401884	Release I
CC Sy Integrated Test Plan	A401570	Release G
ZC Sy Integrated Test Plan	A401571	Release D
LC Sy Integrated Test Plan	A401572	Release E
CC ATP Software Requirements Test Description	A401878	Release Q
CC ATO Software Requirements Test Description	A401879	Release P
ZC Software Requirements Test Description	A401881	Release U
LC Software Requirements Test Description	A401882	Release I
CC ATP Sw Requirement Test Plan	A401462	Release N
ZC Software Requirements Test Plan	A401691	Release T
LC Software Requirements Test Plan	A401692	Release I
CC ATP Sw Requirement Test Report	A402285	Release X
ZC ASw Sw Requirement Test Report	A402289	Release V
LC ASw Sw Requirement Test Report	A402293	Release H
LC ASw Sw Module Test Description	A402264	Release A
ZC ASw Sw Module Test Description	A402290	Release A
CC V Sw Module Test Description	A402313	Release B
LC ASw Sw Module Test Report	A402265	Release H
CC V ATP and VESG SW Module Test Report	A402314	Release K
LC ASw Sw Integrated Test Description	A402269	Release E
ZC ASw Sw Integrated Test Description	A402270	Release E
CC ATP Sw Integrated Test Description	A402309	Release G
LC Sw Integrated Test Description	A402268	Release C
CC ATP Sw Integrated Test Plan	A402308	Release D
ZC Sw Integrated Test Plan	A402910	Release A
LC ASw Integrated Test Report	A402271	Release E
ZC ASw Integrated Test Report	A402272	Release E
CC ATP Integrated Test Report	A402310	Release G
LC Software Requirements Report	A402318	Release H



Title of Document	Alstom Reference	Release/Date
CC Software Requirements Report	A402319	Release O

1.6.2.1 Review (June 2009 – September 2009)

Table 19: Documents Considered during Baseline 1.6.2.1 Review

Title of Document	Alstom Reference	Release/Date
ATC Subdivision Rules	UEVOL-0395-K	26/06/09
ATC Subdivision Rules Checklist	UEVOL-0772-F	26/06/09
B Coding Rules	T-23 A403929-D	03/06/09
B Coding Rules	T-23 A403929-E	29/07/09
ATC Data Preparation, Verification and Validation Process	UEVOL-0398-J	09/07/09
Project Name - LC Parameters Validation Report	UEVOL-I084-B	30/06/09
Project Name - ZC Parameters Validation Report	UEVOL-I085-B	30/06/09
Project Name - Beacon Layout Validation Report	UEVOL-I086-B	30/06/09
Project Name - Compensated Gradients Validation Report	UEVOL-I087-B	30/06/09
CC-Vital Setting Description	UEVOL-0643-I	26/06/09
Vital Checksum Principles for SACEM Messages	UEVOL-0275-A	22/06/09
Project Name - SGD Validation Report	UEVOL-I088-B	30/06/09
Urbalis Evolution - CC-ATP, Formal Proof Document	A402843-S	06/07/09
Urbalis Evolution - ZC Application Formal Proof Document	A402844-S	03/07/09
Urbalis Evolution - LC-ASW Formal Proof Document	A402845-F	01/03/09
Urbalis Evolution - CC-ATP Formal Proof Verification Report	A402916-R	10/07/09
Urbalis Evolution - ZC Software, Software Impact Analysis	A404257-V	01/07/09
Software Safety, Validation and Verification Plan	T-23 A401582-E	16/07/09
Software Safety, Validation and Verification Plan	T-23 A401582-F	04/08/09
Software Safety, Validation and Verification Plan	T-23 A401582-G	26/08/09
Urbalis Evolution - ZC Formal Proof Verification Report	A402917-Q	26/06/09
Urbalis Evolution - LC-ASW Formal Proof Verification Report	A402918-D	07/07/09
UEVOL Trackside ZC, Source Code Verification Report	T-23 A402912-H	08/07/09
UEVOL Trackside LC, Source Code Verification Report	T-23 A402913-F	08/07/09
UEVOL CC-Vital Software Source Code Verification Report	T-23 A402606-P	26/06/09
ATC Exported XML Beacon Layout File Description	UEVOL-I430-A	30/09/08
ATC Data Activities Recorder Project – ATC SW Version	UEVOL-I236-C	30/06/09
Urbalis Evolution - LC B Specification Verification Report	A402915-G	21/07/09
Urbalis Evolution - ZC B Specification Verification Report	A402914-Q	06/07/09
Urbalis Evolution - CC-ATP B Specification Verification Report	A402882-V	24/06/09
UEVOL ZC-LC Coverage of 2003 Safety Exported Constraints	A402444en-E	20/07/09
Critical Code Review Analysis Report	Y3-64 A402322-H	16/06/09
Urbalis Evolution - ZC Critical Code Review Analysis Report	A402528-T	26/06/09



Title of Document	Alstom Reference	Release/Date
UEVOL-CC-ATP-ASW Critical Code Review Analysis Report	T-23 A402598-Z	06/07/09
Urbalis Evolution - ZC Application Software Requirements Specification	Y3-64 A401380-Q	12/06/09
Urbalis Evolution - ZC Software Hazard Analysis	A401824en-T	18/06/09
CC Software Safety Assurance Report	Ha-T-A402620-AT	15/07/09
Compensated Gradients Generation Manual	UEVOL-I083-D	30/06/09
Specific Subdivision Rules for Beacon	UEVOL-I089-B	20/03/09
ZC Parameters Configuration Rules	UEVOL-0396-M	19/05/09
ZC Parameters Configuration Rules	UEVOL-0396-N	19/05/09
LC Parameters Configuration Rules	UEVOL-0397-I	26/03/09
UEVOL ZC Formal Proof Document	A402844-T	22/07/09
ATC Generic Application Safety Case	UEVOL-0887-C	21/07/09
ATC Subdivision Rules Specific Study	UEVOL-I027-B	25/06/09
Specific Safety Study on Trackside ATC Parameters	A402904-B	31/07/09
Specific Safety Study on On-board ATP Parameters	A402903-C	31/07/09
Software Quality Plan	A401468-D	22/07/09
Software Quality Plan	A401468-E	28/08/09
<ATC Data Generation Procedure 1 st Chain>	<UEVOL-I666>-5B	10/07/09
<ATC Data Generation Procedure 2 nd Chain>	<UEVOL-I667>-4A	10/07/09
Tk Software Requirements and Architecture Description Verification Report	T-23 A402938-H	02/07/09
Urbalis Evolution – ZC Software Safety Requirement Report	Y3-64 A402317-Q	26/06/09
ZC – LC Software Safety Assurance Report	A402621-AC	15/07/09
ATC Hazard Log	UEVOL-I705-B	24/08/09
ATC Parameters Process Hazard Analysis	UEVOL-0544-E	10/07/09
ATC Validation Allocation Table	UEVOL-I169-I	07/07/09
Software Module Test Description	A402290	A - 27/03/07
Software Module Test Report	A402291	J – 10/07/09
Software Module Test Description Verification Report	A402925	G – 14/07/09
LC Software Module Test Description	A402264	A – 27/03/07
LC Software Module Test Report	A402265	I – 10/07/09
LC Software Module Test Description Verification Report	A402926	F – 13/07/09
CC – V: ATP and VESG Software Module Test Description	A402313	C – 3/07/09
CC-V: ATP and VESG Software Module Test Report	A402314	L – 3/07/09
CC – V: Software Module Test Description Verification Report	A402266	I – 6/07/09
ZC SyAD	A401536	D – 2/06/09
ZC SyAD/SwRS Verification Report	A402938	H – 2/07/09
ZC SwRS	A401380	Q – 8/06/09
TRK Software Requirements and Architecture Description Verification Report	A402938	2/07/09
LC SyAD	A401537	E – 5/06/09



Title of Document	Alstom Reference	Release/Date
Safety, Verification & Validation Plan	A401582	D&E -
TRK Software Architecture Description	A407321	A – 8/06/09
LC Subsystem Integration Tests Plan	A401572	F – 23/06/09
CC – ATP Software Impact Analysis	A403516	W – 1/07/09
LC Software Impact Analysis	A405062	H – 1/07/09
ZC Software Impact Analysis	A404257	V – 1/07/09
CC ATP Software Requirements Test Description	A401878	R – 26/06/09
ZC Software Requirements Test Description	A401881	V – 23/06/09
LC Software Requirements Test Description	A401882	J – 18/06/09
CC ATP Software Requirements Test Description Verification Report		
ZC Software Requirements Test Description Verification Report	A402921	L – 26/06/09
LC Software Requirements Test Description Verification Report	A402922	G – 26/06/09
CC ATP Software Requirements Test Plan	A401462	O – 26/06/09
ZC Software Requirements Test Plan	A401691	U – 23/06/09
LC Software Requirements Test Plan	A401692	J – 18/06/09
ZC Subsystem Integration Tests Plan	A401571	E – 24/06/09
ZC Subsystem Integration Tests Description	A401883	P – 23/06/09
ZC Subsystem Integration Tests Report	A402288	Y – 17/06/09
ZC Subsystem Integration Test Description Verification Report	A402930	H – 30/06/09
LC Subsystem Integration Test Plan	A401572	F – 23/06/09
LC Subsystem Integration Test Description	A401884	J – 23/06/09
LC Subsystem Integration Test Report	A402292	N – 17/06/09
LC Subsystem Integration Test Description Verification Report	A402933	E – 1/07/09
CC Subsystem Integration Test Plan	A401570	H – 23/06/09
CC Subsystem Integration Test Description	A401880	T – 30/06/09
CC Subsystem Integration Test Report	A402287	AI – 1/07/09
LC Software Integration Tests Plan	A402268	D – 7/07/09
LC Software Integration Test Description	A402269	F – 7/07/09
LC Software Integration Test Report	A402271	F – 7/07/09
LC Software Integration Test Description Verification Report	A402929	T – 10/07/09
CC ATP Software Integration Test Plan	A402308	E – 26/06/09
CC ATP Software Integration Test Description	A402309	H – 26/06/09
CC ATP Software Integration Test Report	A402310	H – 29/06/09
CC ATP Software Integration Test Description Verification Report	A402273	G – 3/07/09
ZC Software Integration Tests Plan	A402910	B – 14/07/09
ZC Software Integration Tests Description	A402270	F – 14/07/09
ZC Software Integration Tests Report	A402272	F – 14/07/09
ZC Software Integration Test Description Verification Report	A402928	E – 16/07/09
LC Software Requirements Test Plan	A401692	J – 18/06/09



Title of Document	Alstom Reference	Release/Date
LC Software Requirements Test Description	A401882	J – 18/06/09
LC Software Requirements Test Report	A402293	I – 18/06/09
LC Software Requirements Test Verification Report	A402922	G – 26/06/09
ZC Software Requirements Test Plan	A401691	U – 23/06/09
ZC Software Requirements Test Description	A401881	V – 23/06/09
ZC Software Requirements Test Report	A402289	W – 23/06/09
ZC Software Requirements Test Description Verification Report	A402921	L – 26/06/09
CC ATP Software Requirements Test Plan	A401462	O – 26/06/09
CC ATP Software Requirements Test Description	A401878	R – 26/06/09
CC ATP Software Requirements Test Report	A402285	Y – 26/06/09
CC ATP Software Requirements Test Description Verification Report	A402284	P – 26/06/09
ATC Interface Hazard Analysis	UEVOL 0431	I – 20/07/09
ATC Safety, Verification & Validation Plan	UEVOL 0353	D
ATC Subsystem Architecture Description Verification Report	UEVOL 0817	L – 25/06/09
ATC Subsystem Requirements Specification Verification Report	UEVOL 0818	K – 25/06/09
CC System-Software Requirement Specification Verification Report	UEVOL 0819	K – 08/07/09
ZC System-Software Requirement Specification Verification Report	UEVOL 0821	H – 07/07/09
LC System-Software Requirements Specification Verification Report	UEVOL 0823	H – 07/07/09
ATC Subsystem Requirements Test Description Verification Report	UEVOL 0824	H – 07/07/09
ATC Subsystem Integration Test Description Verification Report	UEVOL 0825	H – 07/07/09
ATC CC Subsystem Requirement Test Description Verification Report	UEVOL 0826	J – 15/07/09
ATC ZC Subsystem Requirements Test Description Verification Report	UEVOL 0827	J – 08/07/09
ATC Design Verification Plan	UEVOL 1170	D – 15/07/09
ATC Subsystem Requirements Specification	UEVOL 0270	N – 23/06/09
ATC Subsystem Architecture Description	UEVOL 0271	M – 23/06/09
CC-ZC Interface Description	UEVOL 0185	H – 23/06/09
ZC-ZC Interface Description	UEVOL 0192	J – 22/06/09
CC-CC Interface Description	UEVOL 0205	I – 12/03/09
LC-ZC Interface Description	UEVOL 0223	G – 22/06/09
LC Subsystem Requirements Specification	UEVOL 0264	H – 03/03/09
ZC Subsystem Requirements Specification	UEVOL 0114	L – 22/06/09
CC Eurobalise Interface Description	UEVOL 0123	D – 09/02/09
LC Subsystem Requirements Test Plan	UEVOL 0678	A – 31/01/07
ZC Subsystem Requirements Test Plan	UEVOL 0968	A – 27/06/09
CC Subsystem Requirements Test Plan	UEVOL 0103	A – 11/10/07
LC Subsystem Requirements Test Description	UEVOL 0679	H – 07/07/09
ZC Subsystem Requirements Test Description	UEVOL 0969	H – 06/07/09
CC Subsystem Test Description	UEVOL 0139	I – 16/07/09
ATC – ZC Subsystem Requirement Test Description Verification Reports	UEVOL 0827	J – 08/07/09



Title of Document	Alstom Reference	Release/Date
ATC – LC Subsystem Requirements Test Description Verification Report	UEVOL 0828	J – 08/07/09
ATC – CC Subsystem Requirements Test Description Verification Report	UVEOL 0826	I – 01/04/09
LC Subsystem Requirements Test Report	UEVOL 1011	I – 07/07/09
Subsystem Integration Test Plan	UEVOL 0102	A – 23/02/07
Subsystem Integration Test Description	UEVOL 0137	F – 10/07/09
Subsystem Integration Test Report	UEVOL 1046	L – 21/07/09
ATC Subsystem Integration Test Description Verification Report	UEVOL 0825	H – 07/07/09
ZC – CBI Interface Test Plan	UEVOL 0465	E – 25/06/09
CC Subsystem Test Report	UEVOL 0140	AD – 21/07/09
LC Subsystem Test Report	UEVOL 1011	I – 07/07/09
ZC Subsystem Test Report	UEVOL 1186	S – 7/07/09
ATC Subsystem Requirements Test Description	UEVOL 0138	C – 16/07/09
ATC Subsystem Requirements Test Description Verification Report	UEVOL 0824	H – 7/07/09
ATC Subsystem Requirements Test Report Validation Report	UEVOL 1275	E – 17/07/09
ATC Subsystem Architecture Description Verification Report	UEVOL 0817	L – 25/06/09
ATC Subsystem Hazard Analysis	UEVOL 0831	H – 17/07/09
ATC Design Verification Plan	UEVOL 1170	D – 15/07/09
ATC Subsystem Requirement Specification Verification Report	UEVOL 0816	L – 25/06/09
ATC Subsystem Architecture Description Verification Report	UEVOL 0817	L – 25/05/09
CC SyRS	UEVOL 0098	N – 23/06/09
Tk SyAD Coverage Document	A408134	Release A, 09/06/09
CC Software, Architecture Description	A401446	Release I, 09/06/09
CC Vital Software, Architecture Description	A401466	Release F, 11/06/09
CC Vital Software, Software Module Design	A406966	Release F, 08/06/09
CC Vital SyAD Coverage	A408131	Release A, 12/09/09
CC (Vital and non-vital) Software Requirements and Architecture Description Verification Report	A401804	Release C, 02/07/09
LC Software Requirements Specification	A401381	Release H, 08/06/09
ZC Software: SyRS Coverage Document	A403795	Release E, 04/06/09
LC Software: SyRS Coverage Document	A403796	Release E, 04/06/09
CC Software Safety Assurance Report	A402620	Release AT, 15/07/09
Trackside ATC Subsystem: ZC-LC Software Safety Assurance Report	A402621	Release AC, 15/07/09
CC-VESG: Software Safety Requirement Report	A406393	Release B, 03/07/09
CC-Software: SyRS Coverage	A403003	Release I, 08/06/09
CC-VESG: Software Hazard Analysis	A406391	Release B, 30/06/09
CC-VESG: Critical Code Review Analysis Report	A406392	Release B, 03/07/09
Tk Software Requirements and Architecture Description Verification Report	A402938	Release H, 02/07/09
Specific Safety Study on Energy Monitoring	A402326	Release D, 02/07/09



Title of Document	Alstom Reference	Release/Date
CC: Software Safety Requirements Report	A402319	Release P, 06/07/09
ZC Software Safety Requirements Report	A402317	Release R, 07/08/09
CC SyRS – SWRS Verification Report	UEVOL-0819	Release K
LC Software Hazard Analysis	A401825	Release I, 12/06/09
LC – Software Safety Requirement Report	A402318	Release I, 25/07/09
ATC Safety Exported Constraints Verification Report	UEVOL 1704	B, 24/07/09
CC SyRTP	UEVOL 103	B, 02/09/09
ATC SyRTP	UEVOL 0113	A, 15/06/09
LC SyRTP	UEVOL 0678	B, 01/09/09
ZC SyRTP	UEVOL 0968	B, 01/09/09
ConfUevolToUniv.doc	UEVOL-1630	
Procedure for UNIVIC & DMI Data Plugs Configuration	UEVOL-1664-1A	7 July 2009
DS – Beacons Layout – Data Prep	UEVOL-1537-1A	24 July 2008
DS – Compensated Gradients – Data Prep	UEVOL-1538-1A	24/7/08
RS – Compensated Gradients – Data Prep	UEVOL-1539-1A	3 December 2009
DS – Compensated Gradients – Data Prep	UEVOL-1540-1A	24/7/08
DS – On Board – Data Prep	UEVOL-1541-1A	5/12/08
RS – On Board – Data Prep	UEVOL-1542-1A	5/12/08
DS – On Board – Data Prep	UEVOL-1543-1A	24/7/08
DS – Trackside – Data Prep	UEVOL-1544-1A	5/12/08
DS – Trackside – Data Prep	UEVOL-1546-1A	24/7/08
Procedure for Alchemist Deployment, Release 2.9.0 RC3	UEVOL-1631-8A	2/9/09
DS – Beacons Layout – Data Prep	UEVOL-1535-1A	24/7/08
RS – Beacon Layout – Data Prep	UEVOL-1536-1A	5/12/08
ATC Configuration Rules Safety Study	UEVOL-1574-B	13/8/09
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754-A	28/7/09
SGD CVS to XML Translator Requirements Test Report	No formal ref	31/7/09
ATC GenPar Module Evolution, Software Requirements Test Report	No formal ref	4/8/09
GenPZ Requirements Test Report	No formal ref	29/4/09
ATC GSD Gen SGD Module Software Requirements Test Report	No formal ref	5/8/09
Gen ATC Data – System Requirements Test Report PART 1 (for GAD1)	UEVOL-1672-A	31/7/09
Gen ATC Data – System Requirements Test Report PART 2 (for GAD2)	UEVOL-1672-A	31/7/09
VES Software Production Manual	A404453	Release A, 29/5/08
CC Software Release Note 4.5.3	A402045	Release AR, 10/7/09
Trackside Software Release Note 4.5.1	A402079	Release AD, 10/7/09
ATC Software Release Note 4.5.3	A402307	Release BI, 17/7/09
Software Production Manual ZC-LC Application and Track Data Generator	A404112	Release A, 3/3/09



Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Wheel and Train Movement Speed and Acceleration Estimation	A402218	Release 2C, 18/06/09
Specific Safety Study – Automatic Protection	A402331	Release D, 24/06/09
CC Subsystem Requirements Specification	UEVOL-0098	Release N, 23/06/09
ATC-CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release K, 08/07/09
LC Sub-system Hazard Analysis	UEVOL-0430	Release I, 08/06/09
ZC Sub-system Hazard Analysis	UEVOL-0543	Release J, 20/07/09
Z ATC System Requirement Specification Verification Report	UEVOL-0816	Release L
Specific Safety Study on High Integrity Level Controls (HILC)	A405430	Release A, 13/12/08
Specific Safety Study on Safety Related Remote Controls (SRRC)	A405431	Release A, 18/12/08

System Baseline 1.6.2.2 Review (September 2009 – October 2009)

Table 20: Documents Considered during Baseline 1.6.2.2 Review

Title of Document	Alstom Reference	Release/Date
UEVOL ZC, Formal Proof Document	A402844-V	11/09/09
Urbalis Evolution–LC–ASw Formal Proof Document	A402845-F	07/08/09
Urbalis Evolution – ZC Formal Proof Verification Report	A402917-B	22/09/09
Urbalis Evolution–ZC B Specification Verification Report	A402914-S	25/09/09
Urbalis Evolution–LC B Specification Verification Report	A402915-H	11/09/09
Urbalis Evolution – ZC Application Software Requirements Specification	Y3-64 A401380-R	22/07/09
Urbalis Evolution – ZC Software Hazard Analysis	A401824-V	31/08/09
UEVOL Trackside ZC Source Code Verification Report	T-23 A402912-I	09/09/09
UEVOL Trackside LC Source Code Verification Report	T-23 A402913-G	14/09/09
Urbalis Evolution–LC Critical Code Review Analysis Report	Y3-64 A402322-I	03/08/09
Urbalis Evolution–ZC Critical Code Review Analysis Report	T-A402528-V	06/08/09
ISA Support for 2003 Platform Argumentation regarding use of the 'Data Slice' Mechanism	S.PI428.21.6	
Urbalis Evolution–ZC Software Safety Requirement Report	Y364 A402317-S	11/09/09
Trk Generic MW-2 Verification and Validation Plan	T-23-A408343-A	03/09/09
Trackside Generic Middleware 2 Software Hazard Analysis	A408494-A	08/09/09
Trk-Generic MW-2 Source Code Verification Report	T-23 A408328-A	09/09/09
Trackside Generic Middleware 2 Critical Code Review Analysis Report	Y3-64 A408492-A	14/09/09
Generic Trackside Middleware Software Safety Assurance Report	Spa-T408493-B	18/09/09
ZC-LC Software Safety Assurance Report	Ha T A402621-AD	25/09/09
Specific Safety Study on Trackside ATC Parameters	A402904-C	11/09/09
Specific Safety Study on On-board ATP Parameters	A402903-D	11/09/09
Parameter Initialisation on Trackside SW	Memo - PR09 - 0433en	06/10/09
UEVOL CC–Vital Software Source Code Verification Report	T-23 A402606-Q	01/10/09
Urbalis Evolution–CC–ATP Formal Proof Document	A402843-T	05/10/09



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution–CC Vital Formal Proof Verification Report	A402916-S	07/10/09
Coverage of 2003 Safety Exported Constraints	A402444en-F	11/10/09
Trackside Generic Middleware 2 Software Hazard Analysis	A408494-IB	12/10/09
Trackside Generic Middleware 2 Critical Code Review Analysis Report	Y3-64 A408492-IB	13/10/09
Specific Safety Study–Automatic Protection	T-23 A402331-2F	13/10/09
Specific Safety Study on Trackside ATC Parameters	A402904-D	14/10/09
Urbalis Evolution–CC Vital B Specification Verification Report	A402882-V	02/10/09
UEVOL-CC-V-ATP Critical Code Review Analysis Report	T-23 A402598-AA	06/07/09
CC Software Safety Assurance Report	Ha T A402620-AV	07/10/09
LC Parameters Configuration Rules	UEVOL-0397-J	13/08/09
ZC Parameters Configuration Rules	UEVOL-0396-O	13/08/09
CC-Vital Setting Description	UEVOL/0643-K	09/09/09
ATC Configuration Rules Safety Study	UEVOL-1574-C	05/10/09
ATC Subdivision Rules	UEVOL-0395-M	16/09/09
ATC Subdivision Rules Specific Study	UEVOL-1027-C	18/09/09
ATC Data Preparation, Verification and Validation Process	UEVOL-0398-K	05/10/09
ATC Parameters Process Hazard Analysis	UEVOL-0544-F	10/07/09
ATC Data Activities Recorder Project – ATC SW Version	UEVOL-1236-D	01/09/09
Safety Assessment of the ATC Data Preparation Tools	UEVOL-1814-A	01/10/09
Typical ATC Project Input Parameters for GAD Configuration	UEVOL-1802-1A	09/09/09
<ATC Data Generation Procedure 1 st Chain>	<UEVOL-1666>-6B	07/09/09
<ATC Data Generation Procedure 2 nd Chain>	<UEVOL-1667>-5A	07/09/09
Trk Generic MW-2 Requirements Test Description Verification Report	A408353-B	15/10/09
Trk Generic MW-2 Software Requirements Test Descriptions	A408477-B	14/10/09
Trk Generic MW-2 Software Requirements Test Plan	A408351-T	13/10/09
Trk Generic MW-2 Software Requirements Test Report Middleware-2	A408352-C	14/10/09
Safety Requirements for Data Preparation Tools Development	UEVOL-1813-A	24/09/09
System and ATC: T&C Procedures Verification Report	UEVOL-1191-D	01/10/09
Typical Requirements Management Plan	UEVOL-0815-A	28/05/07
ATC Hazard Log	UEVOL-1705-D	20/10/09
LC – Software Requirements Specification	A401381, Release I	22/07/09
LC – Software Hazard Analysis	A401825, Release J	27/07/09
Specific Safety Study – Automatic Protection	A402331, Release E	07/08/09
LC, Software Safety Requirement Report	A402318, Release J	03/08/09
LC Software, SyRS Coverage Document	A403796, Release F	20/07/09
Tk SyAD Coverage Document	A408134, Release B	24/07/09
Tk Software Requirements and Architecture Description Verification Report	A402938, Release I	14/09/09
Software Engineering Guide	A407368, Release A	26/08/09
ZC Software SyRS Coverage Document	A403795	24/07/09



Title of Document	Alstom Reference	Release/Date
ZC-LC Software Safety Assurance Report	A402621, Release AD	25/09/09
Software Requirement Specification, Generic Trackside Middleware	A408226, Release B	10/09/09
Software Architecture and Description – Generic Trackside Middleware	A408350, Release B	10/09/09
MW-2, Software Requirements Test Plan	A408351, Release A	30/06/09
TRK Generic MW-2, Particular Quality Plan	A408342-A	08/09/09
TRK Generic MW-2, System Interface Description, Data Configuration Description	A408251, Release A	22/06/09
Trk Generic MSW-2, Configuration Management Plan	A408474, Release A	01/07/09
Generic Trackside Middleware N2, Release Note – Middleware v1-0	A408227, Release B	18/09/09
Trk Generic MW-2, Subsystem Integration Test Description	A408332, Release A	26/09/09
Trk Generic MW-2, Integration Test Description Verification Report	A408334, Release A	02/09/09
Trk Generic MW-2, Subsystem Integration Test Report Middleware-2	A408333, Release A	11/09/09
Trk Generic MW-2, Software Requirement Test Description	A408477, Release A	31/08/09
Trk Generic MW-2, Software Requirements Test Report	A408352, Release B	14/09/09
Analysis for CR Alpha I43246	I43246	
CC Subsystem, Sub-system Hazard Analysis	UEVOL-0542, Release L	14/09/09
CC Software, SyRS Coverage	A403003, Release L	03/09/09
CC Software, Vital SyAD Coverage	A408131, Release C	30/09/09
CC (vital and non-vital) Software Requirements and Architecture Description Verification Report	Release D	02/10/09
CC Subsystem Requirements Specification	UEVOL-0098, Release O	25/06/09
CC Vital Software Requirements Specification	A401464, Release U	30/09/09
CC Software Architecture Description	A401446, Release L	02/09/09
CC Software Architecture Description	A401466, Release H	28/09/09
CC-Vital Software Module Design	A406966, Release H	06/10/09
CC-VESG, Software Hazard Analysis	A406391, Release C	01/10/09
Specific Safety Study on Train Kinematics	A402218, Release C	18/09/09
Specific Safety Study on Energy Monitoring	A402326, Release E	18/09/09
CC-VESG, Critical Code Review Analysis Report	A406392, Release C	01/10/09
VESG, Safety Verification – Object Code Diversification	A408400, Release B	17/09/09
CC-VESG Software Safety Requirements Report	A406393, Release D	05/10/09
CC Software Safety Requirement Report	A402319, Release R	06/10/09
CC Software Safety Assurance Report	A402620, Release AU	07/10/09
ZC Subsystem Hazard Analysis	UEVOL-0543, Release K	31/07/09
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638, Release B	18/09/09
ATC Subsystem Architecture Description Verification Report	UEVOL-0817, Release M	27/07/09
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816, Release M	27/07/09



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification and Validation Report, ATC Baseline 2.4.1	UEVOL-1171, Release I	20/07/09
Memo: Alignment of Driving Mode REG 1.6.2 Specifications	UEVOL-1799, Version A	31/07/09
Excel Spreadsheet: Documentation de Déploiement, Version de Travail	UEVOL-0931, Version 1A	
ATC Subsystem Verification and Validation Report ATC Baseline 2.5.0.3 (noted as 'I' internally, although file name states '3')	UEVOL-1171, Release I	23/09/09
ATC Validation Allocation Table	UEVOL-1169, Release J	18/08/09
Requirements Management Plan	UEVOL-0273, Release B	04/04/08
SIG-RS Interface Description	UEVOL-0101, Release O	13/12/09
Memo: PSD-SIG REG 1.6.2 from Julien Boyer	UEVOL-1821, Release A	05/10/09
ZC-CBI Interface Test Plan Variant Regular	UEVOL-0465, Release E	25/06/09
Specific Safety Study on Standstill Initialisation,	UEVOL-1040, Release C	07/09/09
Spot checking report	A408174, release C	21/10/09
ZC Architecture Description	A401536 - E	24/06/09
LC Architecture Description	A401537 - F	20/07/09
Trackside Software Architecture Description	A407321 -D	2/9/07
LC Software Impact Analysis	A405062 - I	21/07/09
ZC Software Impact Analysis	A404257 - W	21/07/09
LC Software Module Test Report	A402265 - J	17/09/09
ZC Software Module Test Report	A402291 - K	17/09/09
ZC Subsystem Integration Tests Description	A401883 - Q	31/07/09
LC Subsystem Integration Tests Description	A401884 - K	09/09/09
ZC Subsystem Integration Tests Description Verification Report	A402930 - I	6/08/09
LC Subsystem Integration Tests Description Verification Report	A402933 - F	14/09/09
ZC Subsystem Integration Tests Plan	A401571 - G	24/08/09
LC Subsystem Integration Tests Plan	A401572 - G	09/09/09
ZC Subsystem Integration Tests Report	A402288 - Z	31/07/09
LC Subsystem Integration Tests Report	A402292 - P	11/09/09
LC Software Integration Tests Description	A402269 - F	7/07/09
LC Software Integration Tests Description Verification Report	A402929 - E	10/07/09
LC Software Integration Tests Plan	A402268 - D	7/07/09
ZC Software Integration Tests Description	A402270 - F	14/07/09
ZC Software Integration Test Description Verification Report	A402298 - E	16/07/09
ZC Software Integration Test Plan	A402910 - B	14/07/09
ZC Software Integration Test Report	A402272 - F	14/07/09
LC Software Requirements Test Description Verification Report	A402922 - H	17/09/09
ZC Software Requirements Test Description Verification Report	A402921 - M	14/09/09



Title of Document	Alstom Reference	Release/Date
ZC Software Requirements Test Plan	A401691 – V	3/08/09
LC Software Requirements Test Plan	A401692 – K	31/07/09
ZC Software Requirements Test Report	A402289 – X	3/08/09
LC Software Requirements Test Report	A402293 – X	3/08/09
Software Project Document Plan	A401405 – AN	8/10/09
Software Requirement Specification TRK Generic MW-2 Communication Manager	A408220 – B	10/09/09
TRK Generic MW-2 Software Requirement Specification Tools	A408221 – A	22/06/09
TRK Generic MW-2 Software Requirement Specification	A408226 – B	11/09/09
System Interface Description – TRK Generic MW-2 Data Configuration Description	A408251 – A	22/06/09
Software Requirement Specification TRK Generic MW-2 Failure Manager	A408312 – A	22/06/09
Software Requirement Specification Verification Report TRK Generic MW-2	A409823 – A	16/09/09
Software Architecture Description – UEVOL Education and Data voting	A408222 – A	22/06/09
Software Architecture Description – UEVOL MSW DATABASES ADD/DDDD	A408223 – B	10/09/09
Software Architecture Description – UEVOL MSW Communication Management	A408224 – A	22/06/09
Software Architecture Description – UEVOL MSW TOOLS ADD/DDDD	A408225 – A	22/06/09
Software Architecture Description - TRK Generic MW-2 Failure Manager	A408311 – A	22/06/09
Software Architecture & Description - Generic Trackside Middleware N2	A408350 – B	10/09/09
Software Architecture Description Verification Report - TRK Generic MW-2	A408327 – A	11/09/09
TRK Generic Mw Software Production Manual	A408476 – A	09/07/09
Software Module Test Description - TRK Generic MW-2	A408329 – A	26/08/09
Software Module Test Description Verification Report - TRK Generic MW-2	A408330 – A	10/09/09
Software Module Test Report - TRK Generic MW-2	A408331 – A	9/09/09
System Integration Test Description - TRK Generic MW-2	A408332 – A	26/08/09
Software Integration Test Description - TRK Generic MW-2	A408335 – A	08/09/09
System Integration Test Description Verification Report - TRK Generic MW-2	A408334 – A	09/09/09
Software Integration Test Description Verification Report - TRK Generic MW-2	A408336 – A	10/09/09
TRK Generic MW-2 Subsystem Integration Test Plan	A408339 – B	31/08/09
Software Module & Integration Test Plan - TRK Generic MW-2	A408340 – A	10/08/09
System Integration Test Report - TRK Generic MW-2	A408333 – A	11/09/09
Software Integration Test Report- TRK Generic MW-2	A408338 – A	09/09/09
Software Requirement Test Description Verification Report	A408353 – A	11/09/09
Middleware Project Document Plan	A408458 – B	18/09/09



Title of Document	Alstom Reference	Release/Date
CC Software Impact Analysis	A403516 – X	30/09/09
CC Software Module Test Description	A402313 – D	30/09/09
CC Software Module Test Description Verification Report	A402266 – J	24/09/09
CC Software Module Test Report	A402314 – N	1/10/09
CC Subsystem Integration Test Description	A401880 – U	10/09/09
CC Subsystem Integration Test Description Verification Report	A402282 – N	30/09/09
CC Subsystem Integration Test Plan	A401570 – J	25/09/09
CC Subsystem Integration Test Report	A402287 – AJ	30/09/09
CC Software Integration Test Description	A402309 – I	26/08/09
CC Software Integration Test Description Verification Report	A402273 – H	22/09/09
CC Software Integration Test Report	A402310 – I	17/09/09
CC Software Requirements Test Description	A401878 – S	16/09/09
CC Software Requirements Test Description Verification Report	A402284 – Q	2/10/09
CC Software Requirements Test Plan	A401462 – P	16/09/09
CC Software Requirements Test Report	A402285 – Z	30/09/2009
ATC Subsystem Architecture Description Verification Report	UEVOL 0817 – M	27/07/09
ATC Subsystem Requirement Specification Verification Report	UEVOL 0818 – L	29/07/09
ATC CC Subsystem-Software Requirement Specification Verification Report	UEVOL 0819 – M	2/10/09
ATC ZC Subsystem-Software Requirement Specification Verification Report	UEVOL 0821 – I	29/08/09
ATC LC Subsystem-Software Requirement Specification Verification Report	UEVOL 0823 – I	26/08/09
ATC Subsystem Requirements Test Description Verification Report	UEVOL 0824 – I	19/08/09
ATC Subsystem Integration Test Description Verification Report	UEVOL 0825 – I	18/08/09
ATC-CC Subsystem Requirements Test Description Verification Report	UEVOL 0826 – K	19/08/09
ATC-ZC Subsystem Requirements Test Description Verification Report	UEVOL 0827 – K	19/08/09
ATC-LC Subsystem Requirements Test Description Verification Report	UEVOL 0828 – K	18/08/09
ATC Subsystem Requirements Tests Description	UEVOL 0138 – E	04/09/09
ATC-LC Subsystem Requirements Tests Description	UEVOL 0679 – I	31/07/09
ATC-ZC Subsystem Requirements Tests Description	UEVOL 0969 – I	15/09/09
ATC-CC Subsystem Requirements Tests Description	UEVOL 0139 – K	2/10/09
ATC Subsystem Requirements Test Report	UEVOL 1275 – G	16/09/09
ATC - LC Subsystem Requirements Test Report	UEVOL 1011 -	08/09/09
ATC - ZC Subsystem Requirements Test Report	UEVOL 1186 – T	14/09/09
ATC - CC Subsystem Requirements Test Report	UEVOL 0140 – AF	05/10/09
ATC Subsystem Integration Tests Description	UEVOL 0137 – G	24/08/09
ATC Subsystem Integration Tests Report	UEVOL 1046 – N	16/09/09
ATC Safety Hazard Analysis	UEVOL 0831 – I	3/08/09
ZC Subsystem Requirement Specification	UEVOL 0114 – M	24/06/09



Title of Document	Alstom Reference	Release/Date
CC Eurobalise Interface Description	UEVOL 0123 - E	23/06/09
ATC Subsystem Requirement Specification	UEVOL 0270 – O	24/06/09
ATC Subsystem Architecture Description	UEVOL 0271 – N	24/06/09
ATC Safety Hazard Log	UEVOL 1705 – D	20/10/09
ATC Exported Constraints	UEVOL 1704 – C	6/10/09
ATC Exported Constraints	UEVOL 1704 – D	20/10/09
ATC Safety and V&V Plan	UEVOL 353 – E	30/09/09
ATC Design Verification Plan	UEVOL 1170 – E	09/09/09
CC Software Module Test Report	A402314 – P	29/10/09
CC Source Code Verification Report	A402606 – T	29/10/09
CC Software Architecture Description	A401466 – II	26/10/09
Modification of the Management of Safety Margin,	OR/04/09/02/1A	7/04/09
Memorandum: Evolution of Pente.pas for UEVOL	UEVOL 1846 – B	23/10/09

1.6.2.2 Review (September 2009 – October 2009)

Table 21: Additional Documentation Reviewed for Baseline 1.6.2.2/ATC 2.5

Title of Document	Alstom Reference	Release/Date
ATC Generic Application Safety Case	UEVOL-0887	1E
Parameter Initialisation on Trackside SW	Memo_PR09_0433en	8/12/09
Formal Proof Verification Report	A402916-1U	1U, 3/12/09
GenATC Data – System Requirement Test Report PART 2 (for GAD2)	UEVOL-1672-1B	1B, 28/9/09
GenATC Data – System Requirement Test Report PART 1 (for GAD1)	UEVOL-1672-1B	1B, 28/9/09
ATC Data Generation Procedure 1st Chain	UEVOL-1666	8B, 28/9/09
ATC Data Generation Procedure 2nd Chain	UEVOL-1667	7A, 28/9/09
Urbalis Evolution – GAD Chain 1 Requirements Test Report	UEVOL-1754	3B, 30/9/09
SGD CSV to XML Translator Requirements Test Report	No formal ref	Version 9A, 30/9/09
ATC GenPar Module Evolution Software Requirements Test Report	No formal ref	Version 3 2, 4/9/09
ATC GSD GenSGD Module Software Requirements Test Report	No formal ref	v1.13 28/9/09
ATC GSD GenRTS Module Software Requirements Test Report	No formal ref	v1.11 17/9/09



ATC Baseline 2.5.1–1 Review (March 2010)

Table 22: Additional Documentation Reviewed for ATC Baseline 2.5.1–1

Title of Document	Alstom Reference	Release/Date
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	vC, 15/2/10
Gen ATC Data – System Requirement Test Report, PART 1 (for GADI)	UEVOL-1672	vB, 30/10/09
ATC GSD GenRTS Module, Software Requirements Test Report	No formal ref	v1.13, 2/11/09
ATC Gen Par Module Evolution, Software Requirements Test Report	No formal ref	v2.1, 30/10/09
ATC GSD GenSGD Module, Software Requirements Test Report	No formal ref	v1.14, 29/10/09
SGD CSV to XML Translator, Requirements Test Report	No formal ref	v10A, 8/10/09
Urbalis Evolution GAD Chain 1, Requirement Test Report	UEVOL-1754	v7B, 29/10/09
Delivery Notes for GEN_SGD+CSV_To_XML Tool	No formal ref	8/10/09
Delivery Notes for GADI Tool	No formal ref	29/10/09
Gen RTS SGD_GenPAR_DGC_2.5.1.xls	No formal ref	
Gen ATC Data – System Requirement Test Report, PART 2 (for GAD2)	UEVOL-1672	vB, 30/10/09
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	vB, 18/12/09
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	v2B, 30/10/09
Gen ATC Data – System Requirement Test Description	UEVOL-1671	v2B, 16/10/09
ATC 2.5.1.1 Sub-System Configuration Delivery Sheet	UEVOL-R-1061	v2, 8/3/10
UEVOL ATC Tools Configuration Delivery Sheet v15-1	UEVOL-R-1060	3/3/10
GenPZ, Requirements Test Report		v10A, 31/7/09
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	v1, 27/10/09

2.5.1–6 Review (April 2010–July 2010)

Table 23: Additional Documents Reviewed for Baseline 1.6.2–2

Title of Document	Alstom Reference	Release/Date
ATC Generic Application Safety Case	UEVOL-0887-1	20/5/10
ATC 2.5.1.2 Sub-system Configuration Delivery Sheet	UEVOL-R-1133	26/5/10
Review with ATC SSM of verification CR on baseline ATC 2.5.0, K. Logerot		26/5/10
ATC Generic Application Safety Case	UEVOL-0887-O	6/7/10
ATC Subsystem Verification and Validation Report, ATC Baseline 2.5.1.2	UEVOL-1171	Release K, 21/05/10
CC Software Safety Assurance Report	A402620-BC	25/5/10
Gradients Computation in UEVOL CC	Memo_Pr10_0346en	29/6/10
ZC – LC Software Safety Assurance Report	A402621-AI	23/7/10
Parameter Initialisation on Trackside Software	Memo_Pr09_0433en	22/7/10
ATC Generic Application Safety Case	UEVOL-0887-L	6/7/10
Safety Issue, Invalid Compensated Gradient Change Management in CC-VESG	A429273, SI10-020	16/7/10



Title of Document	Alstom Reference	Release/Date
ATC 2.5.1.5 Sub-System Configuration Delivery Sheet	UEVOL-R-1174	6/7/10
Parameter Initialisation on CC-VESG SW	Memo_PRI0_0381en	22/7/10
CC Software Safety Assurance Report	A402620-en	23/7/10
ATC 2.5.1.6 Sub-System Configuration Delivery Sheet	UEVOL-R-1193	28/7/10
CR review	UEVOL-1988	28/7/10
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667-B_Plus	6/7/10
ATC Data Generation Procedure 1 st Chain	UEVOL-1666-C_Plus	6/7/10
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667-B_Plus_I	29/7/10
ATC Data Generation Procedure 1 st Chain	UEVOL-1666-C_Plus_I	29/7/10

ATC Baseline 4.1.2–2 Review (June-September 2010)

Table 24: Documents Reviewed for ATC Baseline 4.1.2–2 and 4.1.2–1

Title of Document	Alstom Reference	Release/Date
LC Software Hazard Analysis	A401825	L, 16/03/10
Specific Safety Study on Energy Monitoring	A402326	F, 22/12/02
VESG Critical Code Review Analysis Report	A406392	E, 17/03/10
ATC Software Global V&V Report	A402597	O, 26/04/10
Tk Software Requirements and Architecture Description Verification Report	A402938	J, 20/04/10
ZC SyRS Coverage Document	A403795	I, 11/03/10
LC SyRS Coverage Document	A403796	I, 12/03/10
ZC-LC Software Safety Assurance Report	A402621	AG, 27/04/10
CC Software Requirements and Architecture Description Verification Report	A401804	F, 15/04/10
CC Software Safety Assurance Report	A402620	BB, 30/04/10
CC Vital Software – Software Module Design	A406966	I, 10/03/10
CC Software Hazard Analysis	A401823	R, 20/04/10
CC Vital Software Architecture Description	A401466	L, 25/03/10
CC Vital Software – Software Module Design	A406966	I, 10/03/10
CC Software Impact Analysis	A403516	AE, 22/04/10
CC Software Requirements Specification	A401464	AF
ATC SW Spot Checking Report	A408174	D, 27/04/10
CC Software: Architecture Description	A401446	Q, 01/03/10
CC Software Requirements Test Plan	A401462	S, 21/04/2010
CC ATP Software Requirements Test Description	A401878	V, 21/04/2010
CC Software Requirements Test Report	A402285	AF, 21/04/2010
CC Software Requirements Test Description Verification Report	A402284	S, 22/04/2010
ZC Software Requirements Test Plan	A401691	X, 06/04/2010
ZC Software Requirements Test Description	A401881	Y, 06/04/2010



Title of Document	Alstom Reference	Release/Date
ZC Software Requirements Test Report	A402289	Z, 06/04/2010
ZC Software Requirements Test Description Verification Report	A402921	N, 16/04/2010
LC Software Requirements Test Plan	A401692	M, 26/03/2010
LC Software Requirements Test Description	A401882	L, 26/03/2010
LC Software Requirements Test Report	A402293	L, 26/03/2010
LC Software Requirements Test Description Verification Report	A402922	I, 12/04/2010
UEVOL ZC Formal Proof Document	A402844	V, 15/03/10
Urbalis Evolution – LC – ASW Formal Proof Document	A402845	H, 25/02/09
Urbalis Evolution – CC – ATP Formal Proof Document	A402843	W, 30/04/10
Urbalis Evolution – LC – ASW Formal Proof Verification Report	A402918	F, 12/03/10
Urbalis Evolution – ZC Formal Proof Verification Report	A402917	T, 17/03/10
Urbalis Evolution – CC Vital ATP Formal Proof Verification Report	A402916	X, 30/04/10
Software Quality Plan	T-23 A401468	F, 02/11/09
UEVOL Trackside LC Source Code Verification Report	T-23 A402913	I, 30/03/10
UEVOL Trackside ZC Source Code Verification Report	A402912	K, 21/04/10
UEVOL CC – Vital Software Source Code Verification Report	A402606	V, 30/03/10
UEVOL ZC – LC Coverage of 2003 Safety Exported Constraints	A402444	G, 12/04/10
Urbalis Evolution – LC B Specification Verification Report	A402915	J, 12/03/10
Urbalis Evolution – CC Vital B Specification Verification Report	A402882	Y, 12/04/10
Urbalis Evolution – ZC B Specification Verification Report	A402914	V, 19/03/10
Urbalis Evolution – LC Critical Code Review Analysis Report	A402322	K, 07/03/10
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	V, 12/04/10
UEVOL – CC – V – ATP Critical Code Review Analysis Report	A402598	AE, 22/04/10
Specific Safety Study on Trackside ATC Parameters	A402904	E, 14/04/10
Specific Safety Study on On-board ATP Parameters	A402903	E, 15/04/10
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	U, 11/03/10
Urbalis Evolution – ZC Software Hazard Analysis	A401824	W, 30/03/10
Urbalis Evolution – ZC Software Safety Requirements Report	A402317	T, 14/04/10
CC Software Safety Assurance Report	A402620	BB, 30/04/10
ZC – LC Software Safety Assurance Report	A402621	AG, 27/04/10
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AA, 22/04/10
Urbalis Evolution – Trackside Software Architecture Description	A407321	G, 11/03/10
ATC Software Urbalis Evolution – Project Document Plan	A401405	AT, 30/04/10
UEVOL-CC- VESG Critical Code Review	A406392	G, 02/09/10
ZC-LC Software Safety Assurance Report	A402621	AJ, 25/07/10
CC Software Safety Assurance Report	A402620	BJ, 25/08/10
CC Software Impact Analysis	A403516	AL, 19/08/10
CC Subsystem Integration Tests Report	A402287	AW, 24/08/10
CC Subsystem Integration Test Description Verification Report	A402282	V, 24/08/10



Title of Document	Alstom Reference	Release/Date
CC Software Requirements and Architecture Description Verification Report	A401804	G, 24/08/10
SwRS TRK Generic MW-2	A411078	B, 10/03/2010
SwRS Verification Report - TRK Generic MW-2	A409823	B, 10/03/2010
Software Module Test Description Verification Report - TRK Generic MW-2	A408330	B, 2/03/2010
Software Module Test Report - TRK Generic MW-2	A408331	B, 17/02/2010
System Integration Test Description - TRK Generic MW-2	A408332	B, 4/03/2010
Software Integration Test Description - TRK Generic MW-2	A408335	B, 17/02/2010
System Integration Test Description Verification Report - TRK Generic MW-2	A408334	C, 8/03/2010
Software Integration Test Description Verification Report - TRK Generic MW-2	A408336	B, 2/03/2010
System Integration Test Report - TRK Generic MW-2	A408333	B, 5/03/2010
Software Integration Test Report- TRK Generic MW-2	A408338	B, 17/02/2010
Software Requirement Test Description	A408477	D, 9/02/2010
Software Requirement Test Description Verification Report	A408353	C, 5/03/2010
Software Requirement Test Description Verification Report	A408353	D, 8/09/2010
Software Requirement Test Plan - TRK Generic MW-2	A408351	B, 13/10/2009
Software Requirement Test Plan - TRK Generic MW-2	A408351	C, 8/09/2010
Software Requirement Test Report - TRK Generic MW-2	A408352	E, 9/02/2010
Verification & Validation Plan - TRK Generic MW-2	A408343	B, 22/01/2010
Release Note - Generic Trackside Middleware N2	A408227	C, 15/03/2010
Project Document Plan	A408458	C, 15/03/2010
TRK GENERIC MW-2 SOFTWARE IMPACT ANALYSIS	A411303	A, 03/02/2009
Generic Trackside Middleware Software Safety Assurance Report	A408493	C, 16/03/2010
Software Source Code Verification Report - TRK Generic MW-2	A408328	B, 28/01/2010
Generic Trackside Middleware Critical Code Review Analysis Report	A408492	B, 1/03/2010
Generic Trackside Middleware Software Hazard Analysis	A408494	B, 1/03/2010
CC Subsystem Requirements Specification	UEVOL-0098	R, 17/12/09
ATC Interface Hazard Analysis	UEVOL-0431	L, 31/03/10
CC-ZC Interface Description	UEVOL-0185	K, 18/12/10
CC-LC Interface Description	UEVOL-0205	L, 14/12/10
ZC-ZC Interface Description	UEVOL-0192	M, 18/12/10
ATC System, System Hazard Analysis	UEVOL-0831	K, 02/02/10
ATC Hazard Log	UEVOL-1705	H, 08/06/10
LC Subsystem Requirements Specification	UEVOL-0264	L, 09/03/10
LC Subsystem Hazard Analysis	UEVOL-0430	M, 10/03/10
ZC Subsystem Hazard Analysis	UEVOL-0543	N, 11/03/10
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	D, 27/04/10



Title of Document	Alstom Reference	Release/Date
ATC Validation Allocation Table	UEVOL-I169	M, 12/05/10
ATC Design Verification Plan	UEVOL-I170	F, 20/05/10
ATC Safety Exported Constraints	UEVOL-I704	H, 08/06/10
UEVOL ATC Tools Configuration Delivery Sheet v18	UEVOL-R-I100	23/04/10
UEVOL ATC Tools Configuration Delivery Sheet v18-I	UEVOL-R-I150	08/06/10
Delivery Note for GADI Tool		22/04/10
Gen ATC Data – System Requirement Test Report Part 1 (for GADI)	UEVOL-I672	C, 06/05/10
Gen ATC Data – System Requirement Test Report Part 2 (for GAD2)	UEVOL-I672	C, 07/05/10
Gen RTS S&D – Gen Par – DGC – 4.1.5c.xls		
ATC Data Generation Procedure 2 nd Chain	UEVOL-I667	E, 23/04/10
ATC Data Generation Procedure 1 st Chain	UEVOL-I666	F, 23/04/10
Gen PZ Requirements Test Report	VI0A	31/07/09
ATC GenPar Module Evolution Software Requirements Test Report	V2.8	22/04/10
ATC GSD GenRTS Module Software Requirements Test Report	I.20	08/04/10
ATC GSD GenSGD Module Software Requirements Test Report	I.24	22/04/10
LC Parameters Configuration Rules	UEVOL-0397	M, 30/03/10
ZC Parameters Configuration Rules	UEVOL-0396	S, 31/03/10
ATC Subdivision Rules	UEVOL-0395	P, 29/03/10
SGD CSV to XML Translator Requirement Test Report	APIL-CSVtoXML-SWRTR-VI5A	03/04/10
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-I754	I1B, 03/04/10
ATC Subdivision Rules Specific Study	UEVOL-I027	D, 02/03/10
Gen ATC Data – System Requirement Test Plan	UEVOL-I670	C, 07/05/10
Gen ATC Data – System Requirement Test Description	UEVOL-I671	C, 06/05/10
Gen ATC Data – Test Lines Specification	UEVOL-0401	C, 06/05/10
ATC Configuration Rules Safety Study	UEVOL-I574	G, 08/06/10
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	N, 26/04/10
ATC Parameters Process Hazard Analysis	UEVOL-0544	H, 05/03/10
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	Q, 10/03/10
Urbalis Evolution CC – Vital Setting Description	UEVOL-0643	N, 15/04/10
ATC Design Verification Plan (Excel spreadsheet only supplied)	UEVOL-I170	G
Modif-Traceability.xls, CCSwRS to CCSyRS traceability	No reference	
ATC-CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	O1, 12/08/10
UEVOL ATC Safety Exported Constraints	UEVOL-I704	I, 25/08/10
UEVOL ZC Formal Proof Document	A402844	V, 15/03/10
Urbalis Evolution – LC – ASW Formal Proof Document	A402845	H, 25/02/09
Urbalis Evolution – CC – ATP Formal Proof Document	A402843	WV, 30/04/10
Urbalis Evolution – LC – ASW Formal Proof Verification Report	A402918	F, 12/03/10
Urbalis Evolution – ZC Formal Proof Verification Report	A402917	T, 17/03/10



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – CC Vital ATP Formal Proof Verification Report	A402916	X, 30/04/10
Software Quality Plan	T-23 A401468	F, 02/11/09
UEVOL Trackside LC Source Code Verification Report	T-23 A402913	I, 30/03/10
UEVOL Trackside ZC Source Code Verification Report	A402912	K, 21/04/10
UEVOL CC – Vital Software Source Code Verification Report	A402606	V, 30/03/10
UEVOL ZC – LC Coverage of 2003 Safety Exported Constraints	A402444	G, 12/04/10
Urbalis Evolution – LC B Specification Verification Report	A402915	J, 12/03/10
Urbalis Evolution – CC Vital B Specification Verification Report	A402882	Y, 12/04/10
Generic and Specific Signatures for SACEM Vital Checksums	UEVOL-0246	K, 18/12/09
Urbalis Evolution – ZC B Specification Verification Report	A402914	V, 19/03/10
Urbalis Evolution – LC Critical Code Review Analysis Report	A402322	K, 07/03/10
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	V, 12/04/10
UEVOL – CC – V – ATP Critical Code Review Analysis Report	A402598	AE, 22/04/10
UEVOL ATC Tools Configuration Delivery Sheet v18	UEVOL-R-1100	23/04/10
UEVOL ATC Tools Configuration Delivery Sheet v18-1	UEVOL-R-1150	08/06/10
Delivery Note for GADI Tool		22/04/10
Gen ATC Data – System Requirement Test Report Part 1 (for GADI)	UEVOL-1672	C, 06/05/10
Gen ATC Data – System Requirement Test Report Part 2 (for GAD2)	UEVOL-1672	C, 07/05/10
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	E, 23/04/10
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	F, 23/04/10
ATC GenPar Module Evolution Software Requirements Test Report	V2.8	22/04/10
ATC GSD GenRTS Module Software Requirements Test Report	I.20	08/04/10
ATC GSD GenSGD Module Software Requirements Test Report	I.24	22/04/10
Specific Safety Study on Trackside ATC Parameters	A402904	E, 14/04/10
Specific Safety Study on On-board ATP Parameters	A402903	E, 15/04/10
LC Parameters Configuration Rules	UEVOL-0397	M, 30/03/10
ZC Parameters Configuration Rules	UEVOL-0396	S, 31/03/10
ATC Subdivision Rules	UEVOL-0395	P, 29/03/10
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	U, 11/03/10
Urbalis Evolution – ZC Software Hazard Analysis	A401824	W, 30/03/10
Urbalis Evolution – ZC Software Safety Requirements Report	A402317	T, 14/04/10
CC Software Safety Assurance Report	A402620	BB, 30/04/10
ZC – LC Software Safety Assurance Report	A402621	AG, 27/04/10
Urbalis Evolution – GAD Chain 1 Requirements Test Report	UEVOL-1754	11B, 03/04/10
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AA, 22/04/10
ATC Subdivision Rules Specific Study	UEVOL-1027	D, 02/03/10
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	C, 07/05/10
Gen ATC Data – System Requirement Test Description	UEVOL-1671	C, 06/05/10
Gen ATC Data – Test Lines Specification	UEVOL-0401	C, 06/05/10



Title of Document	Alstom Reference	Release/Date
ATC Configuration Rules Safety Study	UEVOL-1574	G, 08/06/10
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	N, 26/04/10
ATC Parameters Process Hazard Analysis	UEVOL-0544	H, 05/03/10
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	Q, 10/03/10
Urbalis Evolution CC – Vital Setting Description	UEVOL-0643	N, 15/04/10
Urbalis Evolution – Trackside Software Architecture Description	A407321	G, 11/03/10
ATC Software Urbalis Evolution – Project Document Plan	A401405	AT, 30/04/10
CC-Vital Setting Description	UEVOL-0643	N, 15/04/10
ATC 4.1.1.3 Sub-system Configuration Delivery Sheet	UEVOL-R-1157	10/06/10
Urbalis Evolution DS-Beacons Layout-Data Prep	UEVOL-1535	1A, 24/07/08
RS-Beacon Layout-Data Prep	UEVOL-1536	1A, 05/12/08
DS-Beacons Layout-Data Prep	UEVOL-1537	1A, 24/07/08
DS-Compensated Gradients-Data Prep	UEVOL-1538	1A, 24/07/08
RS-Compensated Gradients-Data Prep	UEVOL-1539	1A, 05/12/08
DS-Compensated Gradients-Data Prep	UEVOL-1540	1A, 24/07/08
DS-Onboard-Data Prep	UEVOL-1541	1A, 05/12/08
RS-Onboard-Data Prep	UEVOL-1542	1A, 05/12/08
DS-Onboard-Data Prep	UEVOL-1543	1A, 24/07/08
DS-Trackside-Data Prep	UEVOL-1544	1A, 05/12/08
RS-Trackside-Data Prep	UEVOL-1545	1A, 05/12/08
DS-Trackside-Data Prep	UEVOL-1546	1A, 24/07/08
ATC Subdivision Rules Specific Study	UEVOL-1027	E, 16/07/10
ATC Configuration Rules Safety Study	UEVOL-1574	H21/07/10
UEVOL ATC Tools Configuration Delivery Sheet v18-1	UEVOL-R-1150	08/06/10
Software Impact Analysis	A405062	J, 02/06/10
UEVOL CC-Vital Software Source Code Verification Report	A402606	U, 29/03/10
UEVOL CC-Vital Software Source Code Verification Report	A402606	W, 22/07/10
Urbalis Evolution – LC Formal Proof Verification Report	A402918	G, 29/07/10
Urbalis Evolution – ZC Formal Proof Verification Report	A402917	V, 29/07/10
UEVOL Trackside ZC Source Code Verification Report	A402912L	L, 22/07/10
UEVOL Trackside LC Source Code Verification Report	A402913	JT, 22/07/10
Urbalis Evolution – LC Critical Code Review Analysis Report	A402322	L, 01/09/10
UEVOL CC-Vital Software Source Code Verification Report	A402606	Y, 03/09/10
ATC 4.1.1.3 Sub-system Configuration Delivery Sheet	UEVOL-R-1157	10/06/10
ATC 4.1.1.4 Sub-system Configuration Delivery Sheet	UEVOL-R-1182	09/07/10
ATC 4.1.2.1 Sub-system Configuration Delivery Sheet	UEVOL-R-1213	27/08/10
UEVOL ATC Tools Configuration Delivery Sheet V18-4	UEVOL-R-1214	27/08/10
<ATC Data Generation Procedure 2 nd Chain>	<UEVOL-1667>	E-Plus1, 22/07/10
<ATC Data Generation Procedure 1 st Chain>	<UEVOL-1666>	F-Plus1, 22/07/10



Title of Document	Alstom Reference	Release/Date
CR Safety Review	I988	P
Gen ATC Data-System Requirement Test Report PART (for GAD2)	UEVOL-I672	C-Plus , 07/05/10
Gen ATC Data-System Requirement Test Report PART I (for GAD I)	UEVOL-I672	C-Plus , 23/07/10
Urbalis Evolution – GAD Chain I, Requirements Test Report	UEVOL-I654	I2B, 22/7/10
CC ATP SwModule Test Description	A402313	F, 16/04/2010
LC Asw SwMTR	A402265	K, 03/03/2010
ZC Asw SwMTR	A402291	L, 9/04/2010
ZC Asw SwMTR	A402291	M, 21/07/2010
CC ATP SwMTR	A402314	R, 16/04/2010
CC ATP SwMTR	A402314	S, 21/07/2010
ZC SwModule Test DescriptionVR	A402925	H, 14/04/2010
LC SwModule Test DescriptionVR	A402926	G, 31/03/2010
CC ATP SwModule Test DescriptionVR	A402266	M, 20/04/2010
CC ATP SwModule Test DescriptionVR	A402266	N, 21/07/2010
LC Ssy SylTP	A401572	I, 4/02/2010
LC Ssy SylTP	A401572	J, 19/07/2010
LC Ssy SylTD	A401884	M, 22/02/2010
ZC Asw SwITR	A402272	G, 2/03/2010
CC ATP SwITDVR	A402273	I, 31/03/2010
LC Ssy SylTR	A402292	T, 22/04/2010
CC ATP SwITP	A402308	G, 30/03/2010
CC ATP SwITP	A402308	H, 19/07/2010
ZC SwITP	A402910	C, 2/03/2010
ZC SwITDVR	A402928	F, 1/04/2010
LC SylTDVR	A402933	H, 22/04/2010
LC SylTDVR	A402933	J, 19/07/2010
SwRN ATC Sw	A402307	BQ, 30/04/2010
SwRN CC	A402045	AZ, 23/04/2010
SwRN TRK	A402079	AH, 23/04/2010
SwPM CC-V-ATP	A404727	A, 26/03/2010
LC Sw Safety Requirements Report	A402318	K, 13/04/2010
CC Sw Safety Requirements Report	A402319	U, 23/04/2010
ZC Ssy SylTP	A401571	I, 22/03/2010
ZC Ssy SylTP	A401571	J, 24/07/2010
ZC Ssy SylTD	A401883	S, 22/03/2010
LC SwITP	A402268	E, 18/03/2010
ZC Asw SwITD	A402270	G, 2/03/2010
ZC Ssy SylTR	A402288	AD, 22/04/2010
CC ATP SwITD	A402309	J, 9/03/2010



Title of Document	Alstom Reference	Release/Date
CC ATP SwITR	A402310	J, 9/03/2010
ZC SyITDVR	A402930	L, 22/04/2010
ZC SyITDVR	A402930	M, 19/07/2010
CC SyITP	A401570	L, 20/04/2010
CC SyITP	A401570	P, 19/07/2010
CC SyITD	A401880	W, 20/04/2010
LC Asw SwITD	A402269	G, 3/03/2010
LC Asw SwITR	A402271	G, 3/03/2010
CC SyITDVR	A402282	P, 22/04/2010
CC SyITDVR	A402282	U, 19/07/2010
CC SyITR	A402287	AQ, 22/04/2010
CC SyITR	A402287	AV, 19/07/2010
LC SwITDVR	A402929	F, 15/04/2010
ATC Subsystem Requirement Specification	UEVOL-0270	S, 17/12/2009
ATC Architecture Description	UEVOL-0271	Q, 17/12/2009
ATC Ssy: SyADVR	UEVOL-0817	Q, 1/03/2010
ATC Ssy: SyRSVR	UEVOL-0818	P, 19/03/2010
ATC - ZC Ssy: System SwRSVR	UEVOL-0821	K, 5/05/2010
ATC - LC Subsystem: System SwRSVR	UEVOL-0823	K, 5/05/2010
ATC Subsystem: SyRTDVR	UEVOL-0824	L, 10/05/2010
ATC Subsystem: SyITDVR	UEVOL-0825	L, 10/05/2010
ATC - CC Subsystem: SyRTDVR	UEVOL-0826	N, 10/05/2010
ATC - ZC Ssy: SyRTDVR	UEVOL-0827	N, 10/05/2010
ATC - LC Ssy: SyRTDVR	UEVOL-0828	O, 10/05/2010
Urbalis ATC Ssy: SyRSVR	UEVOL-0816	S, 18/04/2010
ATC Ssys RTD	UEVOL-0138	G, 23/04/2010
ATC Ssys RTD (LC)*	UEVOL-0679	K, 11/02/2010
ATC Ssys RTD (ZC)*	UEVOL-0969	K, 11/02/2010
ATC Ssys RTD (CC)*	UEVOL-0139	M, 12/04/2010
ATC Ssys Requirements Tests Report	UEVOL-1275	L, 23/04/2010
ATC Ssys Requirements Tests Report (LC)*	UEVOL-1011	L, 23/04/2010
ATC Ssys Requirements Tests Report (ZC)*	UEVOL-1186	W, 16/04/2010
ATC Ssys Requirements Tests Report (CC)*	UEVOL-0140	AJ, 24/08/2010
ATC Subsystem Verification and Validation Report	UEVOL-1171	L, 28/05/2010
ATC Subsystem Verification and Validation Report	UEVOL-1171	Q, 26/08/2010
ATC Ssys Integration Tests Descriptions	UEVOL-0137	I, 20/01/2010
ATC Subsystems Integration Tests Reports	UEVOL-1046	O, 23/04/2010



ATC Baseline 4.2.1–1 Review (November 2010)

Table 25: Documents Reviewed for ATC Baseline 4.2.1–1 and Software 6.1.1.1

Title of Document	Alstom Reference	Release/Date
CC Software Safety Assurance Report	A402620	Version BM, 19/10/10
CC Software Safety Requirement Report	A402319	Version X, 13/10/10
CC Integration Test Description Verification Report	A402282	Version Y, 15/10/10
CC Subsystem Integration Tests Report	A402287	Version A2, 12/10/10
CC Critical Code Review Analysis Report	A402598	Version AJ, 12/10/10
UEVOL CC Software Release Note 6.1.9	A402045	Version BJ, 18/10/10
CC Sw Reqs. and Architecture Description Verif. Report	A401804	Version J, 18/10/10
CC Software Impact Analysis	A403516	Version A0, 15/10/10
ATC Subsystem V&V Report, ATC Baseline 4.2.1.1,	UEVOL-1171	Version U, 22/10/10
ATC 4.2.1.1 Subsystem Configuration Delivery Sheet	UEVOL-R-1261	
CC Subsystem Tests Report	UEVOL-0140	Version AT, 21/10/10
ATC Hazard Log	UEVOL-1705	Version M, 22/10/10
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Version M, 22/10/10
ATC Generic Application Safety Case	UEVOL-0887	Version U, 22/10/10

ATC Baseline 5.1.1–3 Review (November 2010)

Table 26: Documents Reviewed for ATC Baseline 5.1.1–3 and Software 7.0.10

Title of Document	Alstom Reference	Release/Date
LC Parameters Configuration Rules	UEVOL-0397	Release N, 05/10/10
ZC Parameters Configuration Rules	UEVOL-0396-T	Release T, 07/10/10
Specific Safety Study Gradient	UEVOL-2010	Release A, 06/08/10
ATC Subdivision Rules	UEVOL-0395	Release R, 07/10/10
ATC Subdivision Rules Specific Study	UEVOL-1027	Release G, 11/10/10
CC-Vital Setting Description	UEVOL-0643	Release P, 05/04/10
ATC Configuration Rules Safety Study	UEVOL-1574	Release J, 07/10/10
ZC Sub-system Requirements Specification	UEVOL-0114	Release R, 01/06/10
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release O, 28/06/10
ATC Data Activities Recorder Project – ATC SW Version	UEVOL-1236	Release F, 22/09/10
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release I, 04/10/10
ATC Generic Application Safety Case	UEVOL-0887	Release T, 14/09/10
CR Safety Review	UEVOL-1988	Release W
ATC Generic Application Safety Case	UEVOL-0887	Release T, 14/09/10
ATC Generic Application Safety Case	UEVOL-0887	Release W, 22/11/10
ATC Configuration Rules Safety Study	UEVOL-1574	Rel J-Plus, 07/10/10
Gen ATC Data – System Requirements Test Report Part 1 (for GAD1)	UEVOL-1672	Release D, 11/10/10
Gen ATC Data – System Requirements Test Report Part 2 (for GAD2)	UEVOL-1672	Release D, 11/10/10



Title of Document	Alstom Reference	Release/Date
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	Release D, 11/10/10
Gen ATC Data – System Requirement Test Description	UEVOL-1671	Release D, 11/10/10
Gen ATC Data – Test Line Specification	UEVOL-0401	Release D, 11/10/10
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	Release G, 04/10/10
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	Release G, 04/09/10
UEVOL ATC Tools Configuration Delivery Sheet v22	UEVOL-R-1242	04/10/10
ATC 5.1.1.2 Sub-system Configuration Delivery Sheet	UEVOL-R-1255	13/10/10
GAD Chain I Requirements Test Report	UEVOL-1754	Release I4B, 27/8/10
GenPZ Requirements Test Report	v12A	12/7/10
ATC GSD GenRTSModule, Software Requirements Test Report	v1.25	4/10/10
ATC GSD GenSGD Module, Software Requirements Test Report	v1.29	4/10/10
ATC GenPar Module Evolution, Software Requirements Test Report	v2.11	4/10/10
DGC_v5.2.3.xls		
GenRTS_GenPAR_DGC_5.2.2.xls		
CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release P, 05/10/10
CC Subsystem Requirement Specification	UEVOL-0098	Release S, 31/05/10
CC Subsystem Hazard Analysis	UEVOL-0542	Release O, 16/07/10
ZC Subsystem Hazard Analysis	UEVOL-0543	Release O, 22/06/10
ATC System Hazard Analysis	UEVOL-0831	Release L, 05/07/10
LC Subsystem Requirements Specification	UEVOL-0264	Release M, 09/04/10
LC Subsystem Hazard Analysis	UEVOL-0430	Release N, 09/07/10
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Release E, 28/10/10
ATC Safety Exported Constraints	UEVOL-1704	Release L, 14/10/10
ATC Safety Exported Constraints	UEVOL-1704	Release N, 22/11/10
ATC Interface Hazard Analysis	UEVOL-0431	Release M, 18/06/10
ATC Interface Hazard Analysis	UEVOL-0431	Release N, 18/11/10
LC-ZC Interface Specification	UEVOL-0223	Release J, 02/06/10
ZC-ZC Interface Specification	UEVOL-0192	Release O, 31/05/10
CC-ZC Interface Description	UEVOL-0185	Release L, 31/05/10
ATC Validation Allocation Table	UEVOL-1189	Release N, 01/09/10
ZC-LC Equipment Maintenance Document	UEVOL-1177	Release IB, 11/05/09
CC Equipment Maintenance Document	UEVOL-1229	Release 2A, 27/02/10
Traintracer Software Loading Procedure	UEVOL-1812	Release B, 02/08/10
ATC Ssy System Architecture Description Verification Report	UEVOL-0817	Release S, 07/06/10
ATC Ssy Requirements Specification Verification Report	UEVOL-0818	Release R, 08/06/10
ATC Subsystem Requirements Specification	UEVOL-0270	Release T, 31/05/10
ATC Subsystem Architecture Description	UEVOL-0271	Release S, 31/05/10
ATC – ZC Ssy Sw Requirements Specification Verif. Report	UEVOL-0821	Release L, 05/10/10
ATC – LC Ssy-Sw Requirements Specification Verif. Report	UEVOL-0823	Release L, 5/10/10



Title of Document	Alstom Reference	Release/Date
ATC System Requirements Specification Verification Report	UEVOL-0816	Release T5, 20/09/10
ATC Verification & Validation Report	UEVOL-1171	Release T, 08/10/10
ATC – LC Ssy Requirements Test Description	UEVOL-0679	Release L, 24/09/10
ATC – LC Ssy Requirements Test Description Verif. Report	UEVOL-0828	Release P, 14/09/10
ATC – LC Ssy Requirements Test Report	UEVOL-1011	Release H, 04/10/10
ATC – ZC Ssy Requirements Test Description	UEVOL-0969	Release L, 05/07/10
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	Release X, 27/09/10
ATC – ZC Ssy Requirements Test Description Verif. Report	UEVOL-0827	Release O, 14/09/10
ATC – CC Ssy Requirements Test Description	UEVOL-0139	Release N, 05/07/10
ATC – CC Ssy Requirements Test Description Verif. Report	UEVOL-0826	Release O, 14/09/10
ATC – CC Ssy Requirements Test Report	UEVOL-0140	Release AS, 5/10/10
ATC Ssy Requirements Test Description	UEVOL-0138	Release H, 05/10/10
ATC Ssy Requirements Test Description Verification Report	UEVOL-0824	Release M, 13/09/10
ATC Ssy Requirements Test Report	UEVOL-1275	Release M, 05/10/10
ATC Ssy Integration Test Description	UEVOL-0137	Release J, 05/10/10
ATC Ssy Integration Test Description Verification Report	UEVOL-0825	Release M, 13/09/10
ATC Ssy Integration Test Report	UEVOL-1046	Release P, 30/09/10
ATC Hazard Log	UEVOL-1705	Release L, 14/10/10
ATC Design Verification Plan	UEVOL-1170	Release H, 01/09/10
ATC Hazard Log	UEVOL-1705	Release N, 19/11/10
ATC Tools Configuration Delivery Sheet	UEVOL-R-1275	v22-A, 19/11/10
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	Version G+, 19/11/10
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	Version G+, 19/11/10
SGD CSV to XML Translator Requirements Test Report	APIL CSV to XML SwRTR-v17A	19/11/10
GAD Chain I Requirements Test Report	UEVOL-1754	19/11/10
ATC 5.1.1-3 Subsystem Configuration Delivery Sheet	UEVOL-R-1274	19/11/10
UEVOL ZC Formal Proof Document	A402844	Release W, 15/09/10
CC-ATP Formal Proof Document	A402843	Release Z, 11/10/10
LC – ASW Formal Proof Document	A402845	Release J, 05/10/10
Trackside Software Architecture Description	A407321	Release I, 10/09/10
UEVOL Trackside LC Source Code Verification Report	A402913	Release K, 29/09/10
UEVOL Trackside ZC Source Code Verification Report	A402912	Release M, 29/09/10
UEVOL CC-Vital Software Source Code Verification Report	A402606	Release Z, 28/09/10
LC – ASW Formal Proof Verification Report	A402918	Release H, 27/09/10
ZC Formal Proof Verification Report	A402917	Release W, 30/09/10
CC – ATP Formal Proof Verification Report	A402916	Release AA, 30/09/10
Specific Safety Study on UEVOL CC-V Parameters	A402903	Release G, 17/09/10
LC B Specification Verification Report	A402915	Release K, 27/09/10
ZC B Specification Verification Report	A402914	Release V, 30/09/10



Title of Document	Alstom Reference	Release/Date
CC Vital B Specification Verification Report	A402882	Release AA, 28/09/10
Software Safety, Validation and Verification Plan T-23	A401582	Release H, 28/09/10
LC Critical Code Review Analysis Report	A402322	Release M, 06/09/10
ZC Critical Code Review Analysis Report	A402528	Release W, 22/09/10
UEVOL – CC – V – ATP Critical Code Review Analysis Report	A402598	Release AI, 30/09/10
Letter of Support for 2003 Platform Release R3.4 with EAV v3.33 (letter Issue 1.0)	S.PI428.21.13	29/09/10
ZC Application Software Reqs. Specification	A401380	Release W, 08/09/10
Urbalis Evolution – ZC Software Hazard Analysis	A401824	Release X, 30/03/10
Platform 2003 R2.8 & R3.4 Safety Assessment Report Releases 2.8 and 3.4	S.PI428.40.4	11/03/10
Platform 2003 R3.4 R029 Safety Case Volume I – Executive Summary (Kemel 4.1 ID – Platform 3.4) Y3-64	A425246	Release V, 05/03/10
UEVOL ZC-LC Coverage of 2003 Safety Exported Constraints	A402444	Release I, 27/09/10
Specific Safety Study on Trackside ATC Parameters	A402904	Release F, 13/08/10
CC Software Safety Assurance Report	A402620	Release BL, 12/10/10
CC Software Safety Assurance Report	A402620	Release BN, 19/11/10
ZC-LC Software Safety Assurance Report	A402621	Release AK, 18/10/10
SGD CSV to XML Translator Requirements Test Report	APIL_CSVToXML_SwR T	Release v17A 27/7/10
CC Vital Software, Architecture Description	A401466	Release T, 8/11/10
ZC-LC Software Safety Assurance Report	A402621	Release AL, 16/11/10
UEVOL Trackside LC, Source Code Verification Report	A402913	Release L, 12/11/10
UEVOL Trackside ZC, Source Code Verification Report	A402912	Release N, 12/11/10
UEVOL-CC_V-ATP, Critical Code Review Analysis Report	A402598	Release AK, 15/11/10
UEVOL CC-Vital Software, Source Code Verification Report	A402606	Release AA, 12/11/10
CC Vital Software Requirements Specification	A401464	Release AM, 30/08/10
CC Software Architecture Description	A401446	Release U, 27/08/10
CC Vital Software Architecture Description	A401466	Release R, 13/09/10
CC Sw Reqs. and Architecture Description Verif. Report	A401804	Release I, 27/09/10
TK Sw Reqs. and Architecture Description Verif. Report	A402938	Release K, 29/09/10
LC Software Requirements Specification	A401381	Release O, 09/09/10
ZC Subsystem Architecture Description	A401536	Release K, 03/09/10
LC Subsystem Architecture Description	A401537	Release J, 16/07/10
CC Software Impact Analysis	A403516	Release AN, 01/10/10
LC Software Requirement Specification	A401381	Release O, 09/09/10
Specific Safety Study – Automatic Protection	A402331	Release G, 11/08/10
Specific Safety Study on Energy Monitoring	A402326	Release G, 03/09/10
CC-VESG Critical Code Review Analysis Report	A406392	Release H, 29/09/10
CC Software Hazard Analysis	A401823	Release U, 30/09/10
UEVOL SSS Synchronization vs ATC IHA	memo-ST10-0019en	16/06/10



Title of Document	Alstom Reference	Release/Date
UEVOL SSS Synchronization vs ATC IHA	memo-ST10-0024en	10/11/10
ATC Software Spot-checking Report	A408174	Release E, 08/10/10
CC Vital Software Module Design	A406966	Release K, 30/08/10
ATC Software Global V&V Report	A402597	Release Q, 08/10/10
LC Software Hazard Analysis	A401825	Release N, 19/08/10
Specific Safety Study on High Integrity Level Controls (HILC)	A405430	Release B, 03/06/10
Specific Safety Study on Safety Related Remote Controls	A405431	Release B, 03/06/10
CC Software Requirement Report	A402319	Release W, 6/10/10
LC Sw Module Test Report	A402265	Release L, 30/08/10
ZC Sw Module Testy Report	A402291	Release N, 22/09/10
CC sw Module Test Report	A402314	Release T, 04/10/10
ZC Sw Module Test Description Verification Report	A402925	Release I, 27/09/10
LC Sw Module Test Description Verification Report	A402926	Release H, 28/09/10
CC Sw Module Test Description Verification Report	A402266	Release O, 04/10/10
CC Sw Requirements Test Plan	A401462	Release V, 24/09/10
ZC Sw Requirements Test Plan	A401691	Release Y, 24/09/10
LC Sw Requirements Test Plan	A401692	Release N, 25/08/10
CC Sw Requirements Test Description	A401878	Release X, 24/09/10
ZC Sw Requirements Test Description	A401881	Release Z, 24/09/10
LC Sw Requirements Test Description	A401882	Release M, 25/08/10
CC Sw Requirements Test Description Verification Report	A402284	Release U, 30/09/10
CC SwRTR	A402285	Release AI, 24/09/10
ZC Sw Requirements Test Description Verification Report	A402921	Release O, 30/09/10
ZC SwRTR	A402289	Release AA, 24/09/10
LC Sw Requirements Test Description Verification Report	A402922	Release J, 28/09/10
LC SwRTR	A402293	Release M, 25/08/10
CC Ssy Integration Test Plan	A401570	Release Q, 14/09/10
CC Ssy Integration Test Description	A401880	Release AB, 14/09/10
CC Ssy Integration Test Description Verification Report	A402282	Release X, 01/10/10
CC Ssy Integration Test Report	A402287	Release AY, 01/10/10
LC Ssy Integration Test Plan	A401572	Release K, 26/09/10
LC Ssy Integration Test Description	A401884	Release N, 22/09/10
LC Ssy Integration Test Description Verification Report	A402933	Release K, 01/10/10
LC Ssy Integration Test Report	A402292	Release V, 27/09/10
ZC Ssy Integration Test Plan	A401571	Release K, 25/09/10
ZC Ssy Integration Test Description	A401883	Release T, 23/09/10
ZC Ssy Integration Test Description Verification Report	A402930	Release N, 01/10/10
ZC Ssy Integration Test Report	A402288	Release AE, 28/09/10
CC Sw Integration Test Plan	A402308	Release I, 27/09/10



Title of Document	Alstom Reference	Release/Date
CC Sw Integration Test Description	A402309	Release K, 27/09/10
CC Sw Integration Test Description Verification Report	A402273	Release J, 27/09/10
CC Sw Integration Test Report	A402310	Release K, 27/09/10
ZC Sw Integration Test Plan	A402910	Release D, 09/09/10
ZC Sw Integration Test Description	A402270	Release H, 09/09/10
ZC Sw Integration Test Description Verification Report	A402928	Release G, 17/09/10
ZC Sw Integration Test Report	A402272	Release H, 09/09/10
LC Sw Integration Test Description	A402269	Release H, 30/08/10
LC Sw Integration Test Description Verification Report	A402929	Release G, 28/09/10
LC Sw Integration Test Report	A402271	Release H, 30/08/10
ATC SwRN	A402307	Release CA, 08/10/10
CC SwRN	A402045	Release BI, 05/10/10
Tk SwRN	A402079	Release AJ, 05/10/10
Trackside SwSRR	A402317	Release U, 28/09/10
Trackside SwSRR	A402317	Release V, 16/11/10
LC Sw Module Test Report	A402265	Release M, 15/11/10
CC Sw Module Test Report	A402314	Release U, 12/11/10
CC Vital Software Source Code Verification Report	A402606	Release AB, 19/11/10

ATC Baseline 5.2.1–I Review (December 2010)

Table 27: Documents Reviewed for ATC Baseline 5.2.1–I and Software 7.0.11

Title of Document	Alstom Reference	Release/Date
ATC Generic application Safety Case	UEVOL-0887	Release X, 8/12/10
Safety Hazard Log	UEVOL-1705	Release O, 7/12/10
ATC Exported Constraints	UEVOL-1704	Release O, 7/12/10
ATC Subsystem Verification and Validation Report	UEVOL-1171	Release V, 8/12/10
CR Follow Up	UEVOL-1988	Release AD
ATC-CC Subsystem Reqs. Specification Verif. Report	UEVOL-0819	Release R, 20/12/10
CC-V Software Requirements Specification	A401464	Release AR, 25/11/10
CC-V Software Architecture Description	A401466	Release U, 1/12/10
CC-V Formal Proof Document	A402843	Release AC, 29/11/10
CC-V Formal Proof Verification Report	A402916	Release AB, 1/12/10
CC-V B-Specification Verification Report	A402882	Release AB, 1/12/10
CC Sw Reqs. Spec – Architecture Description Verification Report	A401804	Release K, 30/11/10
CC-V Sw Requirements Test Description Verification Report	A402284	Release V, 2/12/10
CC Subsystem Integration Test Description Verification Report	A402282	Release Z, 2/12/10
CC-V Module Test Description Verification Report	A402266	Release P, 2/12/10
CC-V Software Test Description Verification Report	A402273	Release K, 30/11/10



Title of Document	Alstom Reference	Release/Date
CC Impact Analysis	A403516	Release AQ, 3/11/10
CC-V Software Requirements Test Description	A401878	Release Y, 2/12/10
CC-V Software Requirements Test Report	A402285	Release AJ, 2/12/10
CC Subsystem Integration Test Description	A401880	Release AC, 23/11/10
CC Subsystem Integration Test Report	A402287	Release BA, 3/12/10
CC-V Module Test Report	A402314	Release V, 1/12/10
CC-V Source Code Verification Report	A402606	Release AC, 1/12/10
CC-V Software Integration Test Report	A402310	Release L, 29/11/10
CC-V Software Hazard Analysis	A401823	Release V, 26/11/10
CC-ATC Critical Code Review Analysis Report	A402598	Release AL, 30/11/10
CC-VESG Critical Code Review Analysis Report	A406392	Release I, 26/11/10
CC-V Software Safety Requirements Report	A402319	Release Y, 3/12/10
Energy Specific Safety Study	A402326	Release H, 16/11/10
CC Software Safety Assurance Report	A402620	Release BO, 6/12/10
CC Software Release Note	A402045	Release BK, 3/12/10
CC-V Module Test Description	A401313	Release G, 2/12/10
CC-V Software Integration Test Description	A402309	Release L, 29/11/10
CC-V Software Integration Test Plan	A402308	Release J, 29/11/10
CC Subsystem Architecture Description	A401446	Release Y, 3/11/2010

ATC Baseline 5.2.1–2 Review (January-February 2011)

Table 28: Documents Reviewed for ATC Baseline 5.2.1–2 and Software 7.0.12

Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification and Validation Report	UEVOL-1171	Release Y, 19/1/11
CC Subsystem Requirements Test Report	UEVOL-0140	Release AY, 19/1/11
ATC Hazard Log	UEVOL-1705	Release R, 19/01/11
ATC Safety Exported Constraints	UEVOL-1704	Release R, 18/01/11
ATC Generic Application Safety Case	UEVOL-0887	Release AA, 20/01/11
ATC 5.2.1.2 Subsystem Configuration Delivery Sheet	UEVOL-R-1321	20/01/10
CR Safety Review	UEVOL-1988	Release AJ, 08/07/10
Urbalis Evolution – ATC Subsystem UNIVIC Reset Rules	UEVOL-2165	Release IA, 29/10/10
CC Software Release Note	A402045	Release BO, 18/1/11
CC-V Module Test Description	A402313	Release H, 17/12/10
CC-V Module Test Description Verification Report	A402266	Release P, 18/1/11
CC-V Module Test Report	A402314	Release W, 17/12/10
CC-V Software Integration Test Description	A402309	Release M, 17/12/10
CC-V Software Integration Test Description Verif, Report	A402273	Release L, 17/1/11
CC-V Software Integration Test Report	A402310	Release M, 17/12/10



Title of Document	Alstom Reference	Release/Date
CC Subsystem Integration Test Description	A401880	Release AF, 14/1/11
CC Subsystem Integration Test Description Verif. Report	A402282	Release AD, 17/1/11
CC Subsystem Integration Test Report	A402287	Release BF, 14/1/11
CC Software Impact Analysis	A403516	Release AV, 14/01/11
VESG Critical Code Review Assessment Report	A406392	Release K, 14/01/11
CC Vital Software Architecture Description	A401466	Release W, 13/12/10
CC Vital Software, Software Module Design	A406966	Release L, 13/12/10
CC Software Safety Assurance Report	A402620	Release BS, 18/01/11
ATC SW Spot Checking Report	A408174	Release G, 19/01/11
Urbalis Evolution – CC-ATP Formal Proof Document	A402843-AE	Release AE, 17/01/11
Urbalis Evolution – CC-ATP & VESG Formal Proof Verification Report	A402916-AC	Release AC, 17/01/11
Urbalis Evolution – CC Vital B Specification Verification Report	A402882-AC	Release AC, 13/01/11
CC Vital Software Architecture Description	Y3-T A401466-W	Release W, 13/12/10
UEVOL CC-Vital Software Source Code Verification Report	T-23 A402606-AE	Release AE, 14/01/11

ATC Baseline 7.1 Review (March 2011)

Table 29: Documents Reviewed for ATC Baseline 7.1

Title of Document	Alstom Reference	Release/Date
CC Subsystem Requirement Specification	UEVOL-0098	Release W, 15/10/10
ATC-CC Subsystem Software Requirement Specification Verification report	UEVOL-0819	Release R, 28/01/11
CC-ZC Interface Description	UEVOL-0185	Release M, 27/08/10
CC Subsystem Hazard Analysis	UEVOL-0542	Release Q, 30/10/10
ATC Hazard Log	UEVOL-1705	Release T, 11/02/11
ATC Safety Exported Constraints	UEVOL-1704	Release T, 09/02/11
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Release F, 28/01/11
CR Safety Review	UEVOL-1988	Release AL, 14/02/11
CC Software Impact Analysis	A403516	Release AW, 10/02/11
CC Software Requirements Specification	A401464	Release AS, 02/12/10
CC Software Requirements and Architecture Description Verification Report	A401804	Release L, 04/01/11
CC Software Architecture Description	A401446	Release Z, 10/11/10
CC Software Safety Assurance Report	A402620	Release BU, 11/02/11
CC VESG Critical Code Review Analysis Report	A406392	Release J, 27/12/10
CC-Vital Software Hazard Analysis	A401823	Release W, 13/12/10
CC Vital Software, Architecture Description	A401466-X	14/12/10
ATC Generic Application Safety Case	UEVOL-0887-AC	15/02/11
Urbalis Evolution – CC – ATP Formal Proof Document	A402843-AD	14/01/11
Urbalis Evolution CC – Vital Formal Proof Verification Report	A402916-AD	14/01/11



Title of Document	Alstom Reference	Release/Date
Software Safety, Validation and Verification Plan	A401582-I	08/11/10
UEVOL – CC – V – ATP Critical Code Review Analysis Report	A402598-AP	10/02/11
UEVOL CC-Vital Software Source Code Verification Report	A402606-AD	17/12/10
CC Software Safety Assurance Report	A402620-BU	11/02/11
UEVOL ATC Tools Configuration Delivery Sheet v24	UEVOL-R-1290	18/01/11
ATC Subdivision Rules	UEVOL-0395-S	03/12/10
ATC Subdivision Rules Specific Study	UEVOL-1027-H	08/12/10
CC-Vital Setting Description	UEVOL-0643-R	08/11/10
ATC Parameters Process Hazard Analysis	UEVOL-0544-J	06/12/10
GenPZ, Requirements Test Report	v15A	13/01/11
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-XXXX v2.14	21/12/10
ATC GSD Gen SGD Module Software Requirements Test Report	v1.32	21/12/10
ATC GSD Gen RTS Module Software Requirements Test Report	v1.28	21/12/10
DGC – GAD2 – v7.1.3.b.xls		
SGD CSV to XML Translator Requirements Test Report	APIL-CSV To XML – SwRTR_vB	21/12/10
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754-C	21/12/10
DGC–GADI–v7.1.3c.xls		
Gen ATC Data – System Requirement Test Report Part 1 (for GAD1)	UEVOL-1672-E	10/01/11
Gen ATC Data – System Requirement Test Report Part 2 (for GAD2)	UEVOL-1672-E	10/01/11
Gen ATC Data – System Requirement Test Plan	UEVOL-1670-E	06/01/11
Gen ATC Data – System Requirement Test Description	UEVOL-1671-E	21/01/11
Gen ATC Data – Test Lines Specification	UEVOL-0401-E	21/01/11
<ATC Data Generation Procedure 1 st Chain>	UEVOL-1666-H	18/01/11
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667-H	18/01/11
ATC Data Activities Recorder Project – ATC SW Version	UEVOL-1236-G	10/11/10
Specific Safety Study on UEVOL CC-V Parameters	A402903-H	07/01/11
ATC 7.1.1.2 Sub-system Configuration Delivery Sheet	UEVOL-R-1335	16/02/11
Urbalis Evolution – CC Vital B Specification Verification Report	A402882-AD	23/12/10
Urbalis Evolution – CC – Vital Formal Proof Verification Report	A402916-AE	10/03/11
CC Subsystem Requirements Test Description	UEVOL-0139	Release O, 17/12/2010
CC Subsystem Requirements Test Report	UEVOL-0140	Release AZ, 11/2/2011
CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	Release P, 21/12/2010
ATC Validation Allocation Table	UEVOL-1169	Release O, 6/12/2010
ATC Subsystem V&V Report	UEVOL-1171	Release Z, 15/2/2011
CC Module Test Description	A402313	Release I, 17/12/2010
CC Module Test Report	A402314	Release X, 17/12/2010
CC Module Test Description Verification Report	A402266	Release R, 25/1/2011
CC Software Safety Requirements Report	A402319	Release AC, 10/2/2011
CC Software Requirements Test Plan	A401462	Release W, 16/12/2010



Title of Document	Alstom Reference	Release/Date
CC Software Requirements Test Description	A401878	Release Z, 16/12/2010
CC Software Requirements Test Report	A402285	Release AK, 16/12/2010
CC Software Requirements Test Description Verification Report	A402284	Release W, 3/1/2011
CC Software Integration Test Plan	A402308	Release K, 13/12/2010
CC Software Integration Test Description	A402309	Release N, 17/12/2010
CC Software Integration Test Report	A402310	Release N, 17/12/2010
CC Software Integration Test Description Verification Report	A402273	Release M, 25/1/2011
CC Subsystem Integration Test Description	A401880	Release AE, 5/1/2011
CC Subsystem Integration Test Report	A402287	Release BG, 9/2/2011
CC Subsystem Integration Test Description Verification Report	A402282	Release AF, 9/2/2011
ATC Software Project Document Plan	A401405	Release BI, 2/3/2011
Spot Checking Report	A408174	Release H, 28/1/2011
ATC Software Review Report	A415584	Release A, 31/1/2011
ATC Software Release Note	A402307	Release CI, 14/2/2011
CC Software Release Note	A402045	Release BQ, 11/2/2011
CC-OVLI Release Note	A402199	Release X, 31/1/2011

ATC Baseline 7.2.2.4 to 7.2.2.6 Review (May 2011)

Table 30: Documents Reviewed for ATC Baseline 7.2.2.4 and 7.2.2.5

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ZC Application Software Requirements Specification	A401380-Z	13/012/10
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114-T	18/10/10
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824-Y	14/12/10
Urbalis Evolution – Trackside Software Architecture Description	A407321-K	26/10/11
UEVOL Trackside ZC Source Code Verification Report	A402912-O	22/12/10
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257-AC	07/01/11
UEVOL Zone Controller (ZC) Formal Proof Document	A402844-Y	14/12/10
Urbalis Evolution – Zone Controller (ZC) Formal Proof Verification Report	A402917-Y	21/01/11
ZC Parameters Configuration Rules	UEVOL-0396-V	03/12/10
Specific Safety Study on Trackside ATC Parameters	A402904-G	06/01/11
Urbalis Evolution – ZC Sub-system Configuration Files Specification	UEVOL-0290-V	20/10/10
Coverage of 2003 Safety Exported Constraints	A402444-J	12/01/11
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528-Z	05/01/11
ZC-LC Software Safety Assurance Report	A402621-AN	28/01/11
TK Software Requirements and Architecture Description Verification Report	A402938	Release L, 17/01/11



Title of Document	Alstom Reference	Release/Date
ZC Subsystem Architecture Description	A401536	Release O, 21/03/10 (assumed date should be 21/03/11)
Specific Safety Study – Automatic Protection	A402331	Release I, 28/02/11
ZC Sub-system Hazard Analysis	UEVOL-0543	Release P, 01/10/10
CC Software Impact Analysis	A403516	Release BE, 26/04/11
CC Vital Software Requirements Specification	A401464	Release AW, 14/04/11
CC Software Requirements and Architecture Description Verification Report	A401804	Release N, 01/04/11
CC Software Requirements and Architecture Description Verification Report	A401804	Release O, 22/04/11
Trackside Software Requirements and Architecture Description Verification Report	A402938	Release M, 01/04/11
CC Software Architecture Description	A401446	Release Z, 10/11/10
Specific Safety Study – Automatic Protection	A402331	Release I, 28/02/11
CC Software Hazard Analysis	A401823	Release Y, 20/04/11
CC Vital Critical Code Review Analysis Report	A402598	Release AU, 22/04/11
On-board Software Safety Assurance Report	A402620	Release CB, 29/04/11
On-board Software Safety Assurance Report	A402620	Release CD, 11/05/11
On-board Software Safety Assurance Report	A402620	Release CH, 20/05/11
ATC Global V&V Report	A402597	Release W, 27/04/11
CC Software Safety Requirement Report	A402319	Release AG, 28/04/11
UEVOL CC Software Release Note 7.2.4	A402045	Release BY, 27/04/11
UEVOL Wayside Software Release Note 7.2.3	A402079	Release AO, 19/04/11
UEVOL ATC Software Release Note 7.2.2	A402307	Release CT, 29/04/11
CC-ZC Interface Description	UEVOL-0185	Release M, 27/08/10
ZC-ZC Interface Description	UEVOL-0192	Release P, 07/02/11
ATC Interface Hazard Analysis	UEVOL-0431	Release P, 24/03/11
ZC Sub-system Hazard Analysis	UEVOL-0543	Release Q, 09/03/11
ATC System Hazard Analysis	UEVOL-0831	Release N, 03/12/10
ATC-CC Sub-system Software Requirements Specification Verification Report	UEVOL-0819	Release U, 20/04/11
CC Sub-system Tests Report	UEVOL-0140	Release BE, 28/04/11
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Release G, 12/04/11
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release V, 29/04/11
ATC Hazard Log	UEVOL-1705	Release V, 29/04/11
ZC Sw Module Test Development Report	A402925	Release J, 05/04/2011
LC Sw Module Test Report	A402265	Release M, 05/04/2011
ZC Sw Module Test Report	A402291	Release O, 05/04/2011
ZC Sw Integration Test Plan	A402910	Release E, 07/04/2011
ZC Sw Integration Test Description	A402270	Release I, 07/04/2011



Title of Document	Alstom Reference	Release/Date
ZC Sw Integration Description Verification Report	A402928	Release H, 07/04/2011
ZC Sw Integration Test Report	A402272	Release I, 07/04/2011
ZC Sw Requirements Test Description Verification Report	A402921	Release Q, 13/04/2011
Sw Release Note ATC Software	A402307	Release CI, 13/04/2011
Sw Release Note Trackside	A402079	Release AM, 13/04/2011
ATC – ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821	Release N, 14/04/2011
ATC ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0823	Release M, 14/04/2011
ATC LC Subsystem Requirements Test Description Verification Report	UEVOL-0828	Release P, 14/04/2011
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	Release M, 14/04/2011
ATC ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	Release P, 14/04/2011
ZC Subsystem Requirements Test Reports	UEVOL-1186	Release Z, 14/04/2011
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	Release V, 14/04/2011
ZC Sw Module Test Description Verification Report	A402925	Release K, 09/05/2011
ZC Software Module Test Report	A402291	Release P, 09/05/2011
ZC Subsystem Integration Test Description	A402883	Release W, 09/05/2011
ZC Subsystem Integration Test Description Verification Report	A402930	Release R, 10/05/2011
ZC Subsystem Integration Test Report	A402288	Release AH, 16/05/2011
ZC Software integration Test Plan	A402910	Release F, 16/05/2011
ZC Software Integration Test Description	A402270	Release J, 16/05/2011
ZC Software Integration Test Description Validation Report	A402928	Release I, 16/05/2011
ZC Software Requirements Test Plan	A401691	Release AA, 16/05/2011
ZC Software Requirements Test Description	A401881	Release AD, 16/05/2011
ZC Software Requirements Test Description Verification Report	A402921	Release S, 16/05/2011
ZC Software Requirements Test Report	A402289	Release AE, 16/05/11
Trackside Software Safety Requirements Report	A402317	Release Z, 17/05/2011
ZC Software Module Test Description Verification Report	A402925	Release K, 17/05/2011
CC-VITAL Software Module Test Description Verification Report	A402266	Release T, 17/05/2011
CC-VITAL Software Module Test Report	A402314	Release Z, 17/05/2011
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	Release N, 17/05/2011
ATC ZC Subsystems Test Report	UEVOL-1186	Release AB, 17/05/2011
ATC Subsystem V&V Report	UEVOL-1171	Release AF, 17/05/2011
ATC Configuration Rules Safety Study	UEVOL-1574-K	07/12/10
LC Parameters Configuration Rules	UEVOL-0397-O	11/04/11
ZC Parameters Configuration Rules	UEVOL-0396-V	19/04/11
ATC Configuration Rules Safety Study	UEVOL-1574-L	23/03/10
Urbalis Evolution – ZC Sub-system Configuration Files Specification	UEVOL-0290-Y	16/02/11
ATC Subdivision Rules	UEVOL-0395-T	04/04/11



Title of Document	Alstom Reference	Release/Date
ATC Subdivision Rules Specific Study	UEVOL-1027-I	17/04/11
Specific Safety Study on Tracksides ATC Parameters	A402904-H	13/04/11
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114-W	18/02/11
CR Safety Review	UEVOL-1988 vAV	29/04/11
Urbalis Evolution – GAD Chain 1 Requirement Test Report	UEVOL-1754-D	28/04/11
DGC_GAD_v7.2.8.xls		
Gen PZ Requirements Test Report	vA	28/04/11
ATC GSD Gen SGD Module Software Requirement Test Report	UEVOL-xxxx	Release B, 28/04/11
ATC GenPar Module Evolution Software Requirement Test Report	vB	28/04/11
DGC_GAD2_v7.2.5.xls		
Gen ATC Data – System Requirement Test Report Part 1 (for GAD 1)	UEVOL-1672-F	27/04/11
Gen ATC Data – System Requirement Test Report Part 2 (for GAD 2)	UEVOL-1672-F	28/04/11
Gen ATC Data – System Requirements Test Plan	UEVOL-1670-F	26/04/11
Gen ATC Data – System Requirement Test Description	UEVOL-1671-F	27/04/11
UEVOL ATC Tools Configuration Delivery Sheet v26.1	UEVOL-R-1418	04/05/11
ATC Data Generation Procedure 1 st Chain	UEVOL-1666 v1-Plus	04/05/11
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667 v1-Plus	04/05/11
Gen ATC Data – Test Lines Specification	UEVOL-0401-F	27/04/11
Urbalis Evolution ATC Generic Application Safety Case	UEVOL-0887-AK	29/04/11
ATC GSD GenRTS Module Software Requirements Test Report		Release B , 13/05/11
Urbalis Evolution – ZC Application Software Requirements Specification	A401380-AB	21/03/11
CC Vital Software Architecture Description	A401466-AA	18/04/11
Urbalis Evolution – CC – ATP Formal Proof Document	A402843-AH	15/04/11
Urbalis Evolution – CC – Vital Formal Proof Verification Report	A402916-AF	22/04/11
UEVOL CC-Vital Software Source Code Verification Report	A402606-AG	27/04/11
UEVOL ATC Software Release 7.2.1	A417035-A	27/04/11
UEVOL ATC Software Release 7.2.2	A417035-B	29/04/11
ZC-Package Boolean-hide history		18/05/11
ATC 7.2.2.5 Sub-system Delivery Sheet	UEVOL-R-1444	06/05/11
Urbalis Evolution – CC Vital B Specification Verification Report	A402882-AF	22/04/11
UEVOL Zone Controller (ZC) Formal Proof Document	A402844-AA	06/04/11
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257-AD	13/04/11
Coverage of 2003 Safety Exported Constraints	A402444-K	18/04/11
Urbalis Evolution – Tracksides Software Architecture Description	A407321-N	31/03/11
LC Sw Module Test Report	A402265	M
ZC Sw Module Test Report	A402291	O
ZC Ssy Integration Test Plan	A401571	L
ZC Ssy Integration Test Description	A401883	V
ZC Ssy Integration Test Description Verification Report	A402930	P



Title of Document	Alstom Reference	Release/Date
ZC Ssy Integration Test Report	A402288	AG
ZC Sw Integration Test Plan	A402910	E
ZC Sw Integration Test Description	A402270	I
ZC Sw Integration Test Description Verification Report	A402928	H
ZC Sw Integration Test Report	A402272	I
ZC Sw Requirements Test Plan	A401691	Z
ZC Sw Requirements Test Description	A401881	AB
ZC Sw Requirements Test Description Verification Report	A402921	Q
ZC Sw Requirements Test Report	A402289	AC
SwRN ATC Software	A402307	CI
SwRN Trackside	A402079	AM
ATC ZC SsyR Test Description	UEVOL-0969	M
ATC ZC SsyR Test Description Verification Report	UEVOL-0827	P
ATC ZC SsyR Test Report	UEVOL-1186	Z
ATC Subsystems Integration Tests Descriptions	UEVOL-0137	K
ATC Subsystems Integration Test Description Verification Report	UEVOL-0825	N
ATC Subsystems Integration Tests Reports	UEVOL-1046	Q
UEVOL Trackside ZC Source Code Verification Report	A402912	P, 7/4/11
Urbalis Evolution – ZC, B Specification Verification Report	A402914	Z, 8/4/11
Urbalis Evolution – Zone Controller (ZC) Formal Proof Verification Report	A402917	AA, 19/04/11
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824	Z, 23/3/11
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528	AC, 17/05/11
Gen ATC Data – System Requirement Test Description	UEVOL-1671	E, 21/01/11
Gen ATC Data – Test Lines Specification	UEVOL-0401	E, 21/01/11
Urbalis Evolution – ZC, B Specification Verification Report	A402914	X, 24/12/10
ATC 7.2.2.6 Sub-System Delivery Sheet	UEVOL-R-1475	20/5/11
ATC Generic Application Safety Case	UEVOL-0887	AP, 20/5/11
CC Software Impact Analysis	A403516	Release BF, 04/05/11
CC Software Safety Requirement Report	A402319	Release AH, 05/05/11
UEVOL CC Software Release Note 7.2.6	A402045	Release B2, 04/05/11
UEVOL ATC Software Release Note 7.2.4	A402307	Release CV, 04/05/11
CC SyRTD Validation Session 7.2.6	UEVOL-0139	Release 726, 05/05/11
CC Subsystem Tests Report	UEVOL-0140	Release BF, 05/05/11
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.5	UEVOL-1171	Release AG, 05/05/11
ATC Hazard Log	UEVOL-1705	Release WV, 05/05/11
ATC Safety Exported Constraints	UEVOL-1704	Release X, 19/05/11
ATC Validation Allocation Table	UEVOL-1169	Release P, 21/03/11
ATC System Hazard Analysis	UEVOL-0831	Release O, 19/05/11



Title of Document	Alstom Reference	Release/Date
ATC Design Verification Plan	UEVOL-1170	Release J, 11/04/11
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	Release V, 16/03/11
CC Software Integration Test Plan	A402308	Release M, 27/04/11
CC Software Integration Test Description	A402309	Release P, 27/04/11
CC Software Integration Test Report	A402310	Release P, 27/04/11
CC Software Integration Test Description Verification Report	A402273	Release O, 27/04/11
CC Subsystem Integration Tests Plan	A401570	Release R, 09/12/10
CC Subsystem Integration Test Description Verification Report	A402282	Release AK, 22/04/11
CC Subsystem Integration Tests Report	A402287	Release BM, 20/04/11
CC Subsystem Integration Tests Description	A401880	Release AG, 21/04/11
CC Software Requirements Test Description	A401878	Release AB, 27/04/11
CC Software Requirements Test Description Verification Report	A402284	Release Y, 27/04/11
CC Software Requirements Test Report	A402285	Release AM, 27/04/11
ATC Software Safety Assurance Report	A402620	Release CD, 11/05/11
ATC SW Spot Checking Report	A408174	Release K, 09/05/11

ATC Baseline 7.2.2.10 Review (June 2011)

Table 31: Documents Reviewed for ATC Baseline 7.2.2.10

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution-CC-ATP Formal Proof Document	A402843	AI, 09/06/11
UEVOL CC-Vital Software Source Code Verification Report	A402606	AH, 10/06/11
Urbalis Evolution-ZC Software, Software Impact Analysis	A404257	AG, 07/06/11
Urbalis Evolution-CC-Vital Formal Proof Verification Report	A402916	AG, 10/06/11
UEVOL-CC-V-ATP Critical Code Review Analysis Report	A402598	AW, 10/06/11
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402313	L, 10/06/11
ATC SW Urbalis Evolution – CC Vital Software Module Test Description Verification Report	A402266	V, 10/06/11
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402314	AA, 10/06/11
ATC Software Safety Assurance Report	A402620	CK, 14/06/11
B Specification Verification Report	A402882	AG, 10/06/11
CR Safety Review	UEVOL-1988	AY, 08/07/10
ATC Generic Application Safety Case	UEVOL-0887	AR, 14/06/11
ATC 7.2.2.10 Sub-system Delivery Sheet	UEVOL-R-1514	14/06/11
Urbalis Evolution-CC-Vital Formal Proof Verification Report	A402916	AH, 17/06/11
UEVOL CC-Vital Software Source Code Verification Report	A402606	AI, 17/06/11
CC Software Impact Analysis	A403516	BI, 10/06/11
CC Software Requirements Specification	A401464	AY, 09/06/11
CC Software Architecture Description	A401446	AD, 31/05/11



Title of Document	Alstom Reference	Release/Date
CC Software Requirements and Architecture Description Verification Report	A401804	P, 06/06/11
CC Software Hazard Analysis	A401823	Z, 10/06/11
CC Software Safety Requirement Report	A402319	AI, 13/06/11
UEVOL ATC Release Note 7.2.7	A402307	DE, 14/06/11
UEVOL CC Software Release Note 7.2.9	A402045	CD, 13/06/11
CC Vital Software Integration Test Description	A402309	Q, 10/06/11
CC Vital Software Integration Test Description Verification Report	A402273	P, 10/06/11
CC Vital Software Integration Test Report	A402310	Q, 10/06/11
CC Software Requirements Tests Description	A401878	AC, 10/06/11
CC Software Requirements Test Description Verification Report	A402284	Z, 10/06/11
CC Software Requirements Tests Report	A402285	AO, 10/06/11
CC Subsystem Integration Tests Description	A401880	AH, 10/06/11
CC Subsystem Integration Test Description Verification Report	A402282	AM, 21/06/11
CC Subsystem Integration Tests Report	A402287	BO, 07/06/11
ZC Subsystem Integration Test Description Verification Report	A402930	T, 21/06/11
ZC Subsystem Integration Tests Report	A402288	AK, 07/06/11
Urbalis Evolution Project Document Plan	A401405	BR, 17/06/11
ATC-CC Subsystem Software Requirement Specification Verification Report	UEVOL-0819	V, 10/06/11
CC Subsystem Tests Report	UEVOL-0140	BI, 14/06/11
UEVOL ATC Software Release Note 7.2.7	A402307	DD, 14/06/11
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Z, 14/06/11
ATC Hazard Log	UEVOL-1705	Z, 14/06/11
ATC Subsystem Verification and Validation Report, ATC Baseline 7.2.2.10	UEVOL-1171	AL, 14/06/11

ATC Baseline 7.2.2.11 Review (July 2011)

Table 32: Documents Reviewed for ATC Baseline 7.2.2.11

Title of Document	Alstom Reference	Release/Date
ATC Generic Application Safety Case	UEVOL-0887-AS	27/06/11
ATC Software Safety Assurance Report	A402620-CL	27/06/11
CR Safety Review	UEVOL-1988-BB	21/06/11
UEVOL_CC-V: ATP and VESG, Software Module Test Description	A402313-M	22/06/11
UEVOL_CC-V: ATP and VESG, Software Module Test Report	A402314-AB	22/06/11
Urbalis Evolution – Carborne Controller, Vital Software, Software Integration Test Description	A402309-R	22/06/11
Urbalis Evolution Carborne Controller, Vital Software, Software Integration Test Report	A402310-R	22/06/11
ATC 7.2.2.11 Sub-System Delivery Sheet	UEVOL-R-1536	27/06/11



Title of Document	Alstom Reference	Release/Date
UEVOL ATC Software Release 7.2.9	A417035-E	27/6/11
CC Software Impact Analysis	A403516	Release BJ, 22/06/11
CC Subsystem Integration Tests Report	A402287	Release BP, 21/06/11
UEVOL CC Software Release Note 7.2.11	A402045	Release CE, 24/06/11
UEVOL ATC Software Release Note 7.2.9	A402307	Release DE, 24/06/11
CC Subsystem Tests Report	UEVOL-0140	Release BJ, 24/06/11
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.11	UEVOL-1171	Release AM, 27/06/11
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release AA, 27/06/11
ATC Hazard Log	UEVOL-1705	Release AA, 27/06/11
ATC 7.2.2.11 Subsystem Delivery Sheet	UEVOL-R-1536	27/06/11

ATC Baseline 7.2.2.12 Review (July 2011)

Table 33: Documents Reviewed for ATC Baseline 7.2.2.12

Title of Document	Alstom Reference	Release/Date
CC Software Impact Analysis	A403516	Release BK, 11/07/11
CC Software Safety Requirement Report	A402319	Release AJ, 11/07/11
UEVOL ATC Software Release Note 7.2.10	A402307	Release DG, 11/07/11
UEVOL CC Software Release Note 7.2.12	A402045	Release CF, 11/07/11
CC Subsystem Integration Test Description Verification Report	A402282	Release AN, 18/07/11
CC Subsystem Integration Tests Report	A402287	Release BQ, 11/07/11
CC Subsystem Tests Report	UEVOL-0140	Release BQ, 11/07/11
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.12	UEVOL-1171	Release AN, 12/07/11
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release AB, 12/07/11
ATC Hazard Log	UEVOL-1705	Release AB, 12/07/11
ATC 7.2.2.12 Subsystem Impact Analysis	UEVOL-2408	Release B, 11/07/11
UEVOL-CC-V-ATP Critical Code Review Analysis Report	A402598-AX	11/07/11
Software Module Test Description	A402313-N	11/07/11
ATC SW Urbalis Evolution – CC Vital Software Module Test Description Verification Report	A402266-V	11/07/11
Software Module Test Report	A402314-AC	11/07/11
ATC Software Safety Assurance Report	A402620-CM	11/07/11
ATC 7.2.2.12 Sub-system Delivery Sheet	UEVOL-R-1548	12/07/11
CR Safety Review	UEVOL-1988 vBE	12/07/11
ATC Generic Application Safety Case	UEVOL-0887-AT	12/07/11
UEVOL ATC Software Release 7.2.10	A417035-F	13/07/11



ATC Baseline 7.2.2.13 Review (November 2011)

Table 34: Documents Reviewed for ATC Baseline 7.2.2.13

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ZC Sub-System, Requirements Specification	UEVOL-0114	vAB, 18/10/11
ATC 7.2.2.13 Sub-System Delivery Sheet	UEVOL-R-1637	2/11/11
CC-Vital Setting Description	UEVOL-0643	vW, 11/10/11
ATC Generic Application Safety Case	UEVOL-0887	vAX, 26/10/11
Specific Safety Study on UEVOL CC-V Parameters	A402903	vK, 25/10/11
UEVOL-CC-V: ATP and VESG, Software Module Test Report	A402314	vAF, 20/10/11
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	vY, 21/10/11
UEVOL CC-Vital Software, Source Code Verification Report	A402606	vAL, 18/10/11
UEVOL CC-Vital Software, Source Code Verification Report	A402606	vAN, 28/11/11
UEVOL-CC-V: ATP and VESG, Software Module Test Description	A402313	vQ, 20/10/11
Urbalis Evolution – Carborne Controller Vital Software, Software Integration Test Description	A402309	vU, 18/10/11
Urbalis Evolution – Carborne Controller Vital Software, Software Integration Test Report	A402310	vU, 18/10/11
Urbalis Evolution – ZC Software, Software Impact Analysis	A402257	vV, 16/9/11
UEVOL Trackside ZC, Source Code Verification Report	A402912	vR, 11/10/11
Urbalis Evolution Zone Controller (ZC), Formal Proof Verification Report	A402917	vAC, 19/10/11
Coverage of 2003 Safety Exported Constraints	A402444	vM, 24/10/11
Urbalis Evolution – Zone Controller, Critical Code Review Analysis Report	A402528	vAF, 24/10/11
CC Vital Formal Proof Document	A402843	vAL, 7/10/11
Urbalis Zone Controller (ZC), Formal Proof Document	A402844	vAF, 12/9/11
CC Vital Software, Architecture Description	A401466	vAD, 16/9/11
Urbalis Evolution – CC_Vital, Formal Proof Verification Report	A402916	vAK, 17/10/11
Urbalis Evolution – CC_Vital, B Specification Verification Report	A402882	vAJ, 17/10/11
Urbalis Evolution – ZC Application, Software Requirements Specification	A401380	vAH, 15/9/11
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	vAC, 24/10/11
Urbalis Evolution – ZC, B Specification Verification Report	A402914	vAB, 21/10/11
Urbalis Evolution – ZC, B Specification Verification Report	A402914	vAC, 28/11/11
UEVOL-CC_V_ATP, Critical Code Review Analysis Report	A402598	vBA, 24/10/11
ATC Software Safety Assurance Report	A402620	vCQ, 27/10/11
	UEVOL-1988	vBR
Urbalis Evolution – ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	vS, 13/10/11
UEVOL ATC Software Release 7.2.11	A417035	vG, 28/10/11
CC Vital Software Requirements Specification	A401464	Release BD, 16/09/11



Title of Document	Alstom Reference	Release/Date
TK (LC&ZC) Software Requirements and Architecture Description Verification Report	A402938	Version O, 19/10/11
CC (Vital and Non Vital) Software Requirements and Architecture Description Verification Report	A401804	Version T, 18/10/11
CC Software Architecture Description	A401446	Release AG, 07/09/11
VESG Critical Code Review Analysis Report	A406392	Release O, 24/10/11
CC Vital Software – Software Module Design	A406966	Release L, 13/12/11
CC Software Safety Requirements Report	A402319	Release AM, 24/10/11
CC Vital Software Integration Test Description Verification Report	A402273	Release S, 19/10/11
CC Subsystem Integration Tests Description	A401880	Release AJ, 12/10/11
CC Subsystem Integration Test Description Verification Report	A402282	Release AR, 24/10/11
CC Subsystem Integration Tests Report	A402287	Release BU, 30/09/11
CC Software Release Note 7.2.16	A402045	Release CJ, 25/10/11
Wayside Software Release Note 7.2.5	A402079	Release AU, 25/10/11
Carborne Controller Subsystem Requirements Specification	UEVOL-0098	Version AE, 13/10/11
ATC-CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Version Z, 26/10/11
ATC Subsystem Architecture Description Verification Report	UEVOL-0817	Release X, 07/10/11
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	Release Y, 26/10/11
ATC Subsystem Requirement Specification	UEVOL-0270	Release Z, 01/09/11
ATC Architecture Description	UEVOL-0271	Release Y, 01/09/11
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	Release Z, 02/11/11
CC Subsystem Hazard Analysis	UEVOL-0542	Release T, 12/10/11
ATC System Hazard Analysis	UEVOL-0831	Release Q, 17/10/11
ATC Subsystem Impact Analysis 7.2.2.13	UEVOL-2408	Release E, 27/10/11
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release AE, 28/10/11
ATC Hazard Log	UEVOL-1705	Release AE, 28/10/11
ATC-CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	Release R, 27/10/11
CC Subsystem Tests Report	UEVOL-0140	Release BO, 27/10/11
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	Release P, 27/10/11
ATC Subsystem Integration Report	UEVOL-1046	Release S, 26/10/11
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.13	UEVOL-1171	Release AR, 27/10/11
ZC subsystem Integration Architecture Design	A401536	Release Q, 16/11/2011
ZC subsystem Integration Test Description	A401883	Release W, 16/11/2011
ZC subsystem Integration Test Description Verification Report	A402930	Release V, 16/11/2011
ZC subsystem Integration Test Report	A402288	Release AM, 16/11/2011
ZC Software Requirements Testing	A401380	Release AH, 9/11/2011
ZC Software Impact Analysis	A404257	Release AI, 9/11/2011
ZC Software Requirements Test Plan	A401691	Release AC, 22/11/2011
ZC Software Requirement Test Description	A401881	Release AF, 21/11/2011



Title of Document	Alstom Reference	Release/Date
ZC Software Requirement Test Description Verification Report	A402921	Release U, 22/11/2011
ZC Software Requirement Test Report	A402289	Release AG, 23/11/2011
ZC Software Integration Architecture Design	A407321	Release N, 25/11/2011
ZC Software Integration Test Description	A402270	Release L, 25/11/2011
ZC Software Integration Test Description Verification Report	A402928	Release K, 25/11/2011
ZC Software Integration Test Report	A402272	Release L, 25/11/2011
ZC Software Module Test Description Verification Report	A402925	Release M, 23/11/2011
ZC Software Module Test Report	A402291	Release R, 23/11/2011
CC Software Impact analysis	A403516	Release BO, 9/11/2011
CC ATP Software Requirement Test Plan	A401462	Release AB, 22/11/2011
CC ATP Software Requirement Test Description	A401878	Release AF, 22/11/2011
CC ATP Software Requirement Test Description Verification Report	A402284	Release AC, 22/11/2011
CC ATP Software Requirement Test Report	A402285	Release AR, 22/11/2011
CC Software Hazard Analysis	A401823	Release AE, 24/11/2011
Safety Assurance	A402620	Release AQ, 16/11/2011
ZC Software Hazard Analysis	A401824	Release AC, 25/11/2011
Trackside Safety Requirement Report	A402317	Release AB, 25/11/2011
ATC Subsystem Requirement Specification	UEVOL-0270	Release Z, 23/11/2011
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	Release P, 23/11/2011
ZC Subsystem Requirement Specification	UEVOL-0114	Release AB, 24/11/2011
ZC Subsystem Requirement Test Description Verification Report	UEVOL-0827	Release S, 24/11/2011
ZC Subsystem Requirement Test Report	UEVOL-1186	Release AE, 24/11/2011
ATC Subsystem Software Requirement Specification Verification Report	UEVOL-0821	Release Q, 23/11/2011
ATC Interface Hazard Analysis	UEVOL-0431	Release R, 24/11/2011
ATC Validation Allocation Table	UEVOL-1169	Release S, 25/11/2011
UEVOL ATC Software Release Note 7.2.11	A402307	Release DL, 27/10/11

ATC Baseline 7.2.2.14 Review (March 2012)

Table 35: Documents Reviewed for ATC Baseline 7.2.2.14

Title of Document	Alstom Reference	Release/Date
CC-ATP Software Impact Analysis	A403526	version BQ
CC software RS/AD Verification Report	A401804	version V
CC ATC Software Test Report	A402285	version AT
ATC CC subsystem Requirement Test Report	UEVOL-0140	version BS
Urbalis Evolution – CC Software, Software Impact Analysis	A403516	BQ, 15 February 2012
UEVOL CC-Vital Software, Source Code Verification Report	A402606	AN, 6 February 2012
UEVOL CC-V: ATP and VESG, Software Module Test Report	A402314	AI, 17 February 2012
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	S, 17 February 2012



Title of Document	Alstom Reference	Release/Date
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	AA, 20 February 2012
UEVOL – CC-V ATP, Critical Code Review Analysis Report	A402598	BC, 15 February 2012
ZC Parameters Configuration Rules	UEVOL-0396	Z, 13 February 2012
ATC Configuration Rules Safety Study	UEVOL-1574	O, 24 January 2012
ATC Software Safety Assurance Report	A402620	CS, 21 February 2012
ATC 7.2.2.14b Sub-System Delivery Sheet	UEVOL-R-1814	24 February 2012
Urbalis Evolution – GAD Chain I, Requirements Test Report	UEVOL-1754	10D, 8 February 2012
DGC_GAD1_v7.3.3.xls		
DGC_GAD2_v7.3.5.xls		
ATC GenPar Module Evolution, Software Requirements Test Report		2D, 8 February 2011
<ATC Data Generation Procedure 1st Chain>	<UEVOL-1666>	N, 9 February 2012
<ATC Data Generation Procedure 2nd Chain>	<UEVOL-1667>	N, 9 February 2012
Gen ATC Data – Test Lines Specification	UEVOL-0401	J, 9 February 2012
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	J, 29 February 2012
Gen ATC Data – System Requirement Test Description	UEVOL-1671	J, 9 February 2012
Gen ATC Data – System Requirement Test Report	UEVOL-1672	J, 29 February 2012
ATC Generic Application Safety Case	UEVOL-0887	BA, 24 February 2012
UEVOL ATC Tools Configuration Delivery Sheet v26.2	UEVOL-R-1782	10 February 2011
Review Report, UEVOL ATC Software Release 7.2.12	A417035	H, 21 February 2012
Project Document Plan	A401405	BX, 29 February 2012
ATC 7.2.2.14 Subsystem impact analysis	UEVOL-2408	Release H, 22/02/12
New Configuration Management Dashboard – UNIVIC Platform	UEVOL-1915	(Corresponds to TRV1207001105, AA)
Reg. I.6.6.22 System Impact Analysis	UEVOL-2397	Release I, 24/02/12
CC Software Integration Test Plan	A402308	Release P, 07/02/12
CC Software Integration Test Description	A402309	Release W, 07/02/12
CC Vital Software Integration Test Description Verification Report	A402273	Release U, 07/02/12
CC Vital Software Integration Test Report	A402310	Release W, 07/02/12
CC Subsystem Integration Tests Description	A401880	Release AJ, 12/10/11
CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release AA, 04/01/12
CC Software Safety Requirement Report	A402307	Release AO, 17/02/12
UEVOL ATC Software Release Note 7.2.12	A402307	Release DP, 21/02/12
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release AG, 22/02/12
UEVOL ATC Hazard Log	UEVOL-1705	Release AG, 22/02/12
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.14	UEVOL-1171	Release AU, 17/02/12
UEVOL CC Software Release Note 7.2.19	A402045	Release CL, 20/02/12
CC Subsystem Integration Tests Description	A401880	Release AL, 26/01/12
CC Subsystem Integration Tests Description Verification Report	A402282	Release AR, 24/10/11



Title of Document	Alstom Reference	Release/Date
CC Subsystem Integration Tests Report	A402287	Release BW, 27/01/12
CC Subsystem Integration Tests Description Verification Report	A402282	Release AT, 06/02/12

ATC Baseline 9.2.1.3 Review (January - April 2012)

Table 36: Documents Reviewed for ATC Baseline 9.2.1.3

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	Y, 30/06/11
LC Parameters Configuration Rules	UEVOL-0397	P, 05/09/11
Gaps from ATC7.2 to ATC 9.x		
ZC Parameters Configuration Rules	UEVOL-0396	AA, 24/01/12
ATC Subdivision Rules	UEVOL-0395	W, 08/12/11
Urbalis Evolution – ZC Sub-system Configuration Files Specification	UEVOL-0290	AB, 30/09/11
CC-Vital Setting Description	UEVOL-0643	V, 04/11/11
ATC Subdivision Rules Specific Study	UEVOL-1027	K, 02/12/11
ATC Configuration Rules Safety Study	UEVOL-1574	P, 27/01/12
ATC 9.2.1.2 Sub-system Delivery Sheet	UEVOL-R-1748	27/01/12
CR Safety Review	UEVOL-1988	BV, 26/01/12
Urbalis Evolution – CC ATP Formal Proof Document	A402843	AN, 02/11/11
UEVOL Zone Controller (ZC) Formal Proof Document	A402844	AG, 15/02/11
Urbalis Evolution – LC Software, Software Impact Analysis	A405062	L, 13/01/12
UEVOL Trackside LC Source Code Verification Report	A402913	N, 29/11/11
Urbalis Evolution – Trackside Software Architecture Description	A407321	V, 09/01/12
UEVOL Trackside ZC and TDG Source Code Verification Report	A402912	S, 09/01/12
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AJ, 16/01/12
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	AL, 12/12/11
Urbalis Evolution ATC Generic Application Safety Case	UEVOL-0887	AY, 06/02/12
Urbalis Evolution – Line Controller Critical Code Review Analysis Report	A402322	O, 28/12/11
Software Safety, Validation and Verification Plan	A401582-K	18/01/12
Urbalis Evolution – Zone Controller (ZC) Formal Proof Verification Report	A402917	AC, 11/01/12
CC Vital Software Architecture Description	A401466	AE, 23/09/11
UEVOL CC-Vital Software Source Code Verification Report	A402606	AM, 25/11/11
Urbalis Evolution – CC Vital Formal Proof Verification Report	A402916	AL, 13/01/12
Urbalis Evolution – CC Vital B Specification Verification Report	A402882	AK, 13/01/12
Urbalis Evolution – ZC B Specification Verification Report	A402914	AD, 11/01/11
Specific Safety Study on Trackside ATC Parameters	A402904	J, 03/01/12
Specific Safety Study on UEVOL CC-V Parameters	A402903	L, 06/01/12
System Parameters Configuration Rules	UEVOL-0286	AI, 21/03/11



Title of Document	Alstom Reference	Release/Date
System Parameters Configuration Rule Safety Study	UEVOL-1038	L, 25/10/11
GenPZ Requirements Test Report	vB	21/03/12
ATC GenPar Module Evolution Software Requirements Test Report	vE	16/03/12
ATC GSD Gen RTS Module Software Requirements Test Report	vE	16/03/12
ATC GSD GenSGD Module Software Requirements Test Report	VIE	08/03/12
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754	F, 16/03/12
System Safety Delivery Sheet Evolution 13	UEVOL-2381	H, 16/02/12
Review Report, UEVOL ATC Software Release 9.2.2	A422569	A, 25/01/12
DGC-GAD2-V9.2.9-v1.xls		
DGC-GAD1-v9.2.10-v1.xls		
Specific Safety Study on UEVOL CC-V Parameters	A402903	M, 22/03/12
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	I, 16/03/12
Gen ATC Data – System Requirement Test Description	UEVOL-1671	I, 16/03/12
Gen ATC Data – System Requirement Test Report, Part 1 (for GAD1)	UEVOL-1672	I, 16/03/12
Gen ATC Data – System Requirement Test Report, Part 2 (for GAD2)	UEVOL-1672	I, 16/03/12
Gen ATC Data – Test Lines Specification	UEVOL-0401-I	16/03/12
ATC Generic Application Safety Case	UEVOL-0887 vBB	30/03/12
Memo about old TORR Function – v.2	Memo-safety-uevol 041	19/03/12
CR Safety Review	UEVOL-1988	CG, 30/03/12
ATC 9.2.1.3 Sub-System Delivery Sheet	UEVOL-R-1892	30/03/12
UEVOL ATC Software Release 9.2.3	A422569	B, 30/03/12
ATC Subdivision Rules Specific Study	UEVOL-1027	M, 29/03/12
ATC Configuration Rules Safety Study	UEVOL-1574	R, 22/03/12
UEVOL ATC Tools Configuration Delivery Sheet v31	UEVOL-R-1843	15/03/12
<ATC Data Generation Procedure 1 st Chain>	UEVOL-1666	M, 15/03/12
<ATC Data Generation Procedure 2 nd Chain>	UEVOL-1667	M, 15/03/12
System Database Use by ATC	UEVOL-2542	A,
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528	AG, 12/1/12
UEVOL-CC_V_ATP, Critical Code Review Analysis Report	A402598	BB, 13/1/12
Urbalis Evolution – ZC Subsystem, Sub-System Hazard Analysis	UEVOL-0543	T, 12/12/11
Urbalis Zone Controller, Software Hazard Analysis	A401824	AD, 16/12/11
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805	C, 11/1/12
Urbalis Evolution – Zone Controller (ZC), B – Basic Machine Verification Report	A418801	A, 11/1/12
ATC Software Safety Assurance Report	A402620	CT, 10/4/12
Urbalis Evolution – ZC Application, Software Operational Context Description	A415987	A, 13/10/11
ATC Software Urbalis Evolution, Project Document Plan	A401405	BY, 10/4/12
Urbalis Evolution – TDG, Software Hazard Analysis	A419073	A, 8/9/11



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	B, 30/11/12
Trackside Software Architecture Description	A407321	Y, 27/3/12
CC Formal Proof Verification Report	A402916	AN, 23/3/12
ZC Report	A402917	AF, 22/3/12
ZC Software Impact Analysis	A404257	AL, 21/3/12
ZC Software Requirements Specification	A401380	AS, 10/4/12
ATC subsystems Requirements Test Description	UEVOL-0138	J
ATC Subsystems Requirement Test Description Verification Report	UEVOL-0824	Version O
ATC Subsystems Requirement Test Report	UEVOL-1275	Version O
ATC ZC Subsystem Reqs. Test Description Verification Report	UEVOL-0827	Version R
ATC-ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821	Version P
ZC ASW, Requirements Tests Description Verification Report	A402921	Version T
ZC Software Requirements Test Description	A401881	Version AE
ZC ASw Sw Requirement Test Report	A402289	Version AF
ZC SyAD	A401536	Version P
ZC Software Requirements Test Plan	A401691	Version AB
ZC Subsystem Integration Test Description Verification Report	A402930	Version U
ZC Subsystem Integration Tests Description	A401883	Version X
ZC Ssy Integration TP	A401571	Version M
ZC Ssy Integration TR	A402288	Version AL
ZC and TDG Sw Integration TDVR	A402928	Version J
ZC and TDG Sw Integration TD	A402270	Version K
ZC and TDG Sw Integration TR	A402272	Version K
ZC Sw Integrated Test Plan	A402910	Version G
Software Module Test Description Verification Report	A402925	Version L
ZC Software Module Test Description	A402290	Version B
ZC Software Module Test Report	A402291	Version Q
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	Version BN
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	Version AB
CC ATP Sw Requirement Test Plan	A401462	Version AA
CC ATP Sw Requirement Test Report	A402285	Version AQ
LC Subsystem Integration Test Report	A402292	Version W
Trackside Software Architecture Description	A407321	Version R
LC Software Integration Tests Description	A402269	Version I
LC Software Integration Tests Description Verification Report	A402929	Version H
Trackside Software Safety Requirements Reports	A402317	Version AA
CC Software Hazard Analysis	A401823	Version AD
ATC Interface Hazard Analysis	UEVOL-0431	Version Q
ATC - CC Subsystem: SyRTDVR	UEVOL-0826	Version Q



Title of Document	Alstom Reference	Release/Date
ATC Ssys Requirements Tests Report (CC)	UEVOL-0140	Version BN
ZC Sw Requirements Test Description	A401881	Version AE
ATC - CC Subsystem: SyRTDVR	UEVOL-0826	Version S
ATC Ssys Requirements Tests Report (CC)	UEVOL-0140	Version BP
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	Version O
ATC Subsystems Requirements Test Report	UEVOL-1275	Version N
ZC Subsystem Requirement Test Description Verification Report	UEVOL-0827	Version T
ATC Ssys RTD (ZC)	UEVOL-0969	Version P
ATC Ssys Requirements Tests Report (ZC)	UEVOL-1186	Version AF
LC Ssy Integration Test Description Verification Report	A402933	Version L
ZC Ssy Integration Test Description Verification Report	A402930	Version W
ZC Ssy Integration Test Report	A402288	Version AN
ZC Subsystem Architecture Description	A401536	Version AD
ZC Ssy Integration Test Description	A401883	Version Z
ZC Sw Integration Test Description Verification Report	A402928	Version L
ZC Software Integration Test Description	A402270	Version M
ZC Software Integration Test Report	A402272	Version M
ZC Requirements Test Description Verification Report	A402921	Version V
ZC Software Requirements Test Description	A401881	Version AG
ZC Software Requirements Test Plan	A401691	Version AD
ZC ASw Sw Requirement Test Report	A402289	Version AH
CC ATP Software Requirements Test Report	A402285	Version AS
CC ATP Software Requirements Test Description Verification Report	A402284	Version AD
CC Software Requirements Test Description	A401878	Version AG
CC Software Requirements Test Plan	A401462	Version AC
LC Ssy SyLTR	A402292	Version X
LC SyITDVR	A402933	Version L
LC Ssy Integration Test Description	A401884	Version O
LC Sw Integration Test Report	A402271	Version J
LC Subsystem, Integration Test Description Verification Report, (SwITDVR)	A402929	Version I
LC ASw Sw Integrated Test Description	A402269	Version J
CC Software Hazard Analysis	A401823	Version AF
TK Sw Reqs. and Architecture Description Verif. Report	A402938	Version P
ATC Interface Hazard Analysis	UEVOL-0431	Version S
ATC Validation Allocation Table	UEVOL-1169	Version T
ATC Subsystem Software Requirement Specification Verification Report	UEVOL-0821	Version R
Software Module Test Report ZC ASW	A402291	Version S
ZC Software Module Test Description Verification Report	A402925	Version N
ATC Sw Requirement Specification Verification Report	A401804	Version U



Title of Document	Alstom Reference	Release/Date
ZC ASw Sw Module Test Description	A402290	Version B
ZC Software Module Test Report	A402291	Version S
ATC Software Release Note 4.5.3	A402307	Version DN
ZC Architecture Description	A401536	Version V
Trackside Software Architecture Description	A407321	Version V
LC Software Impact Analysis	A405062	Version L
LC Software Module Test Description	A402264	Version C
LC Software Module Test Description Verification Report	A402926	Version J
LC Software Module Test Report	A402265	Version O
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	Version BR
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	Version AJ
CC V Sw Module Test Description	A402313	Version R
CC – V: Software Module Test Description Verification Report	A402266	Version Z
CC (Vital and non-vital) Software Requirements and Architecture Description Verification Report	A401804	Version U
Trackside SwRS/AD Verification Report	A402938	Version P
CC Software Hazard Analysis	A401823	Version AF
Spot Checking Report	A408174	Version P
ATC Software Global V&V Report	A402597	Version AA
CC-VITAL Sw Integration TR	A402310	Version V
CC Sw Integration Test Description Verification Report	A402273	Version T
CC-VITAL Sw Integration TD	A402309	Version V
CC-VITAL Sw Integration TP	A402308	Version O
ATC ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0823	Version O
ATC Subsystem V&V Report	UEVOL-1171	Version AS
ATC Subsystems Integration Tests Reports	UEVOL-1046	Version T
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	Version Q
ATC Ssys Integration Tests Descriptions	UEVOL-0137	Version M
CC Subsystem Tests Report	UEVOL-0140	Version BP
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	Version AF
ATC Design Verification Plan	UEVOL-1170	Version L
Wayside Software Release Note 9.2.5	A402079	Version AV
CC-OVLI Release Note 10.1.0	A402199	Version AD
CC-OVLI Release Note 9.0.1	A402199	Version AB
UEVOL ATC Software Release Note 9.2.2	A402307	Version DN
UEVOL ATC Software Release Note 9.2.3	A402307	Version DR
UEVOL CC Software Release Note 9.2.3	A402045	Version CK
UEVOL CC Software Release Note 9.2.4	A402045	Version CM
UEVOL-CC-V-ATP Critical Code Review Analysis Report	A402598	Version BB



Title of Document	Alstom Reference	Release/Date
CC Software Hazard Analysis	A401823	Version AF
Trackside Safety Requirement Report	A402317	Version AC
UEVOL ATC Hazard Log	UEVOL-1705	Version AH
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Version I
CC Vital Software Module Design	A406966	Release P, 23/09/11
Specific Safety Study – Automatic Protection	A402331	Release K, 16/12/11
ATC 9.2.1.2 Subsystem Impact Analysis	UEVOL-2408	Release F, 20/01/12
ATC Subsystem Architecture Description Verification Report	UEVOL-0817	Release Y, 09/12/11
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	Release AA, 15/12/11
CC-ZC Interface Description	UEVOL-0185	Release P, 23/09/11
ZC-ZC Interface Description	UEVOL-0192	Release S, 15/11/11
CC Subsystem Hazard Analysis	UEVOL-0542	Release U, 14/12/11
CC Software Safety Requirement Report	A402319	Release AN, 18/01/12
CC-VESG Critical Code Review Analysis Report	A406392	Version P, 05/01/12
Specific Safety Study on High Integrity Level Controls (HILC)	A405430	Release C, 08/02/11
Specific Safety Study on Safety Related Remote Controls (SRRC)	A405431	Release C, 08/02/11
CC Subsystem Hazard Analysis	UEVOL-0542	Release U, 14/12/11
ATC System Hazard Analysis	UEVOL-0831	Release R, 14/10/11
CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release AB, 17/01/12
CC Subsystem Integration Tests Plan	A401570	Release S, 25/08/10
CC Subsystem Integration Tests Description	A401880	Release AK, 04/11/11
CC Integration Test Description Verification Report	A402282	Release AS, 01/12/11
CC Subsystem Integration Tests Report	A402287	Release BV, 24/10/11
Trackside Software Safety Requirement Report	A402317	Release AC, 18/01/12
ATC Subsystem Requirements Test Plan	UEVOL-0113	Release C, 30/03/12
CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release AB, 07/01/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	Release AA, 28/12/11
ATC Software Exported Constraints	UEVOL-2442	Release B, 20/07/11
ATC Exported Constraint Verification Report	UEVOL-2525	Release A, 18/01/12
ATC Hazard Log	UEVOL-1705	Release AH, 30/03/12
ZC-R10 Interface Description	UEVOL-2382	Release B, 10/11/11
Urbalis 400-TDG Software Module Description	A418523	Release F, 18/11/11
TDG Software Module Description Verification Report	A419763	Release B, 17/01/12
CC-Vital Critical Code Review Analysis Report	A402598	Release BD, 26/03/12
CC Subsystem Integration Tests Report	A402287	Release BX, 26/03/12
CC Software Safety Requirements Report	A402319	Release AP, 26/03/12
ZC Configuration Files Specification	UEVOL-0290	Release AC, 07/12/11
Gen ATC Data - System Requirement Test Description	UEVOL-1671	Release 3H, 08/11/11
Gen ATC Data - System Requirement Test Description	UEVOL-1671	Release G, 18/7/11



ATC Baseline 9.2.1.3 Review Addendum: Middleware Baseline 2.1.7 (May 2012)

Table 37: Documents Reviewed for Middleware Baseline 2.1.7

Title of Document	Alstom Reference	Release/Date
"TRK Generic MW-2 – Software Requirements Specification"	A408226	vH 18 November 2010
"TRK Generic MW-2 – SwAD Verification Report"	A408327	vC 18 July 2011
"TRK Generic MW-2 – Software Source Code Verification Report"	A408328	vD 20 July 2011
"TRK Generic MW-2 – Software Module Test Description"	A408329	vB 15 November 2010
"TRK Generic MW-2 – Software Module Test Description Verification Report"	A408330	vD 25 July 2011
"TRK Generic MW-2 – Software Module Test Report"	A408331	vE 11 July 2011
"Trackside Generic Middleware-2 – Software Integration Test Description"	A408335	vE 12 July 2011
"TRK Generic MW-2 – Software Integration Test Description Verification Report"	A408336	vD 25 July 2011
"Trackside Generic Middleware-2 – Software Integration Test Report"	A408338	vE 12 July 2011
"TRK Generic MW-2 – Software Requirement Test Plan"	A408351	vG 17 November 2011
"TRK Generic MW-2 – Software Requirement Test Report"	A408352	vJ 6 July 2011
"TRK Generic MW-2 – Software Requirement Test Description Verification Report"	A408353	vF 25 July 2011
"TRK Generic MW-2 – Software Requirement Test Description"	A408477	vJ 4 July 2011
"TRK Generic MW-2 – Software Requirements Specification Verification Report"	A409823	vC 29 July 2011
"TRK Generic MW-2 – Software Impact Analysis – Generic Trackside Middleware v2.1.7"	A411303	vE 30 June 2011
"TRK Generic MW-2 – Subsystem – Software Integration Test Plan"	A412672	vC 17 November 2010
"TRK Generic MW-2 – Software Requirements Specification – Microlok II Peer Protocol"	A413382	vF 13 May 2011
"TRK Generic MW-2 – Software Module Design – Microlok II Peer Protocol"	A414779	vC 24 May 2011
"TRK Generic MW-2 – Software Module Description Verification Report"	A414857	vA 27 July 2011
Trackside Generic Middleware Software Safety Assurance Report	A413407	Release C, 02/08/11.
Coverage of 2003 and TRK generic MSW Safety Exported Constraints	A402444	Release N, 19/01/12.
Middleware Critical Code Review Analysis Report	A413404	Release C, 02/08/11.
TRK Generic MW-2 Particular Quality Plan	A408342	Release C, 12/04/12.
Release Note – Generic Middleware	A411568	Release F, 22/07/11.
Release Note – Generic Middleware	A411568	Release II, 24/05/12.
Trk Generic MW-2 Software Production Manual	A408476	Release B, 30/11/10.
Trackside Generic Middleware Software Safety Assurance Report	A413407	C 2/8/11
Software Safety Requirement Report	A413406	B 2/8/11
Generic Middleware Software Hazard Analysis	A413405	D 24/1/11
Release Note – Middleware v2.1.7	A408227	E 27/7/11



ATC Baseline 7.2.2.15 Review (May-June 2012)

Table 38: Documents Reviewed for ATC Baseline 7.2.2.15

Title of Document	Alstom Reference	Release/Date
ATC-ZC Subsystem Software Requirement Specification Verification Report	UEVOL-0821	Release T
ATC Interface Hazard Analysis	UEVOL-0431	Release V, 15/05/12
ATC-ZC Subsystem Requirement Test Description	UEVOL-0969	Release S, 10/05/12
ATC-AC Subsystem Requirement Test Report	UEVOL-1186	Release AH, 10/05/12
ATC-CC Subsystem Requirement Test Description	UEVOL-0139	Release T, 15/05/12
ATC-CC subsystem Requirement Test Report	UEVOL-0140	Release BW, 14/05/12
ATC Subsystem Verification and Validation Report	UEVOL-1171	Release AX, 15/05/12
ZC Integration Test Plan	A401571	Release P, 04/05/12
ZC Subsystem Integration Test Description	A401883	Release AB, 10/05/12
ZC Integration Test Description Verification Report	A402923	Release Y, 20/10/11
ZC Subsystem Integration Test Plan	A402288	Release AP, 07/05/12
ZC Subsystem Integration Tests Description Verification Report	A402930	Release Y,
ZC Software Requirements Test Plan	A401691	Release AF, 05/04/12
ZC Software Requirement Test Description	A401881	Release AI, 04/05/12
ZC Software Requirement Test Description Verification Report	A402921	Release X, 07/05/12
ZC Software Requirement Test Report	A402289	Release AJ, 04/05/12
CC ATC Software Test Report	A402285	Release AV, 03/05/12
CC ATP Software Requirement Test Description	A401878	Release AI, 03/05/12
CC ATP Software Requirement Test Description Verification Report	A402284	Release AF, 11/05/12
CC Vital Software Integration Test Description Verification Report	A402273	Release WV, 07/05/12
CC Software Integration Test Description	A402309	Release Y, 03/05/12
CC Vital Software Integration Test Report	A402310	Release Y, 03/05/12
Urbalis Evolution – CC Software, Software Impact Analysis	A403516	Release BT, 25/04/12
ATC Software Safety Assurance Report	A402620	Release CV, 15/05/12
ZC Software Impact Analysis	A404257	Release AM, 02/05/12
UEVOL ATC Software Release Note 7.2.13	A402307	Release DT, 15/05/12
CC Software Hazard Analysis	A401823	Release AH, 25/05/12
TK (LC&ZC) Software Requirements and Architecture Description Verification Report	A402938	Release R, 30/04/12
CC software RS/AD Verification Report	A401804	Release X, 25/04/12
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	Release U, 14/05/12
UEVOL CC-V: ATP and VESG, Software Module Test Report	A402314	Release AK, 03/05/12
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	Release AD, 07/05/12
Project Document Plan	A401045	Release CA, 28/05/12
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	Release AI, 05/04/12
Urbalis Evolution – ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	Release WV, 18/04/12



Title of Document	Alstom Reference	Release/Date
ATC 7.2.2.15 Sub-system Delivery sheet	UEVOL-R-19.9	16/05/12
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	Release AW, 02/05/12
ATC SW U400 ZC Software Formal Proof Document	A402844	Release AI, 02/05/12
ATC SW Urbalis Evolution CC Vital Formal Proof Document	A402843	Release AQ, 16/04/12
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	Release AM, 02/05/12
UEVOL CC-Vital Software Source Code Verification Report	A402606	Release AQ, 27/04/12
U400 Software – Zone Controller (ZC) Formal Proof Verification Report	A402917	Release AG, 10/05/12
CC Vital Formal Proof Verification Report	A402916	Release AO, 04/05/12
CC Vital Software Architecture Description	A401466	Release AF, 28/11/11
U400 Software – ZC Application B Specification Verification Report	A402914	Release AF, 10/05/12
UEVOL CC-V-ATP Critical Code Review Analysis Report	A402598	Release BF, 26/04/12
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528	Release AI, 03/05/12
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824	Release AF, 02/05/12
U400 Software CC-Vital B Specification Verification Report	A402882	Release AM, 09/05/12
ATC Software Safety Assurance Report	A402620	Release CV, 15/05/12
ATC Generic Application Safety Case	UEVOL-0887	Release BD, 16/05/12
CR Safety Review	UEVOL-1988	Release CM, 16/05/12
UEVOL ATC Software Release 7.2.13 Review Report	A417035	Release I, 22/05/12
CC Vital Software Requirements Specification	A401464	Release BL, 12/04/12
CC VESG Critical Code Review Analysis Report	A406392	Release R, 26/04/12
CC Subsystem Integration Tests Description	A401880	Release AN, 11/05/12
CC Subsystem Integration Test Description Verification Report	A402282	Release AV, 11/05/12
CC Subsystem Integration Tests Report	A402287	Release BZ, 11/05/12
CC Software Safety Requirement Report	A402319	Release AR, 04/05/12
CC Software Release Note 7.2.21	A402045	Release CO, 15/05/12
Wayside Software Release Note 7.2.7	A402079	Release AX, 15/05/12
ATC Software Release Note 7.2.13	A402307	Release DJ, 15/05/12
ATC CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	Release AD, 11/05/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	Release AC, 15/05/12
ATC 7.2.2.15 Subsystem Impact Analysis	UEVOL-2408	Release K, 15/05/12
ATC Subsystem Verification and Validation Report ATC Baseline 7.2.2.15	UEVOL-1171	Release AX, 15/05/12
ATC Safety Exported Constraints	UEVOL-1704	Release AJ, 16/05/12
ATC Hazard Log	UEVOL-1705	Release AJ, 16/05/12
CC Software Architecture Description	A401446	Release AO, 17/04/12



ATC Baseline 10.2.2.3 Review (August-September 2012)

Table 39: Documents Reviewed for ATC Baseline 10.2.2.3 (ZC only)

Title of Document	Alstom Reference	Release/Date
ATC Data Generation Procedure 10.1.X to 10.2.X for GAD	UEVOL-2573	IA, 22/6/12
ATC Generic Application Safety Case	UEVOL-0887	BG, 9/8/12
Urbalis Evolution – ZC Subsystem	UEVOL-0543	X, 13/6/12
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114, AH	AH, 12/04/12
ZC Parameters Configuration Rules	UEVOL-0396-AD	AD, 02/07/12
ZC Subsystem Configuration Files Specification	UEVOL-0290-AG	AG, 10/05/12
ATC Data Preparation, Verification and Validation Process	UEVOL-0398-P	P, 22/02/12
ATC Parameters Process Hazard Analysis	UEVOL-0544-K	K, 18/07/12
ATC Setting Description	UEVOL-02444-D	D, 12/07/12
ATC Subdivision Rules	UEVOL-0395-AA	AA, 03/07/12
ATC Subdivision Rules Specific Study	UEVOL-1027-O	O, 05/07/12
ATC Configuration Rules Safety Study	UEVOL-1574-T	T, 05/07/12
CR Safety Review	UEVOL-1988-CW	CW
ATC 10.2.2.3 Sub-System Delivery Sheet	UEVOL-R-1959	08/08/12
U400 Zone Controller (ZC) Formal Proof Document	A402844-AM	AM, 25/06/12
Urbalis Evolution – Zone Controller (ZC) Formal Proof Verification Report	A402917-AI	AI, 02/07/12
ATC Generic Application Safety Case	UEVOL-0887-BF	BF, 17/07/12
Gen PZ Requirements Test Report	VIC	12/04/12
ATC GSD Gen RTS Module Software Requirements Test Report	vF	F, 15/05/12
ATC GenPar Module Evolution Software Requirements Test Report	vF	F, 15/05/12
ATC GSD Gen SGD Module Software Requirements Test Report	vF	F, 15/05/12
DGC-GAD2-v10.1.7.xls		
Urbalis Evolution GAD Chain I Requirements Test Report	UEVOL-1754-8G	8G, 15/05/12
DGC-GAD1-v10.2.6-v1.xls		
GEN ATC Data – Test Lines Specification	UEVOL-0401-J	J, 29/02/12
<ATC Data Generation Procedure 1 st Chain>	UEVOL-1666-O	O, 21/05/12
<ATC Data Generation Procedure 2 nd Chain>	UEVOL-1667-O	O, 21/05/12
Gen ATC Data – System Requirement Test Plan	UEVOL-1670-J	J, 29/02/12
Gen ATC Data – System Requirement Test Report, Part 1 (for GAD1)	UEVOL-1672-J	J, 17/05/12
Gen ATC Data – System Requirement Test Report, Part 2 (for GAD2)	UEVOL-1672-J	J, 15/05/12
Gen ATC Data – System Requirement Test Description	UEVOL-1671-J	J, 17/05/12
UEVEOL ATC Tools Configuration Delivery Sheet v32	UEVOL-R-1918	11/05/12
Urbalis Evolution – ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543-V	V, 27/04/12
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801-D	D, 06/07/12
Urbalis Evolution – Trackside Software Architecture Description	A407321-AB	AB, 09/05/12



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824-AH	AH, 25/06/12
UEVOL Trackside ZC and TDG Source Code Verification Report	A402912-V	V, 25/06/12
Urbalis Evolution – ZC Application Software Requirements Specification	A401380-BA	BA, 29/05/12
Urbalis Evolution – ZC B Specification Verification Report	A402914-AH	AH, 29/06/12
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528-AK	AK, 02/07/12
Specific Study on Trackside ATC Parameters	A402904-M	M, 03/07/12
ZC Software Module Test Description Verification Report	A402925	Q, 29/06/2012
ZC Software Module Test Report	A402291	V, 26/06/2012
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AO, 27/06/2012
ZC Sw Integrated Test Plan	A402910	H, 03/07/2012
ZC ASw Sw Integrated Test Description	A402270	P, 03/07/2012
ZC Sw Integrated Test Description Verification Report	A402928	O, 04/07/2012
ZC Application, Software Integration Test Report	A402272	P, 03/07/2012
UEVOL-ZC: Software Requirements Test Plan	A401691	AH, 28/06/2012
ZC Software Requirement Test Description	A401881	AK, 02/07/2012
ZC Requirements Test Description Verification Report	A402921	Z, 03/07/2012
ZC Software Requirements Tests Report	A402289	AH, 02/07/2012
UEVOL-CC ATP: Software Requirements Test Plan	A401462	AF, 03/07/2012
Subsystem Integration Tests Plan – ZC	A401571	O, 23/01/2012
ZC Sy Integrated Test Description	A401883	AD, 29/06/2012
ZC Subsystem Integration Tests Description Verification Report	A402930	AA, 06/07/2012
ZC - Subsystem Integration Tests Report	A402288	AR, 26/06/2012
ZC Sy Architecture Description	A401536	AB, 09/05/2012
ATC Software: Global Validation Report	A402597	AC, 30/03/2012
Trainborne Software Assurance Report	A402620	CR, 11/07/2012
ZC System Architecture Description and Software Requirements Specification Verification Report	A402938	T, 02/07/2012
ATC SW Spot Checking Report	A408174	S, 10/09/2012
ATC-ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821	V, 13/07/2012
ATC Ssys RTD	UEVOL-0138	M, 25/06/2012
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	R, 12/07/2012
ATC Ssys RTD (ZC)*	UEVOL-0969	U, 12/07/2012
ATC ZC Subsystem Reqs. Test Description Verification Report	UEVOL-0827	W, 12/07/2012
ATC Subsystem Reqs Test Description Verification Report	UEVOL-0824	S, 12/07/2012
ATC Interface Hazard Analysis	UEVOL-0431	W, 18/06/2012
ATC Validation Allocation Table	UEVOL-1169	W, 04/07/2012
ATC Safety Exported Constraints	UEVOL-1704	AM, 07/08/2012
ATC Engineering Management Plan	UEVOL-0280	B, 23/01/2012



Title of Document	Alstom Reference	Release/Date
Sub-system hazard analysis	UEVOL-0543	V, 27/04/2012
ATC safety hazard analysis	UEVOL-0831	R, 03/07/2012
ZC Subsystem: Subsystem Hazard Analysis	UEVOL-0543	V, 27/04/2012
ATC Subsystem Verification and Validation Report ATC Baseline 10.2.2.3	UEVOL-1171	BA, 09/05/2012
ZC-ZC Interface Description	UEVOL-0192	U, 27/1/12
ATC Subsystem Requirement Specification	UEVOL-0270	AG, 12/4/12
ATC Design Verification Plan	UEVOL-1170	O, 4/7/12
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	L, 3/7/12
ATC Software Exported Constraints	UEVOL-02442	E, 29/6/12
ATC Subsystem: Exported Constraints Verification Report	UEVOL-2525	D, 12/7/12
ATC Hazard Log	UEVOL-1705	AL, 18/7/12
ATC Hazard Log	UEVOL-1705	AM, 8/8/12
TDG Software Module Description	A418523	J, 10/5/12
ATC Software Release Note 10.2.1	A402307	DY, 8/8/12
U400 Wayside Software Release Note 10.2.2	A402079	AZ, 11/7/12
Trackside Software Safety Requirements Report	A402317	AG, 6/7/12
ATC Software Safety Assurance Report	A402620	CX, 11/7/12
ATC Software Safety Assurance Report	A402620	CY, 8/8/12
TDG Software Module Description Verification Report	A419763	E, 6/7/12
ATC Software Project Document Plan	A401405	CD, 30/8/12
ATC Software Project Document Plan	A401405	CC, 22/8/12
Specific Safety Study – Automatic Protection	A402331	N, 27/6/12

ATC Baseline 10.2.3.2 Review (November 2012)

Table 40: Documents Reviewed for ATC Baseline 10.2.3.2

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – CC Software, Software Impact Analysis	A403516	CC, 26/08/2012
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	AJ, 30/10/2012
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AQ, 17/10/2012
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	AA, 30/10/2012
CC Module Test Report	A402314	AQ, 30/10/2012
ZC Sw Module Test Description Verification Report	A402925	S, 19/10/2012
Software Module Test Report	A402291	X, 16/10/2012
ZC Sw Integration Test Description	A402270	R, 18/10/2012
ZC Sw Integrated Test Description Verification Report	A402928	Q, 18/10/2012
ZC ASw Integrated Test Report	A402272	R, 18/10/2012
ZC Software Requirements Test Plan	A401691	AJ, 25, 09/2012



Title of Document	Alstom Reference	Release/Date
ZC Sw Requirements Test Description	A401881	AM, 24/10/2012
ZC Software Requirements Test Description Verification Report	A402921	AB/AC, 19/11/2012
ZC Software Requirements Test Report	A402289	AN, 24/10/2012
ZC Sy Integrated Test Description Verification Report	A402930	AC, 19/10/2012
ZC Sy Integrated Test Description	A401883	AF, 18/10/2012
ZC - Subsystem Integration Tests Report	A402288	AT, 18/10/2012
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	AL, 31/10/2012
CC-ATP Software Requirements Tests Description	A401878	AO, 30/10/2012
CC Software Requirements Test Report	A402285	BB, 30/10/2012
CC Software Requirement Tests Plan	A401462	AF, 03/07/2012
ZC Architecture Description	A401536	AF, 23/10/2012
ZC Architecture Description	A402938	V, 10/10/2012
CC (Vital and non-vital) Software Requirements and Architecture Description Verification Report	A401804	AD, 30/10/2012
ATC - ZC Ssy: System SwRSVR	UEVOL-0821	W, 26/10/2012
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	W, 25/10/2012
ATC - ZC Ssy: SyRTDVR	UEVOL-0827	W, 19/10/2012
ATC Ssys Requirements Tests Report	UEVOL-1275	T, 25/10/2012
ATC Ssys Requirements Tests Report (ZC)*	UEVOL-1186	AL, 25/10/2012
ATC-CC: System Requirement Test Description Verification Report	UEVOL-0826	X, 31/10/2012
CC Subsystem Tests Report	UEVOL-0140	CD, 29/10/2012
ATC Interface Hazard Analysis	UEVOL-0431	Y, 05/10/2012
ATC Validation Allocation Table	UEVOL-1169	X, 19/10/2012
ATC Subsystem Impact Analysis	UEVOL-2408	P, 25/10/2012
ZC-ZC Interface Description	UEVOL-0192	W, 04/07/2012
ATC Subsystem Verification and Validation Report Baseline 10.2.3.2	UEVOL-1171	BD, 30/10/2012
ATC Subsystems Integration Tests Reports	UEVOL-1046	X, 25/10/2012
CC-Vital, Software Integration Test Plan	A402308	T, 17/10/2012
CC-ATP Software Integration Test Description Verification Report	A402273	AC, 30/10/2012
CC ATP Sw Integrated Test Description	A402309	AE, 30/10/2012
CC ATP Integrated Test Report	A402310	AE, 30/10/2012
CC Software Hazard Analysis	A401823	AJ, 29/10/2012
CC - Software Safety Requirement Report	A402319	AX, 30/10/2012
Project Document Plan	A401405	CE, 08/11/2012
Trackside Software Release Note	A402079	BB, 29/10/2012
UEVOL ATC Software Release Note	A402307	ED, 31/10/2012
UEVOL-CC: Subsystem Integration Tests Plan	A401570	U, 07/12/2011
CC Sy Integrated Test Description	A401880	AS, 18/10/2012
CC Subsystem Integration Tests Description Verification Report	A402282	BB, 19/10/2012
CC Subsystem Integration Test Report	A402287	CH, 30/10/2012



Title of Document	Alstom Reference	Release/Date
U400 ATC Software release 10.2.4	A428616	C, 31/10/2012
ATC 10.2.2.4 Sub-system Delivery Sheet	UEVOL-R-1962	30/08/12
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805-F	09/07/12
ATC Generic Application Safety Case	UEVOL-0887-BH	05/09/12
Urbalis Evolution, CC-Vital Setting Description	UEVOL-0643-Y	12/04/12
CR Safety Review	UEVOL-1988-DD	09/09/12
ATC Remote I0 Configuration DP-DV Process	UEVOL-1534-D	29/06/12
ATC R10 Parameter Process Hazard Analysis	UEVOL-2142-B	20/06/12
ATP Sw U400 CC Vital Formal Proof Document	A402843-AS	03/07/12
CC Vital Software Architecture Description	A401466-AJ	02/07/12
UEVOL CC-Vital Software Source Code Verification Report	A402606-AS	03/07/12
Urbalis Evolution – CC-Vital Formal Proof Verification Report	A402916-AQ	05/07/12
UEVOL CC-Vital Software Source Code Verification Report	A402606-AW	30/10/12
CC Vital Software Architecture Description	A401466-AN	08/10/12
Urbalis Evolution – Trackside Software Architecture Description	A407321-AD	08/08/12
Specific Safety Study on Trackside ATC Parameters	A402904-N	10/10/12
Specific Safety Study on UEVOL CC-V Parameters	A402903-R	11/10/12
U400 Zone Controller (ZC), Formal Proof Document	A402844-AP	10/10/12
Urbalis Evolution – Zone Controller (ZC) B-Basic Machines Verification Report	A418801-F	19/10/12
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805-I	30/10/12
ATC Sw U400 CC Vital, Formal Proof Document	A402843-AX	26/10/12
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114-AK	17/07/12
ATC Generic Application Safety Case	UEVOL-0887-BJ	31/10/12
UEVOL ATC Tools Configuration Delivery Sheet v36	UEVOL-R-1981	15/10/12
ATC 10.2.3.2 Sub-system Delivery Sheet	UEVOL-R-1994	31/10/12
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667-S	15/10/12
ATC Data Generation Procedure 1 st Chain	UEVOL-1666-S	15/10/12
CR Safety Review	UEVOL-1988 vDJ	31/10/12
ATC Subdivision Rules Specific Study	UEVOL-1027-P	26/10/12
ATC Subdivision Rules	UEVOL-0395-AB	30/09/12
CC-Vital Setting Description	UEVOL-0643-AB	01/08/12
ATC Configuration Rules Safety Study	UEVOL-1574-U	30/10/12
ZC Parameters Configuration Rules	UEVOL-0396 vAE	24/09/12
Urbalis Evolution – GAD Chain I, Requirements Test Report	UEVOL-1754-J	16/10/12
DGC-GADI-V10.4.6.xls		
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591 vJ	17/10/12
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590-J	17/10/12
ATC GSD Gen RTS Module Software Requirements Test Report vI	UEVOL-2589	17/10/12
Gen PZ, Requirements Test Report	UEVOL-2588-C	19/09/12



Title of Document	Alstom Reference	Release/Date
Gen ATC Data – Test Lines Specification	UEVOL-0401-N	16/10/12
Gen ATC Data – System Requirement Test Plan	UEVOL-1670-N	16/10/12
Gen ATC Data – System Requirement Test Description	UEVOL-1671-N	16/10/12
Gen ATC Data – System Requirement Test Report Part 1 (for GAD1)	UEVOL-1672-N	16/10/12
Gen ATC Data – System Requirement Test Report Part 2 (for GAD2)	UEVOL-1672-N	16/10/12
DGC – GAD2 – v10 – 4 – 5.xls		
Urbalis Evolution – ZC SUB-system, Sub-system Hazard Analysis	UEVOL-0543-Z	17/10/12
Urbalis Evolution – Zone Controller (ZC), Formal Proof Verification Report	A402917-AK	29/10/12
ZC SwRS Appendix C		
Urbalis Evolution – CC – Vital Formal Proof Verification Report	A402916-AU	30/10/12
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528-AM	17/10/12
Urbalis Evolution – ZC Application Software Requirements Specification	A401380-BE	05/10/12
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824-AJ	05/09/12
UEVOL-CC-V-ATP, Critical Code Review Analysis Report	A402598-BK	29/10/12
Urbalis Evolution – ZC, B Specification Verification Report	A402914-AJ	25/10/12
Urbalis Evolution – CC Vital, B Specification Verification Report	A402882-AS	30/10/12
ATC Software Safety Assurance Report	A402620-DB	31/10/12
Specific Safety Study on UEVOL CC-V Parameters	A402903-P	29/06/12
ATC Software Safety Assurance Report	A402620-CZ	27/08/12
Urbalis Evolution – CC-Vital, B Specification Verification Report	A402882-AO	04/07/12
Critical Code Review Analysis Report	A402598-BH	06/07/12
UEVOL CC-V-ATP, Critical Code Review Analysis Report	A402598-BL	30/10/12
Critical Code Review Analysis Report Urbalis Evolution – Zone Controller	A402528-AN	12/11/12
TDG Software Module Description	A418523	Release M, 24/08/12
Software Module Description Verification Report	A419763	Release G, 12/10/12
ATC Subsystem Architecture Description Verification Report	UEVOL-0817	Release AC, 23/10/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	Release AF, 23/10/12
CC-Vital Software Requirements Specification	A401464	Release BS, 26/10/12
CC Subsystem Software Requirements Specification Verification Report	UEVOL 0819	Release AH, 29/10/12
CC Subsystem Hazard Analysis	UEVOL-0542	Release AA, 11/10/12
ATC System Hazard Analysis	UEVOL-0831	Release W, 05/10/12
CC-VESG Critical Code Review Analysis Report	A406392	Release W, 23/10/12
ATC Design Verification Plan	UEVOL-1170	Release P, 30/10/12
CC-Vital Software Module Design	A406966	Release U, 27/06/12
ATC Subsystem Requirements Specification	UEVOL-0270	Release AJ, 31/07/12
Carborne Controller Subsystem Requirements Specification	UEVOL-0098	Release AN, 31/07/12



Title of Document	Alstom Reference	Release/Date
Configuration Management Dashboard – UNIVIC Platform	UEVOL-1915	Release AD (TRV1207001105, Release AD)
UNIVIC Platform Configuration Procedure	UEVOL-1830	Release B1.C (TRV1207001370, Release B1.C), 27/09/12
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release AN, 31/10/12
ATC Hazard Log	UEVOL-1705	Release AN, 31/10/12
ATC Software Exported Constraints	UEVOL-2442	Release F, 16/10/12
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Release M, 17/10/12
ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	Release E, 30/10/12
Specific Safety Study – Automatic Protection	A402331	Release P, 08/10/12
ATC Subsystem Requirement Specification	UEVOL-0270	Release Aj, 31/07/12
ATC Architecture Description	UEVOL-0271	Release Aj, 31/07/12
UEVOL – CC-V-ATP Critical Code Review Analysis Report	A402598	BL 30/10/12
Critical Code Review Analysis Report: Urbalis Evolution – Zone Controller	A402528	AN 12/11/12
Urbalis Evolution CC-Vital Formal Proof Verification Report	A402916	AU 30/12/12
Urbalis Evolution CC-Vital Formal Proof Verification Report	A402916	AT 22/10/12
U400 Zone Controller (ZC) Formal Proof Document	A402846	AQ 16/11/12
Urbalis Evolution – Zone Controller (ZC): Formal Proof Verification Report	A402917	AL 20/11/12
Urbalis Evolution – CC Vital Formal Proof Verification Report	A402916	AV 20/11/12

ATC Baseline 9.3.3.2 Review (November-December 2012)

Table 41: Documents Reviewed for ATC Baseline 9.3.3.2

Title of Document	Alstom Reference	Release/Date
UEVOL ATC Software Release Note	A402307	EE, 14/11/12
CC SyITP	A401570	U, 07/12/11
CC Subsystem Integration Tests Description	A401880	AS, 18/10/12
CC System Integration Tests Report	A402287	CH, 30/10/12
CC-Subsystem, Integration Test Description Verification Report	A402282	BB, 19/10/12
CC Software Module Test Report	A402314	CC, 30/08/12
ZC Software Module Test Report	A402291	WV, 05/09/12
ZC ASw Sw Integrated Test Description	A402270	Q, 30/08/12
ZC Sw Integrated Test Description Verification Report	A402928	P, 04/09/12
ZC Application, Software Integration Test Report	A402272	Q, 30/08/12
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	G, 01/10/12
ZC Software Requirements Tests Plan	A401691	AI, 04/08/12
ZC Software Requirements Test Description	A401881	AL, 07/09/12



Title of Document	Alstom Reference	Release/Date
ZC Requirements Test Description Verification Report	A402921	AA, 10/09/12
ZC Software Requirements Tests Report	A402289	AM, 07/09/12
ZC Sy Integrated Test Description	A401883	AE, 13/08/12
ZC Subsystem Integration Tests Description Verification Report	A402930	AB, 06/09/12
ZC - Subsystem Integration Tests Report	A402288	AQ, 31/08/12
ZC System Architecture Description and Software Requirements Specification Verification Report	A402938	U, 27/08/12
ZC Sy Architecture Description	A401536	AD, 27/07/12
ATC Subsystem: SRS Verification Report	A401804	AA, 20/08/12
CC-ATP Requirements Test Description Verification Report	A402284	AI, 04/09/12
CC - ATP Software Reqs Tests Description	A401878	AL, 27/08/12
CC Software Requirements Tests Report	A402285	AY, 20/09/12
CC: Software Hazard Analysis	A401823	AK, 14/08/12
ZC: Software Safety Requirement Report	A402317	AH, 25/09/12
CC Software Integration Test Description	A402309	AB, 23/08/12
CC-ATP Software Integration Tests Description Verif. Report	A402273	Z, 28/08/12
CC - ATP Software Integration Tests Report	A402310	AB, 23/08/12
UEVOL CC Software Release Note	A402045	CS, 02/10/12
UEVOL Wayside Software Release Note	A402079	BA, 02/10/12
ATC SW Spot Checking Report	A408174	U, 12/12/12
ATC Software: Global Validation Report	A402597	AG, 12/12/12
ATC Interface Hazard Analysis	UEVOL-0431	X, 12/07/12
ATC-CC Subsystem Reqs Test Description Verification Report	UEVOL-0826	Y, 15/11/12
CC Subsystem Tests Report	UEVOL-0140	CB/CBI, 14/12/12
ATC ZC Subsystem Reqs. Test Description Verification Report	UEVOL-0827	Y, 05/11/12
ZC Subsystem Test Reports	UEVOL-1186	AK, 02/07/12
ATC-ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821	X, 05/11/12
ATC Subsystem Impact Analysis	UEVOL-2408	Q, 16/11/12
ATC Ssys RTD	UEVOL-0138	N, 13/11/12
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	S, 13/11/12
ATC Validation Allocation Table	UEVOL-1169	Y, 14/11/12
ATC Subsystem Impact Analysis	UEVOL-2408	Q1, 13/12/12
ATC Subsystem Configuration Delivery Sheet	UEVOL-R-2278	13/12/12
ATC 9.3.3.1 Sub-System Delivery Sheet	UEVOL-1997	15/11/12
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-014-AJ	13/06/12
Urbalis Evolution – ZC Sub-system, Sub-System Hazard Analysis	UEVOL-0543-Y	24/07/12
CC-Vital Setting Description	UEVOL-0643-AA	14/06/12
ATC 9.3.3.1B Sub-system Delivery Sheet	UEVOL-R-2230	26/11/12



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801-E	04/09/12
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805-G	30/08/12
ATC Sw v400 ZC Software Formal Proof Document	A402844-AO	24/08/12
ATC Sw Urbalis Evolution CC Vital Formal Proof Document	A402843-AT	10/07/12
CC Vital Formal Proof Document	A402843-AV	17/08/12
Architecture Description	A401466-AM	09/08/12
Urbalis Evolution – Trackside Software Architecture Description	A407321-AC	27/07/12
UEVOL Trackside ZC and TDG Source Code Verification Report	A402912-W	28/08/12
UEVOL CC-Vital Software Source Code Verification Report	A402606-AT	30/08/12
Critical Code Review Analysis Report CC-V-ATP 9.4.2	A402598-BM	08/11/12
Specific Safety Study on UEVOL CC-V Parameters	A402903-Q	21/08/12
ATC Generic Application Safety Case	UEVOL-0887-BL	26/11/12
Urbalis Evolution – CC Vital B Specification Verification Report	A402882-AP	31/08/12
Urbalis Evolution – ZC Application Software Requirements Specification	A401380-BC	24/08/12
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824-AI	17/09/12
Urbalis Evolution – ZC B-Specification Verification Report	A402914-AI	05/09/12
Urbalis Evolution – CC-Vital Formal Proof Verification Report	A402916-AR	29/08/12
Urbalis Evolution – TDG Critical Code Review Analysis Report	A419074-F	20/08/12
Urbalis Evolution – CC Vital Formal Proof Verification Report	A402916-AR	29/08/12
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528-AL	13/09/12
Urbalis Evolution – ATC Sw Sub-System ATC Software Safety Assurance Report	A402620-DC	14/11/12
ATC Subsystem Requirements Specification	UEVOL-0270	AI, 14/6/12
Carborne Controller Subsystem Requirements Specification	UEVOL-0098	AL, 14/6/12
UEVOL-ATC Safety Exported Constraints	UEVOL-1704	AO, 16/11/12
ATC Software Exported Constraints	UEVOL-2442	G, 7/11/12
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	N, 8/11/12
ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	F, 14/11/12
UNIVIC Platform Configuration Procedure	TRV 1207001370	BI.C, 27/9/12
UNIVIC Configuration Management Dashboard	UEVOL-1915	AD, 16/10/12
CC Subsystem Hazard Analysis	UEVOL-0542	Z, 16/7/12
CC Vital Software Requirements Specification	A401464	BQ, 7/8/12
ATC System Hazard Analysis	UEVOL-0831	V, 2/8/12
ATC Subsystem Architecture Description Verification Report	UEVOL-0817	AD, 5/11/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	AG, 6/11/12
Specific Safety Study – Automatic Protection	A402331	O, 5/10/12
ATC Architecture Description	UEVOL-0271	AH, 14/6/12



Title of Document	Alstom Reference	Release/Date
ATC-CC Subsystem Software Requirements Specification Verification Report	UEVOL-0819	AI, 15/11/12
ATC Subsystem Verification & Validation Report ATC Baseline 9.3.3.1	UEVOL-1171	BE, 16/11/12
ATC Subsystem Verification & Validation Report ATC Baseline 9.3.3.2	UEVOL-1171	BEI, 13/12/12
ATC Hazard Log	UEVOL-1705	AO, 16/11/12
Project Document Plan	A401405	CF, 5/12/12
CC Software Architecture Description	A401446	AS, 8/11/12
CC Vital Software Module Design	A406966	V, 10/7/12
CC VESG Critical Code Review Analysis Report	A406392	U, 22/8/12
TDG Software Module Description Verification Report	A419763	F, 3/9/12
CC Software Safety Requirements Report	A402319	AY, 8/11/12
CC Subsystem Integration Tests Plan	A401570	V, 21/9/12
CC Subsystem Integration Tests Description	A401880	AQ, 24/9/12
CC Subsystem Integration Tests Description Verification Report	A402282	AZ, 24/9/12
CC Subsystem Integration Tests Report	A402287	CE, 24/9/12
ATC Generic Application Safety Case	UEVOL-0887	BO, 14/12/12

ATC Baseline 9.3.4.1 Review (December 2012)

Table 42: Documents Reviewed for ATC Baseline 9.3.4.1

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	CD, 27/11/12
Urbalis Evolution - ZC Software, Software Impact Analysis	A404257	AS, 22/11/12
ZC Software Module Test Description Verification Report	A402925	T, 29/11/12
ZC Software Module Test Report	A402291	Y, 27/11/12
UEVOL-ZC: Software Requirements Test Plan	A401691	AK, 09/11/12
ZC Requirements Test Description Verification Report	A402921	AE, 30/11/12
Trainborne Software Assurance Report	A402620	DD, 04/12/12
ZC Software Requirements Test Description	A401881	AO, 29/11/12
ATC Subsystem Reqs Test Description Verification Report	UEVOL-0824	T, 14/11/12
ZC ASW, Software Requirements Tests Report	A402289	AP, 29/11/12
ZC Sw Integrated Test Plan	A402910	L, 23/11/12
ZC ASw Sw Integrated Test Description	A402270	S, 26/11/12
ZC Sw Integrated Test Description Verification Report	A402928	R, 28/11/12
ZC Application, Software Integration Test Report	A402272	S, 26/11/12
ZC Sy Integrated Test Description	A401883	AG, 28/11/12
ZC Subsystem Integration Tests Description Verification Report	A402930	AE, 29/11/12
ZC - Subsystem Integration Tests Report	A402288	AV, 27/11/12
ATC Subsystem Impact Analysis	UEVOL-2408	QI, 13/12/12
CC Subsystem Tests Report	UEVOL-0140	CBI, 14/11/12



Title of Document	Alstom Reference	Release/Date
ATC Software Release Note	A402307	EF, 14/12/12
CC Software Release Note	A402045	CW, 30/11/12
Trackside Software Release Note	A402079	BC, 30/11/12
CC-OVLI Release Note	A402199	AG, 21/11/12
ZC System Architecture Description and Software Requirements Specification Verification Report	A402938	W, 26/11/12
Urbalis Evolution, ZC-ZC Interface Description	UEVOL-0192	X, 10/11/12
ATC Interface Hazard Analysis	UEVOL-0431	AA, 06/12/12
ATC ZC Subsystem Reqs. Test Description Verification Report	UEVOL-0827	Z, 06.12.2012
ATC Validation Allocation Table	UEVOL-1169	Z, 19/11/12
ATC Subsystem Impact Analysis	UEVOL-2408	R, 04/12/12
ZC Subsystem Test Reports	UEVOL-1186	AM, 30/11/12
ATC-CC Subsystem Reqs Test Description Verification Report	UEVOL-0826	Z, 03/12/12
CC Subsystem Tests Report	UEVOL-0140	CE, 05/12/12
ATC – CC Ssy Requirements Test Description	UEVOL-0139	AB, 18/09/12
ATC: System Integration Test Description Verification Report	UEVOL-0825	U, 08/12/12
ATC Ssys Integration Tests Descriptions	UEVOL-0137	Q, 29/09/12
System Delivery Sheet	UEVOL-2251	06/12/12
ZC Software Hazard Analysis	A401824	AK, 29/11/12
ZC: Software Safety Requirement Report	A402317	AK, 03/12/12
Urbalis Evolution – ZC Sub-system, Requirements Specification	UEVOL-0114	vAM, 23/10/12
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801	vG, 30/11/12
ATC SW U400 ZC Software, Formal Proof Document	A402844	vAR, 21/11/12
Architecture Description	A401466	vAP, 14/11/12
Urbalis Evolution – Trackside Software Architecture Description	A407321	vAE, 12/11/12
Urbalis Evolution – Zone Controller (ZC), Formal Proof Verification Report	A402917	vAM, 30/11/12
UEVOL Trackside ZC and TDG, Source Code Verification Report	A402912	vZ, 22/11/12
Specific Safety Study on Trackside ATC Parameters	A402904	vO, 5/12/12
ATC Subdivision Rules Specific Study	UEVOL-1027	vR, 3/12/12
Urbalis Evolution – ZC, B Specification Verification Report	A402914	vAK, 30/11/12
ZC Subsystem Hazard Analysis	UEVOL-0843, release AA	29/11/12
ATC Subsystem requirement Specification Verification Report	UEVOL-0818, release AH	7/11/12
UEVOL ATC Safety Exported Constraints	UEVOL-1704, release AP	6/12/12
Specific Safety Study – Automatic Protection	A402331, release R	15/11/12
ATC Software Safety Assurance Report	A402620, release DD	4/12/12
Software Module Description Verification Report (for Track Data Generator)	A419763, release H	28/11/12



Title of Document	Alstom Reference	Release/Date
ZC Software requirement Specification	A401380, release BF	8/11/12
Project Document Plan	A401405, release CG	17/12/12
ATC Hazard Log	UEVOL-1705, release AP	6/12/12
ATC Design Verification Plan	UEVOL-1170, release R	19/11/12
ATC Subsystem Verification and Validation Report ATC baseline 9.3.4.1	UEVOL-1171, release BF	6/12/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816, release AFI	28/11/12
ATC Generic Application Safety Case	UEVOL-0887, release BH	6/12/12
System: Exported Constraint Verification Report	UEVOL-1446, release LI	31/8/12

ATC Baseline 10.2.3.3 Review (January 2013)

Table 43: Documents Reviewed for ATC Baseline 10.2.3.3

Title of Document	Alstom Reference	Release/Date
ATC Subsystem Impact Analysis	UEVOL-2408	T, 17/12/2012
Subsystem Test Report	UEVOL-0140	CG, 12/12/2012
Software Impact Analysis	A403516	CF, 07/12/2012
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	AC, 10/12/2012
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	AL, 11/12/2012
CC Software Module Test Report	A402314	AS, 10/12/2012
CC Software Integration Test Description	A402309	AG, 10/12/2012
CC-ATP Software Integration Tests Description Verif. Report	A402273	AE, 11/12/2012
CC - ATP Software Integration Tests Report	A402310	AG, 10/12/2012
CC-ATP Requirements Test Description Verification Report	A402284	AN, 12/12/2012
CC Software Requirements Tests Report	A402285	BD, 11/12/2012
ATC SW Spot Checking Report	A408174	U, 23/01/2013
ATC Software: Global Validation Report	A402597	AH, 22/01/2013
ATC Software Release Note 10.2.5	A402307	EI, 17/12/2012
CC Software Release Note 10.2.13	A402045	CY, 13/12/2012
ATC 10.2.3.3 Sub-system Delivery Sheet	UEVOL-2263	21/12/2012
CC-VESG Critical Code Review Analysis Report	A406392, release Y	11/12/12
ATC Safety Exported Constraints	UEVOL-1704, release AS	20/12/12
ATC Hazard Log	UEVOL-1705, release AS	20/12/12
ATC Subsystem Verification & Validation Report, ATC Baseline 10.2.3.3	UEVOL-1171, release BH	17/12/12
CC Software Safety Requirement Report	A402319, release BA	15/12/12



Title of Document	Alstom Reference	Release/Date
CC Subsystem Integration Test Description Verification Report	A402282, release BD	12/12/12
CC Subsystem Integration Test Report	A402287, release CJ	7/12/12
ATC Generic Application Safety Case	UEVOL-0887, release BP	20/12/12
UEVOL CC-Vital Software, Source Code Verification Report	A402606	AY, 11/12/12
UEVOL-CC-V-ATP, Critical Code Review Analysis Report	A402598	BO, 11/12/12
ATC Software Safety Assurance Report	A402620	DG, 12/12/12
ATC Software Safety Assurance Report	A402620	DI, 25/1/13

ATC Baseline 7.2.2.16 Review (February 2013)

Table 44: Documents Reviewed for ATC Baseline 7.2.2.16

Title of Document	Alstom Reference	Release/Date
CC Vital Formal Proof Document	A402843-AZ	28/11/12
UEVOL Trackside ZC, Source Code Verification Report	A402912-Y	13/11/12
CC Vital Software, Architecture Description	A401466-AO	29/10/12
UEVOL CC – Vital Software, Source Code Verification Report	A402606-AX	16/11/12
ATC Software Safety Assurance Report	A402620-DF	12/12/12
Urbalis Evolution – Zone Controller, Critical Code Review Analysis Report	A402528-AO	27/11/12
U400 – CC – Vital, Formal Proof Verification Report	A402916-AW	30/11/12
Urbalis Evolution, CC-Vital Setting Description	UEVOL-0643-AD	21/11/12
Urbalis Evolution, Specific Safety Study on UEVOL, CC-V Parameters	A402903-S	23/11/12
U400 Software – CC-Vital, B Specification Verification Report	A402882-AT	30/11/12
Coverage of 2003 Safety Exported Constraints	A402444-S	28/11/12
ATC 7.2.2.16, Sub-system Delivery Sheet	UEVOL-R-2285	04/01/13
ATC Generic Application Safety Case	UEVOL-0887-Bce	04/01/13
UEVOL-CC-V-ATP, Critical Code Review Analysis Report	A402598-BN	23/11/12
ATC software Release Note	A402307-EH	11/12/12
CC Software Release Note 7.2.23	A402045-CX	30/11/12
Wayside software Release Note	A402079-BD	06/12/12
Trackside Software Safety Requirement Report	A402317-AJ	28/11/12
Software Safety Assurance Report	A402620-DF	12/12/12
CC Software Impact analysis	A403516-CE	27/11/12
CC Software Module Test Description Verification Report	A402266-AK	29/11/12
CC-Vital Sw MTD	A402313-AB	04/05/12
CC-Vital Sw MTR	A402314-AR	20/11/12
CC SwRTDVR	A402284-AM	27/11/12
CC - ATP Software Reqs Tests Description	A401878-AP	16/11/12
CC Software Requirements Test Report	A402285-BC	16/11/12



Title of Document	Alstom Reference	Release/Date
CC-ATP Software Integration Tests Description Verif. Report	A402273-AD	23/11/12
CC Software Integration Test Description	A402309-AF	20/11/12
CC ATP Integrated Test Report	A402310-AF	20/11/12
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257-AR	12/11/12
ZC Software Module Test Description Verification Report	A402925-U	05/12/12
ZC Software Module Test Report	A402291-Z	02/11/12
ZC Requirements Test Description Verification Report	A402921-AD	21/11/12
ZC Software Requirements Test Description	A401881-AN	20/11/12
ZC ASW, Software Requirements Tests Report	A402289-AO	20/11/12
ZC Subsystem Integration Tests Description Verification Report	A402930-AD	21/11/12
ZC - Subsystem Integration Tests Report	A402288-AU	12/11/12
CC: Software Hazard Analysis	A401823-AO	13/11/12
ATC Subsystem: SRS Verification Report	A401804-AE	22/11/12
ATC 7.2.2.12 Subsystem Impact Analysis	UEVOL-2408-U	02/01/13
ATC-CC Subsystem Reqs Test Description Verification Report	UEVOL-0826-AA	18/12/12
ATC – CC Ssy Requirements Test Description	UEVOL-0139-AA	27/11/12
CC Subsystem Tests Report	UEVOL-0140-CF	04/12/12
ZC Subsystem Requirement Test Description Verification Report	UEVOL-0827-AB	02/01/12
ATC – ZC Ssy Requirements Test Description	UEVOL-0969-Y	
ATC – ZC Ssy Requirements Test Report	UEVOL-1186-AN	06/12/12
ATC Ssy Integration Test Description	UEVOL-0137-L	06/12/12
ATC Subsystems Integration Tests Reports	UEVOL-1046-AA	17/12/12
ATC Ssy Requirements Test Description	UEVOL-0138-J	03/10/11
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275-W	17/12/12
CC-Subsystem, Integration Test Description Verification Report	A402282-BC	28/11/12
CC Subsystem Integration Tests Description	A401880-AT	29/01/13
CC Subsystem Integration Test Report	A402287-CI	23/11/12
UEVOL-CC: Subsystem Integration Tests Plan	A401570-W	22/11/12
Project Document Plan	A401405-CJ	03/01/12
CC - Software Safety Requirement Report	A402319-AZ	27/11/12
ATC Subsystem Requirements Test Plan	UEVOL-0113-C	30/03/12
ATC-CC: System-Software Requirement Specification Verification Report	UEVOL-0819-AJ	10/12/12
UEVOL ATC Safety Exported Constraints	UEVOL-1704-AR	19/12/12
ATC Hazard Log	UEVOL-1705-AR	19/12/12
ATC Subsystem V&V Report	UEVOL-1171-BI	03/01/13
CC Vital Software Requirements Specification	A401464, BL	23/11/12
CC Sy Architecture Description	A401446, AT	22/11/12
LC Sy Architecture Description	A401537, L	14/10/11
CC VESG: Critical Code Review Analysis Report	A406392, X	14/11/12



Title of Document	Alstom Reference	Release/Date
Specific Safety Study – Automatic Protection	A402331, Q	15/11/12
Urbalis Evolution – Zone Controller, Critical Code Review Analysis Report	A402528,AS	14/02/13

ATC Baseline 9.3.5 Review (March 2013)

Table 45: Documents Reviewed for ATC Baseline 9.3.5

Title of Document	Alstom Reference	Release/Date
ZC Subsystem: Subsystem Hazard Analysis	UEVOL-0543, AD	12/02/2013
ATC 9.3.5 Sub-system Delivery Sheet	UEVOL-R-2344	26/02/2013
Urbalis Evolution – Trackside Software Architecture Description	A407321, AG	08/02/2013
ZC Sw Requirements Test Description	A401881, AQ	15/02/2013
ZC Software Requirements Specifications	A401380, BF	15/02/2013
ATC Ssy Requirements Test Report	UEVOL-1275, U	05/12/2012
ATC – ZC Subsystem Software Requirements Specification Verification Report	UEVOL-0821, Z	25/02/2013
ATC Interface Hazard Analysis	UEVOL-0431, AC	13/03/2013
ATC 9.3.5 Subsystem impact analysis	UEVOL-2408, V	25/02/2013
ATC ZC SsyR Test Description	UEVOL-0969, AC	19/02/2013
ATC ZC SsyR Test Report	UEVOL-1186, AP	14/02/2013
ZC Ssy Integration Test Report	A402288, AX	21/02/2013
ZC Sy Architecture Description	A401536, AK	08/02/2013
CC Sw Reqs. and Architecture Description Verif. Report	A401804, AF	14/12/2012
Tk Software Requirements and Architecture Description Verification Report	A402938, Y	14/02/2013
ATC Software Global V&V Report	A402597, AK	01/03/2013
Project Document Plan	A401405, CK	27/02/2013
ATC SW Spot Checking Report	A408174, Y	01/03/2013
ZC Software Requirements Test Description Verification Report	A402921, AG	19/02/2013
ZC Software Requirements Test Report	A402289, AR	15/02/2013
ZC Subsystem Integration Tests Description Verification Report	A402930, AG	15/02/2013
ZC Subsystem Integration Test Description	A402883	AI, 21/02/2013
ZC Software Requirements Tests Plan	A401691	AN, 11/02/2013
ZC Sw Module Test Description Verification Report	A402925	V, 21/02/2013
ZC Sw Integration Test Description	A402270	T, 15/02/2013
ZC Software Integration Test Description Validation Report	A402928	S, 21/02/2013
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AU, 08/02/2013
UEVOL ATC Software Release Note	A402307	EL, 26/02/2013
Trackside Software Release Note	A402079	BE, 22/02/2013
CC-OVLI Release Note	A402199	AG, 21/11/2012
ATC Safety Case	UEVOL-1632	AW, 26/02/2013



Title of Document	Alstom Reference	Release/Date
ZC Subsystem Configuration File	UEVOL-0290	AI, 08/02/2013
U400 TDG Software Module Description	A418523	N, 8/2/2013
TDG Software Module Description Verification Report	A419763	I, 15/2/13
Specific Safety Study – Automatic Protection	A402331	T, 14/2/13
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	AH1, 8/2/13
UEVOL ATC Safety Exported Constraints	UEVOL-1704	AU, 6/2/13
ATC Hazard Log	UEVOL-1705	AU, 26/2/13
ATC Software Safety Assurance Report	A402620	DI, 25/2/13

ATC Baseline 7.9.0.2 Review (March 2013)

Table 46: Documents Reviewed for ATC Baseline 7.9.0.2

Title of Document	Alstom Reference	Release/Date
ATC 7.9.0.2 Subsystem Impact Analysis	UEVOL-2408, SI	21/01/2012
ATC Validation Allocation Table	UEVOL-1169, AA	13/12/2012
ATC Ssy Integration Test Description Verification Report	UEVOL-0825, V	13/12/2012
ATC Ssys Integration Tests Descriptions	UEVOL-0137, R	29/11/2012
ATC Ssy Integration Test Report	UEVOL-1046, Z	05/12/2012
ATC Interface Hazard Analysis	UEVOL-0431, Z	06/12/2012
ATC Subsystem Requirements Specification	UEVOL-0270, AM	12/12/2012
ATC Subsystem Reqs. Specification Verification Report	UEVOL-0818, AJ	13/12/2012
ATC Architecture Description	UEVOL-0271, AM	12/12/2012
ATC Design Verification Plan	UEVOL-1170, J	13/12/2012
ATC System, System Hazard Analysis	UEVOL-0831, X	29/11/2012
ATC Subsystem Verification and Validation Report	UEVOL-1171, BG	21/01/2013
ATC Subsystem Architecture Description Verification Report	UEVOL-0817, AE	13/12/2012
UEVOL Wayside Software Release Note	A402079, BE	22/02/2013
ATC Software Release Note	A402307, EL	26/02/2013
ATC sub-system delivery sheet 7.9.0.2	UEVOL-2288	11/01/2013
ATC Generic Application Safety Case	UEVOL-0887	21/01/2013
ATC Subdivision Rules Specific Study	UEVOL-1027,S	17/12/12
Urbalis Evolution ZC & LC Subsystems, ATC Configuration Rules Safety Study	UEVOL-1574, W	5/12/12
ATC Data Generation Procedure 1 st Chain	UEVOL-1666,T	7/12/12
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667, T	4/12/12
ATC Data Generation 7.9.X, 7.2/9.3 Compatibility Analysis	UEVOL-3019, A	12/12/12
ATC Hazard Log	UEVOL-1705, AX	19/03/2013
ATC Hazard Log	UEVOL-1705	AT, 21/01/2013
ATC interface hazard analysis	UEVOL-0431, AD	18/03/2013
ATC Generic Application Safety Case	UEVOL-0887, BU	22/03/2013



Title of Document	Alstom Reference	Release/Date
ATC sub-system Delivery Sheet 7.9.0.3	UEVOL-2376	22/03/2013
ATC exported constraints	UEVOL-1704, AX	22/03/2013
ATC Safety Exported Constraints	UEVOL-1704	AT, 21/1/13
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	AG, 13/12/12

ATC Baseline 10.2.4.1 Review (May 2013)

Table 47: Documents Reviewed for ATC Baseline 10.2.4.1

Title of Document	Alstom Reference	Release/Date
ATC 10.2.4 Subsystem Impact Analysis	UEVOL-2408	X, 25/03/2013
ATC Interface Hazard Analysis	UEVOL-0431	AB, 11/01/2013
ATC – ZC Ssy Requirements Test Description	UEVOL-0969	AA, 25/02/2013
ATC Ssys Requirements Tests Report (ZC)*	UEVOL-1186	AO, 06/02/2013
ATC Subsystems Integration Tests Reports	UEVOL-1046	AB, 07/02/2013
ATC Ssy Requirements Test Report	UEVOL-1275	Y, 07/02/2013
ATC Ssys Requirements Tests Report (CC)*	UEVOL-0140	CI, 22/03/2013
ATC-CC: System Requirement Test Description Verification Report	UEVOL-0826	AB, 15/02/2013
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	AC, 05/02/2013
ATC Subsystem Reqs. Specification Verification Report	UEVOL-0818	AF, 08/10/2013
SwRN ATC Sw	A402307	EN, 22/03/2013
CC Software Release Note	A402045	DA, 20/03/2013
SwRN TRK	A402079	BF, 20/03/2013
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	CH, 22/02/2013
CC – V: ATP and VESG Software Module Test Description	A402313	AD, 30/01/2013
CC V ATP and VESG SW Module Test Report	A402314	AT, 30/01/2013
CC ATP Software Integration Test Description	A402309	AH, 30/01/2013
CC-ATP Software Integration Test Description Verification Report	A402273	AF, 31/01/2013
CC ATP Software Integration Test Report	A402310	AH, 30/01/2013
CC ATP Software Requirements Test Description	A401878	AQ, 30/01/2013
CC-ATP Software Requirements Test Description Verification Report	A402284	AO, 31/01/2013
CC ATP Software Requirements Test Report	A402285	BE, 30/01/2013
CC Subsystem Integration Tests Description	A401880	AU, 31/01/2013
CC-Subsystem, Integration Test Description Verification Report	A402282	BE, 01/02/2013
CC Subsystem Integration Tests Report	A402287	CK, 05/02/2013
ZC Software Impact Analysis	A404257	AT, 19/12/2012
ZC Software Requirements Test Plan	A401691	AJ, 18/12/2012
ZC Software Requirements Test Description	A401881	AP, 31/01/2013
ZC Sw Requirement Test Description Verification Report	A402921	AF, 04/02/2013
ZC ASW, Software Requirements Tests Report	A402289	AQ, 31/01/2013



Title of Document	Alstom Reference	Release/Date
ZC Subsystem Integration Tests Description	A401883	AH, 11/01/2013
ZC Sy Integrated Test Description Verification Report	A402930	AF, 24/01/2013
ZC Subsystem Integration Tests Report	A402288	AW, 11/01/2013
ZC Sy Architecture Description	A401536	AI, 17/12/2012
ZC - Software Safety Requirement Report	A402317	AO, 08/03/2013
CC Software Hazard Analysis	A401823	AQ, 09/01/2013
ATC Sw Requirement Specification Verification Report	A401804	AG, 30/01/2013
ATC Software Spot-checking Report	A408174	AA, 27/03/2013
ATC Software Global V&V Report	A402597	AM, 12/03/2013
UEVOL ATC Safety Exported Constraints	UEVOL-1704	AV, 26/3/12
ATC Hazard Log	UEVOL-1705	AV, 26/3/13
Specific Safety Study – Automatic Protection	A402331	S, 26/12/12
ATC Subsystem Verification and Validation Report ATC baseline 10.2.4.1	UEVOL-1171	BI, 25/3/13
CC-Vital Software Requirements Specification	A401464	BV, 11/12/12
CC-VESG Critical Code Review Analysis Report	A406392	Y, 11/12/12
ATC Software Safety Assurance Report	A402620	DK, 22/3/13
ATC Software Safety Assurance Report	A402620	DN ³ , 24/4/13
Urbalis Evolution – ZC & LC Subsystems, ATC Configuration Rules Safety Study	UEVOL-1574	vX, 11/1/13
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	vAL, 1/10/12
Urbalis Evolution – ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	vAB, 9/1/13
ATC 10.2.4.1 Sub-system Delivery Sheet	UEVOL-R-2379	25/3/13
CR Safety Review	UEVOL-1988	vEI, 29/3/13
ATC Generic Application Safety Case	UEVOL-0887	vBV, 26/3/13
Urbalis Evolution – ZC Application, Software Requirements Specification	A401380	vBG, 17/12/12
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	vAL, 2/6/12
ATC SW U400 Vital, Formal Proof Document	A402843	vBA, 18/12/12
U400 Zone Controller (ZC), Formal Proof Document	A403844	vAS, 17/12/12
Urbalis Evolution – Zone Controller (ZC), Formal Proof Verification Report	A402917	vAN, 25/1/13
Urbalis Evolution – Trackside Software, Architecture Description	A407321	vAF, 17/12/12
UEVOL Trackside ZC and TDG, Source Code Verification Report	A402912	vAA, 18/1/13
UEVOL CC-Vital Software, Source Code Verification Report	A402606	vAZ, 28/1/13
Urbalis Evolution, B Specification Verification Report	A402914	vAL, 25/1/13
Urbalis Evolution – CC Vital, B Specification Verification Report	A402882	vAU, 6/2/13
Urbalis Evolution – Zone Controller, Critical Code Review Analysis Report	A402528	vAQ, 27/12/12

³ The official version of the SwSAR for ATC 10.2.4.1 was DK. However, DN was also supplied following some corrections being carried out by request of ADL. These corrections are commented on in the body of this report.



Title of Document	Alstom Reference	Release/Date
UEVOL-CC-V-ATP, Critical Code Review Analysis Report	A402598	vBP, 30/1/13
Urbalis Evolution – CC_Vital, Formal Proof Verification Report	A402916	vAX, 5/12/13
Urbalis Evolution – ZC, B Specification Verification Report	A402914	vAO, 14/5/13
Urbalis Evolution – CC Vital, B Specification Verification Report	A402882	vAV, 4/5/13
Urbalis Evolution – Zone Controller (ZC), Formal Proof Verification Report	A402917	vAQ, 14/5/13

ATC Baseline 10.2.5.1 Review (September 2013)

Table 48: Documents Reviewed for ATC Baseline 10.2.5.1

Title of Document	Alstom Reference	Release/Date
ATC Software Release Note	A402307	ES, 31/07/13
CC Software Release Note	A402045	DC, 30/07/13
Wayside Software Release Note	A402079	BH, 30/07/13
CC Subsystem Requirements Specification	UEVOL-0098	AV, 03/07/13
ATC - CC Subsystem: SyRTDVR	UEVOL-0826	AC, 31/07/13
CC-ATP Software Impact Analysis	A403516	CL, 24/07/13
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	AW, 05/07/13
ZC Software Requirements Test Description Verification Report	A402921	AI, 25/07/13
ZC ASw Sw Requirement Test Report	A402289	AQ, 23/07/13
ZC Software Requirements Test Description	A401881	AS, 23/07/13
Trainborne Software Assurance Report	A402620	DO, DR, 31/07/13, 19/09/13
ZC Subsystem Integration Test Description Verification Report	A402930	AI, 24/07/13
ZC - Subsystem Integration Tests Report	A402288	BB, 17/07/13
ZC Ssy Integration Test Description	A401883	AM, 29/07/13
CC ATP Software Requirements Test Description Verification Report	A402284	AQ, 24/07/13
CC ATP Sw Requirement Test Report	A402285	BG, 19/07/13
CC-ATP Software Requirements Tests Description	A401878	AS, 17/07/13
CC-Subsystem, Integration Test Description Verification Report	A402282	BH, 25/07/13
CC Subsystem Integration Tests Report	A402287	CN, 24/07/13
CC Subsystem Integration Tests Description	A401880	AX, 24/07/13
ZC, Software Safety Requirements Report	A402317	AQ, 25/07/13
CC Software Hazard Analysis	A401823	AT, AV, 24/07/13, 16/09/13
CC Software Requirements and Architecture Description Verification Report	A401804	AI, 24/07/13
ZC Sy Architecture Description/Sw Requirement Specification Verification Report	A402938	AB, 23/07/13
ATC Subsystem impact analysis	UEVOL-2408	Z, 06/08/13
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	AG, 31/07/13



Title of Document	Alstom Reference	Release/Date
ATC Interface Hazard Analysis	UEVOL-0431	AF, 11/07/13
CC SyRTD Validation Session	UEVOL-0139	AK, 23/07/13
ATC Ssys Requirements Tests Report (CC)	UEVOL-0140	CL, 01/08/13
ZC Subsystem Requirements Test Reports	UEVOL-1186	AS, 16/07/13
ZC SYRS-SYAD-SWRS VERIFICATION REPORT	A436803	A, 25/07/13
ATC Software Global V&V Report	A402597	AN, 20/08/13
ATC SW Spot Checking Report	A408174	AB, 29/07/13
Software Safety, Validation and Verification Plan (SV+VP)	A401582	L, 17/06/13
CC ATP Software Requirements Specifications	A401464	BY, 19/06/13
CC Software: Architecture Description	A401446	AZ, 04/07/2013
CC Software Requirements Report	A402319	BD, BF, 23/07/2013, 11/09/2013
Specific safety study on automatic protection	A402331	WV, 24/07/13
ATC Safety Exported Constraints	UEVOL-1704	BA, 02/08/13
ATC Hazard Log	UEVOL-1705	BA, 02/08/13
ATC Ssy: SyRSVR	UEVOL-0818	AM, 08/07/13
ATC Subsystem Verification and Validation Report	UEVOL-1171	BN, 06/08/13
CC SYRS-SYAD-SWRS VERIFICATION REPORT	A444099	B, 25/07/13
CC Subsystem, Subsystem Hazard Analysis	UEVOL-0542	AD, 15/07/13
U400 Zone Controller (ZC), Formal Proof Document	A402844	AV, 24/07/13
ATC Sw U400 CC Vital, Formal Proof Document	A402843	BD, 19/06/13
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801	J, 22/07/13
Urbalis Evolution – CC Vital, B-Basic Machines Verification Report	A418805	L, 19/07/13
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	BM, 04/07/13
Urbalis Evolution – Zone Controller Software Hazard Analysis	A401824	AQ, 24/07/13
Urbalis Evolution – Zone Controller (ZC), Formal Proof Verification Report	A402917	AR, 22/07/13
Urbalis Evolution – ZC B Specification Verification Report	A402914	AP, 19/07/13
Urbalis Evolution – Zone Controller, Critical Code Review Analysis Report	A402528	AT, 24/07/13
Urbalis Evolution – CC Vital Formal Proof Verification Report	A402916	AZ, 22/07/13
Urbalis Evolution – CC Vital B Specification Verification Report	A402882	AX, 19/07/13
Critical Code Review Analysis Report	A402598	BR, BT, 11/07/13, 16/09/13
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0014	AV, 14/06/13
Urbalis Evolution – ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	AG, 17/07/13
ATC 10.2.5.1 Sub-system Delivery Sheet	UEVOL-R-2513	05/08/13
CR Safety Review	UEVOL-1988	EV, 05/08/13
ATC Generic Application Safety Case	UEVOL-0887	BY, 06/08/13
UEVOL CC ATP, Source Code Verification Report	A402606	BC, 13/09/13



Title of Document	Alstom Reference	Release/Date
B Specification Verification Report	A402914	AP, 19/07/13
CC-VESG Critical Code Review Analysis Report	A406392	AB, 16/09/13

ATC Baseline 10.2.6.2 Review (December 2013)

Table 49: Documents Reviewed for ATC Baseline 10.2.6.2

Title of Document	Alstom Reference	Release/Date
ATC SW U400 CC Vital, Formal Proof Document	A402843	vBF, 4/10/13
U400 Zone Controller (ZC), Formal Proof Document	A402844	vAX, 20/11/13
Urbalis Evolution Zone Controller (ZC), Formal Proof Verification Report	A402917	vAT, 13/11/12
Urbalis Evolution – CC-Vital, Formal Proof Verification Report	A402916,	vBC ,5/11/13
Urbalis Evolution – ZC, B Specification Verification Report	A402914,	vAR,13/11/13
UEVOL Trackside ZC and TDG, Source Code Verification Report	A402912	vAE, 12/11/13
Urbalis Evolution Zone Controller, Critical Code Review Analysis Report	A402528,	vAV, 14/11/13
Urbalis Evolution – CC Vital, B Specification Verification Report	A402882,	vBC, 5/11/13
CC Vital, Critical Code Review Analysis Report	A402598,	vBW, 8/11/13
CC Vital Software, Architecture Description	A401466,	vAT, 8/10/13
Specific Safety Study on UEVOL CC-V Parameters	A402903,	vV, 15/11/13
UEVOL CC ATP, Source Code Verification Report	A402606	vBF, 6/11/13
ATC Generic application Safety Case	UEVOL-0887,	vCE,25/11/2013
ZC Subsystem requirement specification	UEVOL-0114	vBA,17/10/2013
ZC Subsystem Hazard Analysis	UEVOL-0543,	vAG_Plus I, 21/11/2013
ATC Subsystem Requirements Specification Verification Report	UEVOL-0818,	vAO,12/11/2013
ATC ZC SsyRTD	UEVOL-0969	vAJ, 20/11/2013
ATC ZC SsyRTDVR	UEVOL-0827	vAH,15/11/2013
ATC ZC SsyRTR	UEVOL-1186	vAU, 22/11/2013
ATC Subsystem V&V Report (includes VAT filled)	UEVOL-1171	vBR, 22/11/2013
ATC 10.2.6.2 Sub-system delivery sheet	UEVOL-2643	25/11/2013
ZC Sw Requirements Specification	A401380	vBP, 29/10/2013
Trackside SwRS/AD Verification Report	A402938	AC, 18/11/2013
Subsystem Integration tests description	A401883	AN, 14/11/2013
Integration Test Description verification Report	A402930	AK,15/11/2013
Subsystem Integration Test Report	A402288	BC,14/11/2013
Software Requirements Tests Description	A401881	AU,18/11/2013
ZC Sw Requirements test description Verification Report	A402921	AK, 18/11/2013
ZC Sw Requirements TR	A402289	AV,18/11/2013
Software Hazard Analysis	A401824	AR, 22/11/2013
ZC SysRS SyAD SwRS Verification Report	A436803	C,15/11/2013



Title of Document	Alstom Reference	Release/Date
Project Document Plan	A401405	CS, 22/11/2013
AC Spot Checking Report	A408174	AC, 25/11/2013
Global Verification and Validation Report	A402597	AO,25/11/2013
Trackside Sw Safety Requirements Report	A402317	AS,18/11/2013
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	CQ, 05/11/13
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	BA,14/11/13
CC Software Safety Assurance Report	A402620	DU, 22/11/13
CC Software Release Note	A402045	DG, 21/11/13
Sw Release Note Trackside	A402079	BJ, 21/11/13
CC Software Hazard Analysis	A401823	AY, 08/11/13
CC – V: Software Module Test Description Verification Report	A402266	AQ, 11/11/13
CC – V: ATP and VESG Software Module Test Description	A402313	AH, 06/11/13
CC-V: ATP and VESG Software Module Test Report	A402314	AX, 06/11/13
CC ATP Software Integration Test Description	A402309	AL, 31/10/13
CC ATP Software Integration Test Report	A402310	AL, 31/10/13
CC-V Software Test Description Verification Report	A402273	AJ, 11/11/13
CC Software Requirements Test Description Verification Report	A402284	AT/AU, 13/11/13
CC ATP Software Requirements Test Report	A402285	BJ, 13/11/13
CC ATP Software Requirements Test Description	A401878	AV,13/11/13
CC Subsystem Integration Test Description Verification Report	A402282	BK, 13/11/13
CC Subsystem Integration Tests Report	A402287	CQ, 12/11/13
CC Subsystem Integration Test Description	A401880	AZ, 04/11/13
CC Software, Architecture Description	A401446	BF, 21/10/13
ATC Sw Requirement Specification Verification Report	A401804	AL, 19/11/13
CC Software Requirements Report	A402319	BI, 15/11/13
CC SYRS-SYAD-SWRS VERIFICATION REPORT	A444099	E, 15/11/13
CC-VESG Critical Code Review Analysis Report	A406392	AD, 08/11/13
CC ATP Software Requirements Specifications	A401464	CC, 04/10/13
ATC Subsystem Impact Analysis 10.2.6	UEVOL-2408	AD, 22/11/13
ATC Validation Allocation Table	UEVOL-1169	AE, 22/11/13
CC Subsystem Requirements Test Report	UEVOL-0140	CP, 19/11/13
ATC Hazard Log	UEVOL-1705	BF, 22/11/13
ATC Exported Constraints	UEVOL-1704	BF, 22/11/13
Sw Release Note ATC Software	A402307	EY, 22/11/13
CC Vital Software Architecture Description	A401466	AU, 5/12/13



ATC Baseline 7.2.5.1-1 Review (April 2014)

Table 50: Documents Reviewed for ATC Baseline 7.2.5.1-1

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	CW, 28/02/14
CC Software Release Note 7.2.20	A402045	DM, 24/03/14
UEVOL CC ATP Software Requirements Specification	A401464	CI, 25/02/14
CC ATP Software Architecture Descriptions	A401466	AV, 23/01/14
CC Sy Architecture Description	A401446	BJ, 16/01/14
ZC Application Software Requirements Specification	A401380	BS, BT 05/03/14
ZC SyAD/SwRS Verification Report	A402938	AE, 10/03/14
ATC Sw Requirement Specification Verification Report	A401804	AN, 16/02/14
CC Software Hazard Analysis	A401823	BA, 26/02/14
ZC Software Impact Analysis	A404257	W, Z, BC, 14/03/14
UEVOL Wayside Software Release Note 7.2.15	A402079	BL, 24/03/14
CC V ATP and VESG SW Module Test Report	A402314	AZ, 26/02/14
ZC Software Module Test Report	A402291	AB, AE, 18/02/14
CC ATP SwModule Test Description	A402313	AJ, 26/02/14
CC – V: Software Module Test Description Verification Report	A402266	AS, 28/02/14
ZC S/w Hazard Analysis	A401824	AT, 11/03/14
CC Software Requirements Report	A402319	BK, 28/02/14
ZC, Software Safety Requirements Report	A402317	AU, 24/03/14
ZC Software Integration Tests Description	A402270	X, 17/02/14
ZC Sw Integration Test Description Verification Report	A402928	W, 18/02/14
ZC Software Integration Tests Report	A402272	X, 17/02/14
VESG Critical Code Review Analysis Report	A406392	AF, 26/02/14
CC Critical Code Review Analysis Report	A402598	BY, 26/02/14
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	AX, 19/03/14
ZC Subsystem Integration Test Description Verification Report	A402930	AH, 29/04/13
ATC SW Spot Checking Report	A408174	AE, 24/03/14
ATC Software Release Note 7.2.5.1	A402307	25/03/14
ZC SysRS SyAD SwRS Verification Report	A436803	F, 21/03/14
ZC Subsystem Integration Tests Report	A402288	AZ, 11/04/13
ZC Sy Integrated Test Description	A401883	AK, 08/04/13
ATC Software Global V&V Report	A402597	
CC-ATP Requirements Test Description Verification Report	A402284	AW, 28/02/14
ZC Software Requirements Test Description Verification Report	A402921	AM, 31/03/14
ATC Subsystem Impact Analysis 7.2.5.1	UEVOL-2408	AF, 27/03/14
ATC Ssys Requirements Tests Report (CC)	UEVOL-0140	CF, CH, CQ 03/04/14
ATC - CC Subsystem: SyRTDVR	UEVOL-0826	AH, 25/03/14
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	AQ, AV 31/03/14



Title of Document	Alstom Reference	Release/Date
ATC Validation Allocation Table	UEVOL-1169	AG, 28/03/14
CC Subsystem Requirements Specification	UEVOL-0098	BC, 10/01/13
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BG, 05/03/14
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	AH, 22/01/14
Urbalis Evolution - ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	AL, 27/02/14
CC Subsystem Requirements Test Description	UEVOL-0139	AD, 04/04/14
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	AJ, 24/03/14
ZC Subsystem Test Description	UEVOL-0969	AK, 21/1/14
CR follow up	UEVOL-1988	FQ
Safety V&V Plan	A401582	N, 12/02/2014
ATC SW U400 ZC Software, Formal Proof Document	A402844	AZ, 14/03/14
CC Vital Formal Proof Document	A402843-BI	26/02/14
U400 Software – Zone Controller (ZC), Formal Proof Verification Report	A402917-AV	19/03/14
U400 – CC – Vital, Formal Proof Verification Report	A402916-BE	28/02/14
U400 – Wayside Software, Architecture Description	A407321-AH	19/03/13
UEVOL Trackside ZC Source Code Verification Report	A402912-AG	18/03/14
U400 Software-ZC Application B Specification Verification Report	A402914	AT, 19/03/14
ZC Parameters Configuration Rules	UEVOL-0396	Z, 13/02/12
Urbalis Evolution – ZC Subsystem Configuration File Specification	UEVOL-0290	AS, 16/01/14
CC-Vital Setting Description	UEVOL-0643	AI, 10/01/13
ATC Configuration Rules Safety Study	UEVOL-1574	AC, 26/03/14
CC Vital Software, Architecture Description	A401466	AV, 23/01/12
Specific Safety Study on Trackside ATC Parameters	A402904	T, 20/03/14
ATC SW U400 ZC Software, Formal Proof Document	A402844	AI, 10/04/13
Specific Safety Study on UEVOL CC-V Parameters	A402903	X, 06/02/14
ATC 7.2.5.1 Sub-system Delivery Sheet	UEVOL-R-2788	27/03/14
UEVOL CC-Vital Software, Source Code Verification Report	A402606	BH, 26/02/14
U400 Software – CC – Vital, B Specification Verification Report	A402882	BE, 12/02/14
U400 Software – Zone Controller (ZC), Formal Proof Verification Report	A402917	AP, 15/04/13
UEVOL 2C-LC Coverage of 2003 Safety Exported Constraints	A402444	T, 20/3/14
Specific Safety Study – Automatic Protection	A402331	U, 14/2/14
ATC Software Safety Assurance Report	A402620	DX, 25/3/14
CCSyRS-SyAD-SwRS Verification Report	A444099	G, 3/3/14
ATC Safety Exported Constraints	UEVOL-1704	BH, 26/3/14
ATC Safety Exported Constraints	UEVOL-1704	BI, 10/4/14
ATC Hazard Log	UEVOL-1705	BH, 26/3/14
ATC Engineering Management Plan	UEVOL-0280	B, 23/1/12
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	AQ, 17/3/14



Title of Document	Alstom Reference	Release/Date
ATC Design Verification Plan	UEVOL-1170	T, 15/4/13
ATC Subsystem Verification & Validation Report ATC baseline 7.2.5.1	UEVOL-1171	BT, 22/3/14
ATC Generic Application Safety Case	UEVOL-0887	CG, CH, 11/4/14
ATC SW Urbalis Evolution, Coverage of 2003 Safety Exported Constraints	A402444	U, 3/4/14
888_1.9.1_NIAP_Suppressed_v4.xls	no reference	no date)
ATC Design Verification Plan	UEVOL-1170	W, 31/3/14
Safety Issue form: Ghost train due to NIAP suppression in AP fence approach	PST Ref: 6832	10/4/14
U400 ATC Sw – Technical Note: G2L6 – Locomotive NIAP Suppression	A461321	B, 28/2/14
CC ATP Software Requirements Test Report	A402285	BL, 28/02/2014
CC ATP Software Requirements Test Description	A401878	AX, 28/02/2014
ZC Sw Requirements TR	A402289	AX, 21/03/2014
Software Requirements Tests Description	A401881	AW, 21/03/2014
ZC Software Requirements Test Plan	A401691	AT, 22/01/2014
CC-V Software Test Description Verification Report	A402273	AL, 27/02/2014
CC ATP Software Integration Test Description	A402309	AN, 20/02/2014
CC ATP Software Integration Test Report	A402310	AN, 20/02/2014
Project Document Plan	A401405	CU, 26/03/2014
U400 – CC – Vital, Formal Proof Verification Report	A402916-BF	10/04/14
UEVOL CC-Vital Software, Source Code Verification Report	A402606-BK	11/4/14
FSFB2 2003 Generic Middleware – Bug on Implementation Leading to Degradation of Safety Response Time	SI_6858/A	8/4/11

ATC Baseline 10.2.7.1-1 Review (May 2014)

Table 51: Documents Reviewed for ATC Baseline 10.2.7.1-1

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	CV, 24/02/14
CC Software Release Note	A402045	DN, 21/02/14
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	BE, 20/03/14
UEVOL Wayside Software Release Note	A402079	BJ, 08/03/14
ZC Software Requirements Specifications	A401380	BU, 14/03/14
Software Safety, Validation and Verification Plan	A401582	L, 12/02/14
ZC: Software Hazard Analysis	A401824	AU, 27/03/14
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	AY, 28/03/14
ZC, Software Safety Requirements Report	A402317	AV, 04/04/14
ZC SyAD/SwRS Verification Report	A402938	AF, 25/03/14
ZC SysRS SyAD SwRS Verification Report	A436803	F, 03/04/014
ZC Software Requirements Test Description Verification Report	A402921	AN, 03/04/14
CC Subsystem Integration Test Description Verification Report	A402282	BM, 04/03/14



Title of Document	Alstom Reference	Release/Date
CC Software Safety Assurance Report	A402620	DY, 08/04/14
UEVOL ATC Software Release Note	A402307	FI, 08/04/14
ATC Subsystem Impact Analysis	UEVOL-2408	AG, 12/04/14
ATC delivery sheet	UEVOL-R-2806	II/04/14
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	BI, 17/03/14
ZC Sub-system Hazard Analysis	UEVOL-0543	AN, 26/03/14
ATC Hazard Log	UEVOL-1705	BI, 09/04/14
ATC – ZC Ssy Requirements Test Description Verif. Report	UEVOL-0827	AK, 04/04/14
ATC Subsystem Verification and Validation Report	UEVOL-1171	BU, 15/04/14
CR Safety Review	UEVOL-1988	FS
CR Safety Review	UEVOL-1988	FT, 11/4/14
ATC Generic Application Safety Case	UEVOL-0887	CI, 14/04/14
ATC Generic Application Safety Case	UEVOL-0887	CJ, 29/04/14
ZC Formal Proof Document	A402844	BA, 17/03/14
ZC and TDG Software Source Code Verification Report	A402912	AH, 25/03/14
B ZC Specification Verification Report	A402914	AU, 28/03/2014
ZC Formal Proof Verification Report	A402917	AW, 28/03/2014
ZC B Basic Machines Verification Report	A418801	N, 28/03/2014
CC Subsystem Integration Tests Description	A401880	BB, 28/02/2014
CC Subsystem Integration Tests Report	A402287	CS, 28/02/2014
Project Document Plan	A401405	CV, 15/04/2014
ZC Software Requirements Tests Description	A401881	AX, 04/04/2014
Software Requirements Tests Report	A402289	AY, 02/04/2014
Global V&V report	A402597	AR, 07/04/2014
Spot Checking report	A408174	AF, 07/04/2014
ATC Ssy Requirement Specification Verification Report	UEVOL-0818	AR, 03/04/2014
ATC - ZC Subsystem Tests Description	UEVOL-0969	AN, 03/04/2014
ATC - ZC Subsystem Tests Description	UEVOL-0969	AO, 29/04/2014
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	AW, 04/04/2014
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	AZ, 29/04/2014
ATC I0.2.7.1-I Subsystem Delivery Sheet	UEVOL-R-2820	29/4/14

ATC Baseline 9.3.6.2 Review (May 2014)

Table 52: Documents Reviewed for ATC Baseline 9.3.6.2

Title of Document	Alstom Reference	Release/Date
CC-ATP Sw Impact Analysis	A403516	CX, 18/04/2014
CC ATP Sw Requirements TD	A401878	AY, 23/04/2014
CC ATP Sw Requirements TR	A402285	BM, 23/04/2014



Title of Document	Alstom Reference	Release/Date
CC ATP Sw Requirements TDVR	A402284	AX, 25/04/2014
CC-VITAL Sw Integration TD	A402309	AO, 28/03/2014
CC-VITAL Sw Integration TR	A402310	AO, 23/04/2014
CC-VITAL Sw Integration TDVR	A402273	AM, 07/04/2014
ZC Sw Impact Analysis	A404257	BF, 10/04/2014
ZC Sw Requirements TD	A401881	AY, 23/04/2014
ZC Sw Requirements TR	A402289	AZ, 23/04/2014
ZC Sw Requirements TDVR	A402921	AO, 24/04/2014
Safety, Verification and Validation Plan	A401582	M, 12/02/2014
Spot Checking Report	A408174	AG, 30/04/2014
GLOBAL V&V REPORT	A402597	AS, 30/04/2014
Project Document Plan	A401405	CW, 02/05/2014
ZC and TDG Sw Integration TD	A402270	Y, 10/04/2014
ZC and TDG Sw Integration TR	A402272	Y, 10/04/2014
ZC and TDG Sw Integration TDVR	A402928	X, 15/04/2014
CC Ssy Integration TD	A401880	BD, 27/04/2014
CC Ssy Integration TR	A402287	CU, 25/04/2014
ZC Ssy Integration TD	A401883	AP, 04/04/2014
ZC Ssy Integration TDVR	A402930	AM, 28/04/2014
ATC Subsystem Requirements Specification Verification Report	UEVOL-0818	AS, 30/04/2014
ATC ZC SsyRTD	UEVOL-0969	AL, 25/04/2014
ATC ZC SsyRTR	UEVOL-1186	AY, 25/04/2014
Safety Hazard Log	UEVOL-1705	BK, 30/04/2014
ATC Exported Constraints	UEVOL-1704	BJ, 30/04/2014
CC ATP Sw Requirements TDVR	A402284	AZ, 13/05/2014
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801	O, 22/4/14
Urbalis Evolution – CC Vital, B-Basic Machines Verification Report	A418805	P, 24/4/14
ATC Configuration Rules Safety Study	UEVOL-1574	AD, 6/5/14
Wayside Software Release Note	A402079	BN, 24/04/14
CC Software Release Note	A402045	DO, 23/04/14
CC Software Impact Analysis	A403516	CX, 18/04/14
ZC Sw Module Test Description Verification Report	A402925	AA, 18/04/14
Software Module Test Report	A402291	AF, 14/04/14
CC ATP SwModule Test DescriptionVR	A402266	AT, 08/04/14
CC-V: ATP and VESG Software Module Test Report	A402314	BA, 07/04/14
ZC Application Software Requirements Specification	A401380	BX, 02/04/14
CC ATP Software Requirements Specification	A401464	CM, 17/04/14
CC Software Hazard Analysis	A401823	BB, 17/04/14
ZC Software Hazard Analysis	A401824	AV, 03/04/14



Title of Document	Alstom Reference	Release/Date
ZC - Software Safety Requirement Report	A402317	AW, 25/04/14
CC: Software Safety Requirements Report	A402319	BL/BM, 12/05/14
ZC Sy Architecture Description	A401536	AS, 27/03/14
Tk Software Requirements and Architecture Description Verification Report	A402938	AG, 03/04/14
CC Software Requirements and Architecture Description Verification Report	A401804	AO, 25/04/14
ZC SysRS SyAD SwRS Verification Report	A436803	G, 11/04/14
CC Critical Code Review Analysis Report	A402598	BZ, 17/04/14
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	AZ, 18/04/14
TDG Software Module Description Verification Report	A419763	L, 04/04/14
CC Software Safety Assurance Report	A402620	EA, 30/04/14
CC ATP Software Requirements Test Description Verification Report	A402284	AX, 25/04/14
ZC Software Requirements Test Description Verification Report	A402921	AO, 24/04/14
ZC Ssy Integration Test Description	A401883	AP, 04/04/14
Specific safety study on automatic protection	A402331	Y, 18/04/14
Sw Release Note ATC Software	A402307	FK, 30/04/14
CC Software: Architecture Description	A401446	BL, 05/03/14
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	K, 18/04/14
CC-ATP Formal Proof Document	A402843	BJ, 07/03/14; BL, 17/04/14
CC-ATP Formal Proof Verification Document	A402916	BG, 24/04/14
ZC Formal Proof Verification Report	A402917	AX, 22/04/14
UEVOL Trackside ZC Source Code Verification Report	A402912	AI, 15/04/14
CC ATP Source Code Verification Report	A402606	BI, 23/04/14
CC - ATP B Specification Verification Report	A402882	BF, 24/04/14 BG, 15/05/14
Urbalis Evolution – ZC B Specification Verification Report	A402914	AV, 22/04/14
CC-VESG: Critical Code Review Analysis Report	A406392	AG, 17/04/14
UEVOL ZC Formal Proof Document	A402844	BB, 03/04/14
Urbalis Evolution – Trackside Software Architecture Description	A407321	AN, 24/03/14
Specific Safety Study on Trackside ATC Parameters	A402904	U, 18/04/14
Specific Safety Study on On-board ATP Parameters	A402903	Y, 17/04/14
ATC 9.3.6.2 Subsystem impact analysis	UEVOL-2408	AH, 06/05/14
Delivery sheet for ATC 9.3.6.2	UEVOL-R-2829	06/05/14
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BJ, 04/04/14
Urbalis Evolution - ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	AM, 06/02/14
ATC Generic Application Safety Case	UEVOL-0887	CK, 02/05/14
CR Follow Up	UEVOL-1988	FV
ATC Subsystem Verification and Validation Report	UEVOL-1171	BW, 06/05/14
CC Subsystem Tests Report	UEVOL-0140	CS, 09/05/14



Title of Document	Alstom Reference	Release/Date
CC SyRTD Validation	UEVOL-0139	CR, 12/05/14
ATC – CC Ssy Requirements Test Description Verif. Report	UEVOL-0826	AI, 29/04/14
ATC - ZC Ssy: SyRTDVR	UEVOL-0827	AL, 28/04/14
ZC Sub-system Configuration Files Specification	UEVOL-0290	AW, 21/03/14
Specific Safety Study – Automatic Protection	A402331	Y, 18/4/14
CC Subsystem Integration Test Description Verification Report	A402282	BN, 25/4/13
CC SyRS-SyAD-SwRS Verification Report	A444099	I, 24/4/14

ATC Baseline 9.3.6.6 Review (October 2014)

Table 53: Documents Reviewed for ATC Baseline 9.3.6.6

Title of Document	Alstom Reference	Release/Date
ATC Sw Release Note 9.4.8	A402307	FX, 14/10/2014
CC Sw Release Note 9.4.10	A402045	DV, 10/10/2014
CC vital Sw Architecture Description	A401466	AZ, 01/10/2014
CC vital formal proof document	A402843	BQ, 30/09/2014
CC impact analysis	A403516	DO, 03/10/2014
CC vital formal proof verification report	A402916	BK, 08/10/14
Software Module Design	A406966	AA, 13/10/14
Software source code verification report	A402606	DN, 03/10/14
CC ATP and VEST Sw module description	A402313	AN, 06/10/14
CC vital Sw module description verification report	A402266	AW, 07/10/14
CC V ATP and VESG SW Module Test Report	A402314	BD, 06/10/14
CC-ATP Software Requirements Tests Description	A401878	BO, 06/10/14
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	BD, 07/10/14
CC Software Requirements Test Report	A402285	BR, 06/10/14
CC-VESG Critical Code Review Analysis Report	A406392	AL, 06/10/14
CC: Software Hazard Analysis	A401823	BF, 06/10/14
CC - Software Safety Requirement Report	A402319	BR, 09/10/14
CC Critical Code Review Analysis Report	A402598	CE, 06/10/14
CC - ATP B Specification Verification Report	A402882	BK, 08/10/14
CC Software Safety Assurance Report	A402620	EF, 14/10/14
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805	S, 08/10/14
CC-VITAL Sw Integration TD	A402309	AR, 03/10/14
CC-VITAL Sw Integration TDVR	A402273	AP, 07/10/14
CC-VITAL Sw Integration TR	A402310	AR, 03/10/14
Spot-Checking Report	A408174	AK, 14/10/14
GLOBAL V&V REPORT	A402597	AX, 13/10/14
Project Document Plan	A401405	DB, 13/10/14



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification and Validation Report, ATC Baseline 9.3.6.6	UEVOL-1171	CC, 13/10/14
Delivery sheet for ATC baseline 9.3.6.6	UEVOL-R-3053	15/10/14
CR Safety Review	UEVOL-1988	GG
ATC Generic Application Safety Case	UEVOL-0887	CP, 13/10/14
System Safety Delivery Sheet evolution 14	UEVOL-2511	ANplus32, 30/10/14
ATC CC Ssy RTR	UEVOL-0140	CW, 27/10/14
ATC Subsystem Impact Analysis	UEVOL-2408	AM, 15/10/14

ATC Baseline 10.5.4.3 Review (September 2014)

Table 54: Documents Reviewed for ATC Baseline 10.5.4.3

Title of Document	Alstom Reference	Release/Date
Project Document Plan	A401405	DA, 22/09/14
Software Quality Plan	A401468	H, 07/07/14
Global V&V Report	A402597	AW, 23/09/14
Spot-Checking Report	A408174	AJ, 23/09/14
CC Vital Software Module Design	A406966	X, 05/06/13
TDG Sw Module Description	A418523	U, 20/02/14
TDG Sw Module Description Verification Report	A419763	M, 23/05/14
ZC SyRS-SyAD-SwRS Verification Report	A436803	I, 03/09/14 H, 04/07/14
CC SyRS-SyAD-SwRS Verification Report	A444099	H, 17/04/14
CC ATP Sw Requirements TD	A401878	BB, 03/09/14
CC ATP Sw Requirements TDVR	A402284	BB, 05/09/14
CC CCRAR	A402598	CD, 02/09/14
Software Safety Assurance Report	A402620	EE, 12/09/14
VESG CCRAR	A406392	AK, 22/08/14
ZC Sw Requirements TP	A401691	AU, 31/03/14
LC Sw Requirements TP	A401692	Q, 18/09/14
LC Sw Requirements TR	A402293	O, 02/06/14
LC Ssy Integration TP	A401572	N, 18/09/13
LC Ssy Integration TD	A401884	R, 07/07/14
LC Ssy Integration TR	Error! Unknown document property name.	AA, 07/07/14
LC Ssy Integration TDVR	A402933	O, 08/07/14
LC Sw Integration TP	A402268	G, 26/07/13
LC Sw Integration TD	A402269	L, 14/05/14
LC Sw Integration TR	A402271	L, 14/05/14
LC Sw Integration TDVR	A402929	K, 15/05/14



Title of Document	Alstom Reference	Release/Date
ZC and TDG Sw Integration TD	A402270	Z, 09/07/14
ZC and TDG Sw Integration TR	A402272	Z, 09/07/14
ZC Sw Integration TP	A402910	O, 09/07/14
ZC and TDG Sw Integration TDVR	A402928	Y, 10/07/14
ZC Ssy Integration TP	A401571	S, 14/06/13
ZC Ssy Integration TD	A401883	AQ, 15/07/14
ZC Ssy Integration TR	A402288	BE, 15/07/14
ZC Ssy Integration TDVR	A402930	AN, 17/07/14
ZC Sw Requirements TD	A401881	BA, 10/09/14
ZC Sw Requirements TDVR	A402921	AQ, 08/09/14
ATC CC Ssy RTD	UEVOL-0139	AO, 13/03/14
ATC CC Ssy RTDVR	UEVOL-0826	AJ, 18/07/14
ATC LC Ssy RTP	UEVOL-0678	C, 25/06/13
ATC LC Ssy RTDVR	UEVOL-0828	R, 10/07/14
ATC LC Ssy RTD	UEVOL-0679	N, 07/02/14
ATC LC Ssy RTR	UEVOL-1011	O, 29/05/14
ATC ZC Ssy RTP	UEVOL-0968	E, 31/07/14
ATC ZC Ssy RTD	UEVOL-0969	AP, 05/09/14
ATC ZC Ssy RTDVR	UEVOL-0827	AO, 15/09/14
ATC Safety and V&V Plan	UEVOL-0353	F, 06/01/14
ATC Subsystems Integration Tests Reports	UEVOL-1046	AE, 10/06/14
ATC Exported Constraints	UEVOL-1704	BL, 15/09/14
Safety Hazard Log	UEVOL-1705	BO, 15/09/14
ATC Subsystem Impact Analysis	UEVOL-2408	AK, 15/09/14
ATC ZC Ssy RTR	UEVOL-1186	BB, 08/09/14
ATC CC Ssy RTR	UEVOL-0140	CV, 10/09/14
ATC Software Exported Constraints	UEVOL-2442	J, 08/07/14
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Q, 08/07/14
ATC Subsystem Requirements Specification Verification Report	UEVOL-0818	AT, 28/07/14
ATC Design Verification Plan	UEVOL-1171	CA, 11/09/14
ZC-R10 Interface Description	UEVOL-2382	C, 21/11/12
CC Sw Module Test Description Verification Report	A402266	AU, 24/04/14
CC – V: ATP and VESG Software Module Test Description	A402313	AL, 08/04/14
CC ATP Software Requirements Specifications	A401464	CK, 10/03/14
CC Software, Architecture Description	A401446	BK, 14/02/14
CC (Vital and non-vital) Software Requirements and Architecture Description Verification Report	A401804	AP, 31/03/14
CC ATP Software Architecture Descriptions	A401466	AX, 18/03/14
LC Software Requirement Specification	A401381	T, 18/03/14



Title of Document	Alstom Reference	Release/Date
LC SyAD	A401537	S, 18/03/14
LC-Software Hazard Analysis	A401825	P, 04/08/14
CC: Software Hazard Analysis	A401823	BC, 16/04/14
UEVOL ZC Formal Proof Document	A402844	BC, 09/07/14
LC - ASW Formal Proof Document	A402845	L, 03/03/14
Urbalis Evolution – CC – ATP Formal Proof Verification Report	A402916	BH, 30/04/14
UEVOL CC ATP, Source Code Verification Report	A402606	BJ, 04/04/14
CC Eurobalise Interface Description	UEVOL-0123	F, 11/01/13
ATC SyRSAD	UEVOL-3013	D, 14/01/14
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BA, 11/04/14
Urbalis Evolution – Trackside Software Architecture Description	A407321	AF, 18/03/14
Specific Safety Study on On-board Parameters	A402903	AB, 03/07/14
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BF, 19/03/13
ZC Subsystem Hazard Analysis	UEVOL0543	AK, 10/03/14
CC-ZC Interface Description	UEOVL-0185	S, 19/11/12
Urbalis Evolution, ZC-ZC Interface Description	UEVOL-0192	AH, 14/02/14
CC-LC Interface Description	UEVOL-0205	P, 08/13
ZC Sub-system Configuration Files Specification	UEVOL-0290	AX,
Urbalis Evolution CC – Vital Setting Description	UEVOL-0643	AI, 13/12/13
Urbalis Evolution - LC Sub-system, Requirements Specification	UEVOL-0264	R, 09/08/13
LC Sub-system Hazard Analysis	UEVOL-0430	P, 21/10/13
CC Subsystem, Subsystem Hazard Analysis	UEVOL-0542	AG, 14/02/14
ATC Configuration Rules Safety Study	UEVOL-1574	AB, 29/11/13
ATC System Hazard Analysis	UEVOL-0831	AA, 26/02/14
ATC Interface Hazard Analysis	UEVOL-0431	AH, 18/02/13
Critical Code Review Analysis Report, LC	A402322	R, 22/05/14
ZC Application Software Requirements Specification	A401380	BL, BZ, 16/05/14
ZC Sy Architecture Description	A401536	BR, 18/03/14
ZC Software Hazard Analysis	A401824	AW, 03/07/14
Specific Safety Study – Automatic Protection	A402331	Z, 23/06/14
LC SYRS-SYAD-SWRS Verification Report	A444100	B, 10/07/14
ZC SysRS SyAD SwRS Verification Report	A436803	
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AH, 10/07/14
Urbalis Evolution – ZC Formal Proof Verification Report	A402917	AY, 11/07/14
Urbalis Evolution – LC – ASW Formal Proof Verification Report	A402918	R, 08/07/14
ZC - Software Safety Requirement Report	A402317	AX, 18/07/14
CC - Software Safety Requirement Report	A402319	BP, 03/07/14
Specific Safety Study on Energy	A402326	I, 06/06/13
Critical Code Review Analysis Report, LC	A402322	R, 22/05/14



Title of Document	Alstom Reference	Release/Date
ATC 10.5.4.3. Sub system delivery sheet	UEVOL-R-3028	15/09/14
CC Subsystem Requirements Specification	UEVOL-0098	BG, 18/02/14
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BF, 18/02/14
ATC Validation Allocation Table	UEVOL-1169	AH, 18/07/14
ATC Subsystem Requirements Test Plan	UEVOL-0113	E, 10/06/14
ATC: System Requirement Test Description Verification Report	UEVOL-0824	WV, 09/07/14
ATC subsystems Requirements Test Description	UEVOL-0138	Q, 04/06/14
Urbalis Evolution-ATC, Subsystem Integration Test Plan	UEVOL-0102	C, 18/02/14
ATC Ssy Integration Test Description	UEVOL-0137	P, 04/06/14
ATC Subsystem: SylTDVR	UEVOL-0825	Y, 09/07/14
Wayside Software Release Note	A402079	BO, 21/07/14
Urbalis Evolution - ZC Software, Software Impact Analysis	A404257	BI, 13/08/14
CC-ATP Software Impact Analysis	A403516	DB, 20/08/14
LC Software Impact Analysis	A405062	O, 18/03/14
Wayside Software Release Note	A402079	BP, 10/09/14
UEVOL CC Software Release Note	A402045	DU, 10/09/14
UEVOL ATC Software Release Note	A402307	FV, 12/09/14
ZC Application Software Requirements Specification	A401380	CB, 19/08/14
LC ASw Sw Module Test Description	A402264	F, 19/05/14
ZC Software Module Test Report	A402291	AG, 02/07/14
LC ASw Sw Module Test Report	A402265	Q, 19/05/14
LC Software Module Test Description Verification Report	A402926	L, 22/05/14
Software Module Test Description Verification Report	A402925	AB, 11/01/14
CC-ATP Formal Proof Document	A402843	BO, 20/08/14
UEVOL ZC Formal Proof Document	A402844	BD, 19/08/14
UEVOL CC ATP, Source Code Verification Report	A402606	BM, 25/08/14
UEVOL Trackside ZC Source Code Verification Report	A402912	AJ, 08/07/14
UEVOL Trackside LC Source Code Verification Report	A402913	P, 13/05/14
Urbalis Evolution – CC – ATP Formal Proof Verification Report	A402916	BJ, 05/09/14
Urbalis Evolution – ZC Formal Proof Verification Report	A402917	AZ, 05/09/14
ZC Software Hazard Analysis	A401824	AX, 21/08/14
ZC - Software Safety Requirement Report	A402317	AT, 09/09/14
CC - Software Safety Requirement Report	A402319	BQ, 04/09/14
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BB, 01/09/14
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	L, 12/05/14
ZC Sw Requirement Test Description Verification Report	A402921	AQ, 08/09/14
LC ASW, Requirements Tests Description Verification Report	A402922	L, 10/06/14
LC Software Requirements Test Description	A401882	O, 02/06/14
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AI, 02/09/14



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification and Validation Report	UEVOL-1171	CA, 11/09/14
CR Safety Review	UEVOL-1988	GD
Urbalis Evolution – Zone Controller (ZC), B-Basic Machines Verification Report	A418801	Q, 05/09/14
LC B-Basic Machines Verification Report	A443871	B, 10/07/14
Urbalis Evolution – CC Vital, B-Basic Machine Verification Report	A418805	R, 05/09/14
ATC Generic Application Safety Case	UEVOL-0887	CO, 11/09/14
Urbalis Evolution-ATC, Subsystem Integration Test Plan	UEVOL-0102	D, 10/06/14
UEVOL ATC Tools Configuration Delivery Sheet	UEVOL-R-2889	22/6/14
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	AA, 25/6/14
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	AA, 25/6/14
ATC Data Activities Recorder, Project – ATC SW Version	UEVOL-1236	G, 10/11/10
DGC_GAD1_v10.8.8_v1.xls		
DGC_GAD2_v10.8.9_v1.xls		
ATC Data Activities Recorder, Project – ATC SW Version	UEVOL-1236	H, 29/6/11
ATC Subdivision Rule and Track Data Checking Checklist	UEVOL-0395	AF, 02/12/13
ZC Parameters Configuration Rules	UEVOL-0396	AJ, 04/03/14
Gen PZ, Requirements Test Report	UEVOL-2588	D, 14/10/13
ATC GSD Gen RTS Module Software Requirements Test Report v1	UEVOL-2589	L, 16/12/13
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	Q, 24/06/14
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	Q, 24/06/14
GAD Chain 1, RTR	UEVOL-1754	Q
Gen ATC Data – Test Lines Specification	UEVOL-0401	V, 20/06/14
Gen ATC Data – System Requirement Test Description	UEVOL-1671	V, 16/06/14
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	16/06/14
Gen ATC Data – System Requirements Test Report PART 2 (for GAD2)	UEVOL-1672	16/06/14
LC Parameters Configuration Rules	UEVOL-0397	Q, 11/06/13
LC Gen PAR RTR	UEVOL-3604	3A, 24/09/13
LC Gen PAR SwRTR	UEVOL-3605	3A, 10/04/13

ATC Baseline 11.3.0.7 Review (August 2015)

Table 55: Documents Reviewed for ATC Baseline 11.3.0.7

Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Tracksides ATC Parameters	A402904	vAA, 6 May 2015
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAK, 12/6/15
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vC, 23/6/15
ATC Remote IO Configuration & DP-DV Process	UEVOL-1534	vG, 4/2/15
Urbalis Evolution – ZC, B Verification Reports	E136716	vC, 23/6/15



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – LC	EI36717	vA, 7/5/15
ATC Configuration Rules Safety Study	UEVOL-1574	vAJ, 21/4/15
ATC Subdivision Rules Specific Study	UEVOL-1027	vAB, 22/4/15
ATC Data Activities Recorder, Project ATC – SW Version	UEVOL-1236	vl, 28/5/15
ATC Parameters Process Hazard Analysis	UEVOL-0544	vM, 5/5/15
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	VIR, 10/4/14
CC-CC Interface Description	UEVOL-3139	Release D, 08/12/2014
CC-Eurobalise Interface Description	UEVOL-0123	Release G, 12/11/2014
CC-ZC Interface Description	UEVOL-0185	Release Y, 04/01/2015
ZC-ZC Interface Description	UEVOL-0192	Release AK, 29/01/2015
CC-LC Interface Description	UEVOL-0205	Release P, 08/2013
ZC-RIO INTERFACE DESCRIPTION	UEVOL-2382	Release D, 25/02/2013
Safety, Verification and Validation Plan	UEVOL-0353	Release G, 21/01/2015
ATC Interface Hazard Analysis	UEVOL-0431	Release AK, 13/03/2015
ATC Sub system impact analysis	UEVOL-2408	Release AS, 02/06/2015
ATC Subsystems ITD	UEVOL-0137	Release 2Y, 01/04/2015
ATC Subsystems Integration Tests Reports	UEVOL-1046	Release AG, 19/12/2015
AA, ATC Subsystems Integration TDVR	UEVOL-0825	Release 06/01/2015
ATC ZC SsyRTP	UEVOL-0968	Release F, 16/10/2014
ATC Subsystem Impact Analysis	UEVOL-2408	Release AU, 06/07/2015
ATC ZC SsyRTD	UEVOL-0969	Release AU, 25/05/2015
ATC ZC SsyRTD	UEVOL-0969	Release AW, 17/06/2015
ATC ZC SsyRTR	UEVOL-1186	Release BJ, 27/05/2015
ATC ZC SsyRTR	UEVOL-1186	Release BL, 30/06/2015
ATC ZC SsyRTDVR	UEVOL-0827	Release AV, 22/05/2015
ATC CC SsyRTP	UEVOL-0103	Release C, 07/01/2015
ATC CC SsyRTD	UEVOL-0139	Release CT, 27/05/2015
ATC CC SsyRTD	UEVOL-0139	Release CV, 08/07/2015
ATC CC SsyRTR	UEVOL-0140	Release DE, 06/07/2015
ATC Subsystems Integration TD	UEVOL-0137	Release Y, 07/07/2015
ATC Subsystems ITR	UEVOL-1046	Release AH, 26/06/2015
ATC Subsystems ITDVR	UEVOL-0825	Release AB, 24/06/2015
ATC CC SsyRTDVR	UEVOL-0826	Release AS, 24/06/2015
Hazard Log	UEVOL-1705	Release BV, 01/07/2015
Exported constraints	UEVOL-1704	Release BT, 06/07/2015
ATC Interface Hazard Analysis	UEVOL-0431	Release AK+I, 01/07/2015
ATC sw Exported Constraints	UEVOL-2442	Release O, 27/03/2015
Exported Constraint Verification Report	UEVOL-2525	Release N, 02/06/2015
CC-V Sw ITD	A402309	Release AW, 27/05/2015



Title of Document	Alstom Reference	Release/Date
CC-V Sw ITDVR	A402373	Release AU, 28/05/2015
CC-V Sw ITP	A402308	Release Y, 27/05/2015
CC-V Sw ITR	A402310	Release AW, 27/05/2015
LC Sw ITD	A402269	Release N, 10/04/2015
LC Sw ITR	A402271	Release N, 10/04/2015
LC Sw ITDVR	A402929	Release M, 14/04/2015
CC ATP Sw Requirements TP	A401462	Release AL, 18/05/2015
CC ATP Sw Requirements TD	A401878	Release BI, 21/05/2015
CC ATP Sw Requirements TR	A402285	Release BV, 26/05/2015
URBALIS 400 TDG Sw MD	A418523	Release AB, 24/02/2015
TDG software MDVR	A419763	Release P, 22/05/2015
CC-ATP Formal Proof Document	A402843	Release BY, 23/04/2014
ZC Formal Proof Document	A402844	Release BK, 17/04/2015
LC Formal Proof Document	A402845	Release N, 24/02/2015
LC Sw Requirements TP	A401692	Release Q, 18/09/2013
LC Sw Requirements TD	A401882	Release Q, 22/04/2015
LC Sw Requirements TR	A402293	Release Q, 23/04/2015
VESG CCRAR	A406392	Release AR, 27/04/2015
CC CCRAR	A402598	Release CK, 26/05/2015
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	Release P, 13/05/2015
ATC Ssy-Sw Requirement Specification VR (ZC)	A436803	Release M, 04/05/2015
LC SYRS-SYAD-SWRS Verification Report	A444100	Release C, 12/04/2015
ZC Formal Proof Document	A402844	Release BL, 27/05/2015
CC-V Sw ITR	A402310	Release AY, 22/06/2015
ZC and TDG Sw Integration TD	A402270	Release AF, 10/06/2015
ZC and TDG Sw Integration TR	A402272	Release AF, 10/06/2015
ZC Sw Requirements TP	A401691	Release AZ, 28/02/2015
ZC Sw Requirements TD	A401881	Release BH, 25/06/2015
CC ATP Sw Requirements TD	A401878	Release BK, 25/06/2015
CC ATP Sw Requirements TR	A402285	Release BY, 25/06/2015
LC Sw Requirements TD	A401882	Release S, 29/06/2015
LC Sw Requirements TR	A402293	Release S, 27/06/2015
ZC Sw Requirements TR	A402289	Release BI, 25/06/2015
VESG CCRAR	A406392	Release AT, 27/04/2015
CC Critical Code Review Analysis Report	A402598	Release CM, 12/06/2015
CC-V Sw ITDVR	A402273	Release AW, 25/06/2015
ZC and TDG, ITDVR	A402928	Release AE, 15/06/2015
CC-V, RTDVR	A402284	Release BK, 25/06/2015
LC, RTDVR	A402922	Release P, 01/07/2015



Title of Document	Alstom Reference	Release/Date
ZC, TDVR	A402921	Release AW, 29/06/2015
Safety, Verification and Validation Plan	A401582	Release P, 29/05/2015
Safety, Verification and Validation Plan	A401582	Release Q, 03/06/2015
SPOT-CHECKING REPORT	A408174	Release AM, 13/07/2015
Global V&V Report	A402597	Release AZ, 10/07/2015
SOFTWARE QUALITY PLAN	A401469	Release I, 24/11/2014
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	Release R, 23/06/15
URBALIS 400 TDG Sw MD	A418523	Release AB, 24/02/2015
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release S, 07/07/2015
ATC Data Activities Recorder	UEVOL-1236	Release J, 03/07/2015
Project Name – Beacon Layout Verification and Validation Report	UEVOL-1086	Release D, 07/07/2015
Project Name – ZC Parameters Validation Report	UEVOL-1085	Release ICD, 06/07/2015
Project Name – LC Parameters Validation Report	UEVOL-1084	Release C, 06/07/2015
Template for Project Analysis of AC/Restriction/Note	UEVOL-3815	Release A, 08/07/2015
Template On-Board Data Verification and Validation Report	A481062	Release C, 06/07/2015
Template for Project Analysis of Manual Procedure	UEVOL-3813	Release A, 08/07/2015
Project Name –SGD Validation Report	UEVOL-1088	Release IC, 06/07/2015
ATC Data Preparation, Verification and Validation Process	UEVOL-0398	Release T, 05/08/2015
ATC Parameters Process Hazard Analysis	UEVOL-0544	Release M Plus I, 04/08/2015
ATC Sub-division Rules Specific Study	UEVOL-1027	Release AB, 22/04/2015
Project Name-LC Parameters Validation Report	UEVOL-1084	Release D, 05/07/2015
Project Name-ZC Parameters Validation Report	UEVOL-1085	Release D, 05/08/2015
Project Name – Beacon Layout Verification and Validation Report	UEVOL-1086	Release VE, 04/08/2015
ATC Data Activities Recorder	UEVOL-1236	Release VK, 04/08/2015
Template On-board Data Verification and Validation Report	UEVOL-3814	Release D, 05/08/2015
ATC Subdivision Rules Specific Study	UEVOL-1027	Release AB Plus I
Project Name – SGD Validation Report	UEVOL-1088	Release D, 05/08/2015
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	Release AB, 09/07/2015
B Verification Reports	E136716	Release D, 27/08/2015
Urbalis Evolution-ZC Sub-system, Sub-system Hazard Analysis	UEVOL-0543	Release AY, 05/08/2015
Urbalis Evolution-ZC, B Verification Reports	E136716	Release E, 13/08/2015
ATC Tools Configuration Delivery sheet	UEVOL-R-3241	V52, 30/04/14
ATC DATA generation procedure 1 st Chain	UEVOL-1666	Y, 10/01/14
ATC DATA Generation Procedure 2 nd Chain	UEVOL-1667	Y, 10/06/14
LC Parameter Configuration rules	UEVOL-0397	R, 04/02/15
ZC Parameter Configuration Rules	UEVOL-0396	AS, 04/03/14
ATC Subdivision Rules	UEVOL-0395	AM, 15/04/15
Gen ATC Data SyRSTP	UEVOL-1670	X, 29/04/15
Gen ATC Data Test Line specification	UEVOL-0401	X, 29/04/15



Title of Document	Alstom Reference	Release/Date
Gen ATC Data – System Requirement Test Description	UEVOL-1671	X, 30/04/15
Gen ATC Data – System Requirement Test Report, PART 2 (for GAD2)	UEVOL-1672	X, 30/04/15
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754	6V, 28/04/15
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	8R, 09/04/15
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	9R, 09/04/15
Gen PZ, Requirements Test Report	UEVOL-2588	D, 14/10/13
ATC GSD Gen RTS Module Software Requirements Test Report v1	UEVOL-2589	P, 18/05/15
DGC GAD 1		V11.3.7
DGC GAD 2		V11.3.8
LC Sub-system Requirements Specification and Architecture Description	UEVOL-2702	B, 13/11/14
ATC Validation Allocation Table	UEVOL-1169	AO1, 28/05/15
ATC Design Verification Plan	UEVOL-1170	AC, 01/06/15
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	Y, 09/01/15
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	D, 19/12/14
ATC Subsystem Requirement Validation Table	UEVOL-3757	B, 01/05/15
CC Software Requirements and Architecture Description Verification Report	A401804	AV, 05/05/15
CC Software Impact Analysis	A403516	DJ, 26/05/15
LC Software Impact Analysis	A405062	R, 17/04/15
LC ASw Sw Module Test Description	A402264	G, 03/04/15
LC Software Module Test Description Verification Report	A402926	N, 09/04/15
UEVOL Wayside Software Release Note	A402079	BV, 04/06/15
LC ASw Sw Module Test Report	A402265	S, 03/04/15
CC Software Release Note	A402045	EC, 02/06/15
CC ATP SwModule Test Description	A402313	AS, 27/05/15
CC – V: Software Module Test Description Verification Report	A402266	BB, 28/05/15
CC-V Module Test Report	A402314	BI, 27/05/15
CC ATP Software Architecture Descriptions	A401466	BF, 25/03/15
CC Vital Software – Software Module Design	A406966	AC, 05/02/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AS, 24/02/15
LC Application, Software Requirements Specification	A401381	T, 24/02/15
TRK Software Requirements and Architecture Description Verification Report	A402938	AL, 27/05/15
UEVOL CC – Vital Software Source Code Verification Report	A402606	BS, 27/05/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AN, 22/05/15
UEVOL Trackside LC Source Code Verification Report	A402913	R, 15/04/15
CC Software Requirements Report	A402319	BQ, 28/05/15
CC-V Software Hazard Analysis	A401823	BM, 28/05/15
LC Software Hazard Analysis	A401825	R, 27/04/15
Urbalis Evolution – ZC Software Hazard Analysis	A401824	BD, 28/04/15



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	P, 27/04/15
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BG, 12/05/15
ATC Validation Allocation Table	UEVOL-1169	AO2, 28/08/15
ATC Subsystem Requirement Validation Table	UEVOL-3757	C, 30/06/15
ATC Subsystem Configuration Delivery Sheet	UEVOL-R-3276	10/07/2015
ATC System Hazard Analysis	UEVOL-0831	AC, 20/04/15
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	AI, 26/06/15
ATC: System Requirement Test Description Verification Report	UEVOL-0824	AA, 24/06/15
ATC Generic Application Safety Case	UEVOL-0887	CX, 06/07/15
CC Sw Reqs. and Architecture Description Verif. Report	A401804	AX, 24/06/15
CC ATP SwModule Test Description	A402313	AU, 15/06/15
CC Software Impact Analysis	A403516	DL, 02/07/15
CC – V: Software Module Test Description Verification Report	A402266	BD, 17/06/15
CC-V Module Test Report	A402314	BK, 15/06/15
LC Software Impact Analysis	A405062	T, 30/06/15
ZC Software Impact Analysis	A404257	BP, 25/06/15
ZC Sw Module Test Description Verification Report	A402925	AH, 08/06/15
Software Module Test Report, ZC ASW	A402291	AM, 05/06/15
CC Sw Module Test Description Verification Report	A402266	BU, 17/06/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AP, 10/06/15
CC-V Software Hazard Analysis	A401823	BO, 01/07/15
LC Software Hazard Analysis	A401825	T, 27/04/15
CC Software Requirements Report	A402319	BZ, 01/07/15
Critical Code Review Analysis Report – LC	A402322	W, 15/07/15
CC Critical Code Review Analysis Report	A402598	CK, 12/06/15
Trackside Safety Requirement Report	A402317	BG, 03/07/15
ZC Software Hazard Analysis	A401824	BF, 11/07/15
ZC Critical Code Review Analysis Report	A402528	BI, 01/07/15
ATC Software Release Note	A402307	GN, 08/07/15
ZC Sw Requirement Specification	A401380	CN, 17/04/15
CC ATP Software Requirements Specifications	A401464	DA, 27/05/15
Specific Safety Study on On-board ATP Parameters	A402903	AK, 17/06/15
CC Software Interface Description	A455727	C, 24/04/15
ATC Subsystem Verification and Validation Report	UEVOL-1171	CK, 03/07/15
LC Sub-system Hazard Analysis	UEVOL-0430	T, 24/06/15
ATC Generic Application Safety Case	UEVOL-0887	CX, 08/07/15
CC Software Release Note	A402045	EE, 08/06/15
UEVOL Wayside Software Release Note	A402079	BVW, 08/06/15
ATC Software Urbalis Evolution – Project Document Plan	A401405	DI, 03/08/15



Title of Document	Alstom Reference	Release/Date
TRK Generic MW-2 – Software Impact Analysis – Generic Trackside Middleware 2.1.8	A411303	T, 22/12/14
SwRS Verification Report - TRK Generic MW-2	A409823	C, 29/07/11
Software Requirements Specification fsfb2 protocol	A410613	C, 07/02/14
SwRS - Generic Trackside Middleware	A408226	H, 18/11/10
Software Source Code Verification Report - TRK Generic MW-2	A408328	J, 13/03/14
Software Safety Requirement Report	A413406	H, 30/01/15
Generic Trackside Middleware 2 Software Hazard Analysis	A413405	E, 24/01/11
Middleware Critical Code Review Analysis Report	A413404	L, 30/01/15
ATC Subsystem Impact Analysis	UEVOL-2408	AW, 28/07/15
ATC ZC SsyRTP	UEVOL-0968	G, 09/07/15
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	BN, 31/07/15
ATC ZC SsyR Test Description	UEVOL-0969	AZ, 06/08/15
ZC Sub-system Requirements Specification and Architecture Description	UEVOL-2701	F, 08/07/15
ATC - ZC Ssy: SyRTDVR	UEVOL-0827	BA, 30/07/15
UEVOL ATC Safety Exported Constraints	UEVOL-1704	BV, 10/08/15
ATC Hazard Log	UEVOL-1705	BX, 07/08/15
ATC Subsystem Configuration Delivery Sheet	UEVOL-R-3300	06/08/15
ATC Subsystem Verification and Validation Report	UEVOL-1171	CM, 04/08/15
ATC: System Requirement Specification Verification Report	UEVOL-0818	BP, 28/07/15
UEVOL ZC Formal Proof Document	A402844	BN, 15/07/15
ZC Critical Code Review Analysis Report	A402528	BK, 03/08/15
ATC System, System Hazard Analysis	UEVOL-0831	AE, 10/08/15
ZC Sw Requirement Specification	A401380	CN, 17/07/15
ZC Software Hazard Analysis	A401824	BH, 05/08/15
Trackside Safety Requirement Report	A402317	BI, 03/08/15
Software Assurance Report	A402620	ER, 06/08/15
UEVOL Wayside Software Release Note	A402079	IBX, 17/07/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AV, 17/07/15
ATC Generic Application Safety Case	UEVOL-0887	DA, 10/08/15
Trackside Safety Requirement Report	A402317	Bk, 20/08/15
Software Assurance Report	A402620	ET, 20/08/15
Critical Code Review Analysis Report – LC	A402322	X, 20/08/15
ZC Critical Code Review Analysis Report	A402528	BM, 20/08/15
ATC Software Release Note	A402307	GS, 20/08/15
ATC Generic Application Safety Case	UEVOL-0887	DB, 19/08/15
TRK Generic MW-2 Software Module Test Description verification report	A408330	vA, 25/07/11
TRK Generic MW-2, Software Module Test Report	A408331	vE, 11/07/11



Title of Document	Alstom Reference	Release/Date
TRK Generic MW-2 Software Integration Test Description Verification Report	A408336	vD, 25/07/11
TRK Generic MW-2 Software Integration Test Description	A408335	vE, 12/07/11
TRK Generic MW-2 Software Integration Test Report	A408338	vE, 12/07/11
TRK Generic MW-2, Software Requirement Test Plan	A408351	vG, 17/11/10
Software Requirements Test Description	A408477	vJ, 04/07/11
Software Requirements Test Description Verification Report	A408353	vF, 25/07/11
Software Requirement Test Report	A408352	vR, 28/01/15
Safety Verification and Validation Plan	A408343	vD, 08/04/11
Project Document Plan	A408458	vL, 11/02/15
ZC & TDG Softwares Software Impact Analysis	A404257	vBR, 31/07/15
ZC SyRS SwRS Verification Report	A436803	vP, 31/07/15
ZC ASW Software Requirements Test Report	A402289	vBK, 03/08/15
Software Requirements Test Description	A401881	vBJ, 03/08/15
ZC Software Requirements Test Description Verification Report	A402921	vAY, 04/08/15
ATC SyRSAD	UEVOL-3013	G, 04/02/14
CC Subsystem Requirements Specification and Architecture Description	UEVOL-2700	E, 04/02/15
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	AZ, 21/04/15
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	AP, 23/06/15
Software Safety Assurance Report	A402620	EO, 08/07/15
Trackside Generic Middleware Software Safety Assurance Report	A413407	K, 30/01/15
Specific Safety Study on Energy	A402326	M, 15/04/15
Specific Safety Study on kinematic	A402218	F, 24/04/15
Specific Safety Study - Automatic Protection	A402331	AD, 26/06/15

ATC Baseline 9.3.6.7 Review (August 2015)

Table 56: Documents Reviewed for ATC Baseline 9.3.6.7

Title of Document	Alstom Reference	Release/Date
ATC Subsystem Impact Analysis	UEVOL-2408	Av, 20/07/15
ATC delivery sheet	UEVOL-R-3287	21/07/15
ATC Generic Application Safety Case	UEVOL-0887	CY, 23/07/15
CC-ATP Software Impact Analysis	A403516	DM, 30/06/15
ATC Software Release Note	A402307	GO, 20/07/15
CC Subsystem Integration Test Report	A402287	CW, 01/07/15
Software Safety Assurance Report	A402620	EP, 20/07/15
CR Analysis	UEVOL-1988	GZ
UEVOL CC Software Release Note	A402045	2EE, 30/06/15
UEVOL CC Software Release Note	A402045	EY, 20/07/15
ATC Software Release Note	A402307	GT, 20/08/15



ATC Baseline 10.5.5.3 Review (September 2015)

Table 57: Documents Reviewed for ATC Baseline 10.5.5.3

Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Energy Monitoring	A402326	N, 21/05/15
VESG Critical Code Review Analysis Report	A406392	AS, 21/05/15
Software Safety Assurance Report	A402620	EN, 25/06/15
CC Subsystem Requirements Specification	UEVOL-0098	BK, 02/04/15
CC Subsystem Hazard Analysis	UEVOL-0542	AO, 28/04/14
ATC Subsystem Verification and Validation Report	UEVOL-1171	CJ, 02/06/14
Exported Constraint Verification Report	UEVOL-2525	M, 05/06/15
ATC Software Exported Constraints	UEVOL-2442	P, 05/06/15
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	V, 05/06/15
Gen ATC Data – Test Lines Specification	UEVOL-0401	AA, 05/05/15
ATC Subdivision Rules	UEVOL-0395	AK, 01/10/14
ZC Parameters Configuration Rules	UEVOL-0396	AR, 21/04/15
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AA, 05/05/15
Urbalis Evolution CC – Vital Setting Description	UEVOL-0643	AV, 20/04/15
ATC Tools Configuration Delivery Sheet	UEVOL-R-3247	22/05/15
ATC GSD Gen RTS Module Software Requirements Test Report	UEVOL-2589	P, 18/05/15
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	4T, 22/05/15
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	5T, 20/05/15
DGC GAD 1		VI0.8.13
DGC GAD 2		VI0.8.18
Urbalis Evolution – GAD Chain 1 Requirements Test Report	UEVOL-1754	VV, 03/06/15
CC Subsystem Requirements Specification	UEVOL-0098	BN 02/04/15
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BP, 24/03/15
ATC SyRSAD	UEVOL-3013	J, 20/04/15
CC-ZC Interface Description	UEVOL-0185	Z, 24/03/15
ZC-ZC Interface Specification	UEVOL-0192	AJ, 29/10/14
Urbalis Evolution - LC Sub-system, Sub-system Hazard Analysis	UEVOL-0430	R, 17/04/15
LC Software Requirements Specification	A401381	V, 13/04/15
UEVOL CC ATP Software Requirements Specification	A401464	CY, 08/04/15
ZC Application Software Requirements Specification	A401380	CK, 13/04/15
CC Software Release Note	A402045	4EC, 12/05/15
UEVOL Wayside Software Release Note	A402079	4BU, 15/04/15
CC Sy Architecture Description	A401446	BP, 02/04/15
LC Sy Architecture Description	A401537	T, 13/04/15
ZC Sy Architecture Description	A401536	AV, 13/04/15



Title of Document	Alstom Reference	Release/Date
CC ATP Software Architecture Descriptions	A401466	BG, 08/04/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AT, 08/04/15
CC-ATP Software Module Description	A406966	AD, 01/04/15
U400 TDG Software Module Description	A418523	AC, 13/04/15
Urbalis Evolution – CC – ATP Formal Proof Document	A402843	BX, 08/04/14
UEVOL ZC, Formal Proof Documents	A402844	BJ, 14/04/15
LC - ASW Formal Proof Document	A402845	O, 13/04/15
UEVOL Wayside Software Release Note	A402079	BV, 04/06/15
LC Software Requirements Specification	A401381	U, 24/02/15
LC Sub-system Requirements Specification and Architecture Description	UEVOL-2702	D, 30/04/15
LC Software Impact Analysis	A405062	S, 17/04/15
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	BO, 20/04/15
CC – ATP Software Impact Analysis	A403516	DK, 15/05/15
LC ASw Sw Module Test Description	A402264	H, 04/06/15
LC Software Module Test Report	A402265	T, 02/06/15
Software Module Test Description Verification Report	A402925	AG, 02/06/15
Software Module Test Report, ZC ASW	A402291	AL, 02/06/15
ATC SW Urbalis Evolution – CC ATP Software Module Test Description Verification Report	A402266	BC, 22/06/15
CC V ATP and VESG SW Module Test Report	A402314	BJ, 02/06/15
Critical Code Review Analysis Report, LC	A402322	V, 04/06/15
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BH, 20/05/15
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	Q, 04/06/15
ZC - Software Safety Requirement Report	A402317	BE, 05/06/15
CC Software Requirements Report	A402319	BY, 03/06/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AO, 02/06/15
UEVOL Trackside LC Source Code Verification Report	A402913	S, 03/06/15
UEVOL CC ATP Source Code Verification Report	A402606	BT, 02/06/15
ZC SyAD/SwRS Verification Report	A402938	AM, 20/05/15
ATC Sw Requirement Specification Verification Report	A401804	AVV, 20/05/15
UEVOL ATC Software Release Note	A402307	GL, 05/06/15
Specific Safety Study on On-board ATP Parameters	A402903	AJ, 29/05/15
LC SYRS-SYAD-SWRS Verification Report	A444100	C, 12/05/15
LC-Software Hazard Analysis	A401825	S, 04/06/15
ZC Software Hazard Analysis	A401824	BE, 02/06/15
CC Software Hazard Analysis	A401823	BN, 21/05/15
ATC delivery sheet for 10.5.5.2	UEVOL-R-3060	08/06/15
ATC Subsystem Requirements Specification Verification Report	UEVOL-0818	BA, 24/04/15
Urbalis Evolution - LC Sub-system, Sub-system Hazard Analysis	UEVOL-0430	S, 25/05/15
LC Subsystem, Subsystem Hazard Analysis	UEVOL-0431	AL, 28/04/15



Title of Document	Alstom Reference	Release/Date
ATC Safety Hazard Analysis	UEVOL-0831	AD, 28/04/15
ATC Validation Allocation Table	UEVOL-1169	AP, 04/05/15
CR Safety Review	UEVOL-1988	GU
ATC Generic Application Safety Case	UEVOL-0887	CWV, 04/06/15
Subsystem Impact Analysis	UEVOL-2408	AY, 03/08/15
Urbalis Evolution - ZC Sub-system, Requirements Specification	UEVOL-0114	BS, 10/07/15
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	AZ, 29/07/15
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	BA, 17/07/15
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	BO, 10/08/15
ATC Subsystem Verification and Validation Report	UEVOL-1171	CJ, 19/08/15
UEVOL ATC Safety Exported Constraints	UEVOL-1704	BW, 12/08/15
ATC Hazard Log	UEVOL-1705	BU, 12/08/15
ZC Sub-system Hazard Analysis	UEVOL-0543	AZ, 12/08/15
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BC, 27/07/15
ATC Delivery Sheet for 10.5.5.3	UEVOL-R-3320	24/08/15
ZC Application Software Requirements Specification	A401380	CO, 17/07/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AW, 17/07/15
UEVOL ZC, Formal Proof Documents	A402844	BO, 22/07/15
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	BS, 27/07/15
Software Module Test Description Verification Report	A402925	AJ, 06/08/15
Software Module Test Report, ZC ASW	A402291	AO, 04/08/15
ZC Software Requirements Test Description	A401881	BK, 12/08/15
ZC Software Requirements Test Description Verification Report	A402921	AZ, 19/08/15
ZC ASw Sw Requirement Test Report	A402289	BL, 13/08/15
CC Software Release Note	A402045	ED, 04/06/15
UEVOL Wayside Software Release Note	A402079	BZ, 18/08/15
UEVOL ATC Software Release Note	A402307	GU, 18/08/15
ZC Software Hazard Analysis	A401824	BI, 07/08/15
ZC - Software Safety Requirement Report	A402317	BJ, 20/08/15
ATC Software Global V&V Report	A402597	BC, 25/08/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AR, 29/07/15
ZC SysRS SyAD SwRS Verification Report	A436803	Q, 10/08/15
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BL, 10/08/15
CC Software Safety Assurance Report	A402620	ES, 20/08/15
ATC Generic Application Safety Case	UEVOL-0887	DD, 25/08/15
Spot Checking Report	A408174	AP, 07/09/15
Urbalis Evolution – LC Critical Code Review Analysis Report	A402322	Y, 20/08/15
ATC Subsystem Impact Analysis	UEVOL-2408	Release AT, 04/06/2015
ATC CC SyRTD	UEVOL-0139	Release CU, 28/05/2015



Title of Document	Alstom Reference	Release/Date
ATC CC SsyRTR	UEVOL-0140	Release DD, 29/05/2015
ATC CC SsyRTDVR	UEVOL-0826	Release AR, 01/06/2015
ATC CC SsyRTP	UEVOL-0103	Release C, 07/01/2015
ATC ZC SsyRTD	UEVOL-0969	Release AV, 10/04/2015
ATC ZC SsyRTR	UEVOL-1186	Release BK, 29/05/2015
ATC ZC SsyRTDVR	UEVOL-0827	Release AW, 02/06/2015
ATC LC SsyRTR	UEVOL-1011	Release S, 29/05/2015
Safety Hazard Log	UEVOL-1705	Release BU, 18/05/2015
Exported Constraints	UEVOL-1704	Release BS, 05/06/2015
LC Sw Integration TP	A402268	Release G, 26/07/2013
LC Sw Integration TR	A402271	Release O, 24/04/2015
LC Sw Integration TDVR	A402929	Release N, 13/05/2015
LC Sw Integration TD	A402269	Release O, 24/04/2015
ZC Sw Integration TP	A402910	Release Q, 16/02/2015
ZC and TDG Sw Integration TR	A402272	Release AE, 07/05/2015
ZC and TDG Sw Integration TDVR	A402928	Release AD, 14/05/2015
ZC and TDG Sw Integration TD	A402270	Release AE, 07/05/2015
CC-VITAL Sw Integration TP	A402308	Release Z, 29/04/2015
CC-VITAL Sw Integration TR	A402310	Release AX, 29/04/2015
CC-VITAL Sw Integration TDVR	A402273	Release AV, 15/05/2015
CC-VITAL Sw Integration TD	A402309	Release AX, 29/04/2015
ZC Ssy Integration TD	A401883	Release AR, 24/11/2014
ZC Ssy Integration TDVR	A402930	Release AO, 01/12/2014
ZC Ssy Integration TR	A402288	Release BF, 26/11/2014
LC Sw Requirements TR	A402293	Release R, 30/04/2015
LC Sw Requirements TD	A401882	Release R, 30/04/2015
LC Sw Requirements TDVR	A402922	Release O, 02/06/2015
CC ATP Sw Requirements TD	A401878	Release BJ, 20/05/2015
CC ATP Sw Requirements TR	A402285	Release BX, 21/05/2015
CC ATP Sw Requirements TDVR	A402284	Release BJ, 28/05/2015
ZC Sw Requirements TD	A401881	Release BG, 22/05/2015
ZC Sw Requirements TR	A402289	Release BH, 22/05/2015
ZC Sw Requirements TDVR	A402921	Release AV, 03/06/2015
CC CCRAR	A402598	Release CL, 21/05/2015
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	Release Q, 01/06/2015
ATC Ssy-Sw Requirement Specification VR (ZC)	A436803	Release N, 20/05/2015
TDG software Module Description Verification	A419763	Release Q, 16/02/2015
Project Document Plan	A401405	Release DH, 08/06/2015
Safety, Verification and Validation Plan	A401582	Release Q, 03/06/2015



Title of Document	Alstom Reference	Release/Date
Software Safety Assurance Report	A402620	Release EV, 23/09/2015
ATC Subdivision Rules Specific Study	UEVOL-1027	vZ, 1/12/14
ATC Configuration Rules Safety Study	UEVOL-1573	vAH_Plus_I, 15/4/15
Specific Safety Study on Trackside ATC Parameters	A402904	vAB, 2/6/15
Urbalis Evolution – LC, B Verification Reports	E136717	vB, 28/5/15
Urbalis Evolution – ZC, B Verification Reports	E136716	vB, 28/5/15
Urbalis Evolution – ZC, B Verification Reports	E136716	vH, 29/9/15
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vB, 28/5/15
Urbalis Evolution – ZC Sub-system	UEVOL-0543	vAV, 28/4/15
ATC Subdivision Rules Specific Study	UEVOL-1027	vZ_PlusI, 1/12/14
Urbalis Evolution – ZC, B Verification Reports	E136716	vE, 11/8/15
Urbalis Evolution – LC	E136717	vC, 3/7/15

ATC Baseline 11.3.0.8 Review (October 2015)

Table 58: Documents Reviewed for ATC Baseline 11.3.0.8

Title of Document	Alstom Reference	Release/Date
ATC delivery sheet for 11.3.0.8	UEVOL-R-3349	07/10/2015
ATC Subsystem Requirement Validation Table	UEVOL-3757	D, 02/10/15
ZC Software Requirements Specifications	A401380	CT, 23/09/15
CC Software Release Note	A402045	EH, 02/10/15
Sw Release Note Trackside	A402079	CB, 02/10/15
	A465332	V, 09/06/15
	A465333	V, 30/04/15
Software Module Test Description Verification Report	A402925	AL, 30/09/15
Software Module Test Report	A402291	AQ, 29/09/15
Urbalis Evolution – CC-ATP Software, Software Impact Analysis	A403516	DO, 23/09/15
ZC Software Impact Analysis	A404257	BU, 02/10/15
Urbalis Evolution – ZC, B Verification Reports	E136716	vl, 1/10/15
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAL, 17/9/15
ZC SysRS SyAD SwRS Verification Report	A436803	S, 24/09/15
ZC Sw Integration Test Description Verification Report	A402928	AH, 30/09/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AZ, 22/09/15
CC Critical Code Review Analysis Report	A402598	CO, 02/10/15
ZC Software Integration Tests Description	A402270	AI, 28/09/15
ZC Software Integration Tests Report	A402272	AI, 28/09/15
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AO, 01/10/15
CC - ATP Formal Proof Document	A402843	CA, 01/10/15
ATC SW U400 ZC Software, Formal Proof Document	A402844	BS, 23/09/15

Title of Document	Alstom Reference	Release/Date
UEVOL CC ATP, Source Code Verification Report	A402606	Bw, 30/09/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AT, 30/09/15
CC Software Hazard Analysis	A401823	BP, 30/09/15
ZC S/w Hazard Analysis	A401824	BK, 29/09/15
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BO, 02/10/15
ZC - Software Safety Requirement Report	A402317	BM, 06/10/15
CC - Software Safety Requirement Report	A402319	CB, 02/10/15
ZC Software Requirements Tests Plan	A401691	BB, 22/10/15
CC-ATP Software Requirements Tests Description	A401878	BM, 30/09/15
CC ATP Software Requirements Test Description Verification Report	A402284	BL, 01/10/15
CC Software Requirements Test Report	A402285	BZ, 30/09/15
UEVOL ATC Software Release Note	A402307	GW, 07/10/15
ZC ASW, Software Requirements Tests Report	A402289	BN, 05/10/15
ZC Requirements Test Description Verification Report	A402921	BB, 08/10/15
Subsystem Impact Analysis	UEVOL-2408	BA, 30/09/15
CC Subsystem Requirements Test Description	UEVOL-0139	DB, 09/10/15
System Parameters Configuration Rules	UEVOL-0286	AU, 30/09/15
CC Subsystem Tests Report	UEVOL-0140	DG, 30/09/15
ATC ZC SsyRTP	UEVOL-0968	H, 29/09/15
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	BE, 30/09/15
ATC Ssys Requirements Tests Report (ZC)	UEVOL-1186	BQ, 05/10/15
Sub-system V&V Report for CBTC Revenue Service	UEVOL-1171	CP, 06/10/15
Urbalis Evolution - ATC System: System Hazard Analysis	UEVOL-0831	AE Plus 1, 07/10/15
ATC Generic Application Safety Case	UEVOL-0887	DF, 07/10/15
ATC-ZC Subsystem Reqs Test Description Verification Report	UEVOL-0827	BC, 29/09/15

ATC Baseline 10.5.5.4 Review (October – November 2015)

Table 59: Documents Reviewed for ATC Baseline 10.5.5.4

Title of Document	Alstom Reference	Release/Date
CC Subsystem Requirements Specification	UEVOL-0098	BO, 09/09/15
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	BT, 10/09/15
ATC SyRSAD	UEVOL-3013	J, 20/10/15
Urbalis Evolution, ATC Interface Hazard Analysis	UEVOL-0431	AO, 21/10/15
ZC-ZC Interface Description	UEVOL-0192	AL, 13/08/15
ATC System Hazard Analysis	UEVOL-0831	AG, 21/10/15
CC Subsystem Hazard Analysis	UEVOL-0542	AS, 21/10/15
ZC Sub-system Hazard Analysis	UEVOL-0543	BC, 21/10/15
CC Software Release Note	A402045	IET, 08/10/15



Title of Document	Alstom Reference	Release/Date
UEVOL Wayside Software Release Note	A402079	ICC, 09/10/15
ZC Sw Requirement Specification	A401380	CS, 23/09/15
LC Application, Software Requirements Specification	A401381	Y, 07/10/15
CC Vital Software Requirements Specification	A401464	DB, 09/09/15
CC Software Architecture Description	A401446	BQ, 28/08/15
ZC Architecture Description	A401536	AW, 11/09/15
CC ATP Software Architecture Descriptions, (CCSwAD)	A401466	BH, 28/08/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AY, 11/09/15
Urbalis Evolution – CC – ATP Formal Proof Document	A402843	BZ, 14/09/15
UEVOL ZC Formal Proof Document	A402844	BU, 29/10/15
LC - ASW Formal Proof Document	A402845	R, 08/10/15
LC - ASW Formal Proof Document	A402845	Q, 22/09/15
UEVOL ZC Formal Proof Document	A402844	BR, 22/09/15
ATC Tool Configuration Delivery Sheet	UEVOL-R-3361	26/10/15
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	AE, 26/10/15
ATC Data Generation Procedure 2 nd Chain	UEVOL-1667	AD, 26/10/15
LC Application, Software Requirements Specification	A401381	Y, 07/10/15
ZC Sw Requirement Specification	A401380	CV, 07/10/15
CC Software Release Note	A402045	EI, 28/10/15
UEVOL Wayside Software Release Note	A402079	CC, 28/10/15
UEVOL ATC Software Release Note	A402307	GX, 29/10/15
TRK Software Requirements and Architecture Description Verification Report	A402938	AP, 16/10/15
CC Software Requirements and Architecture Description Verification Report	A401804	AY, 09/10/15
Urbalis Evolution - CC-ATP Software, Software Impact Analysis	A403516	DP, 16/09/15
LC Software Impact Analysis	A405062	U, 23/09/15
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	BV, 23/09/15
UEVOL CC-Vital Software, Source Code Verification Report	A402606	BX, 13/10/15
UEVOL Trackside LC Source Code Verification Report	A402913	T, 15/10/15
UEVOL Trackside ZC, Source Code Verification Report	A402912	AU, 15/10/15
CC Software Hazard Analysis	A401823	BQ, 21/10/15
LC Software Hazard Analysis	A401825	U, 14/10/15
Urbalis Evolution – ZC Software Hazard Analysis	A401824	BL, 13/10/15
Trackside Software Safety Requirement Report	A402317	BN, 23/10/15
CC Software Safety Requirements Report	A402319	CC, 20/10/15
CC Critical Code Review Analysis Report	A402598	CP, 19/10/15
Critical Code Review Analysis Report – LC	A402322	AA, 19/10/15
CC VESG Critical Code Review Analysis Report	A406392	AU, 19/10/15



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – Zone Controller Critical Code Review Analysis Report	A402528	BP, 23/10/15
LC ASw Sw Module Test Description	A402264	I, 20/10/15
LC Software Module Test Description Verification Report	A402926	P, 22/10/15
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402313	AW, 19/10/15
CC Sw Module Test Description Verification Report	A402266	BF, 20/10/15
CC sw Module Test Report	A402314	BM, 19/10/15
ZC Sw Module Test Development Report	A402925	AM, 21/10/15
ZC Sw Module Testy Report	A402291	AR, 20/10/15
ZC Software Requirements Test Plan	A401691	BC, 23/09/15
CC Software Integration Test Description	A402309	AZ, 09/10/15
CC-ATP Software Integration Test Description Verification Report	A402273	AY, 14/10/15
CC-V Software Integration Test Report	A402310	BA, 09/10/15
LC Sw ITD	A402269	P, 12/10/15
LC Sw Integration TDVR	A402929	O, 14/10/15
LC Sw Integration TD	A402271	P, 12/10/15
ZC Sw Integration Test Description	A402270	AJ, 12/10/15
ZC SwITDVR	A402928	AI, 15/10/15
ZC Sw Integration Test Report	A402272	AJ, 12/10/15
LC, RTDVR	A402922	Q, 19/10/15
LC Sw Requirements TD	A401882	T, 16/10/15
LC Sw Requirements TR	A402293	T, 16/10/15
CC ATP Software Requirements Test Description Verification Report	A402284	BM, 20/10/15
CC Software Requirements Test Report	A402285	CA, 16/10/15
ZC Software Requirement Test Description Verification Report	A402921	BC, 21/10/15
ZC Software Requirements Test Report	A402289	BO, 16/10/15
ZC Software Requirements Test Description	A401881	BN, 16/10/15
CC Software Requirements Test Description	A401878	BW, 16/10/15
LC SYRS-SYAD-SWRS Verification Report	A444100	D, 12/10/15
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	S, 23/09/15
ATC SW Spot Checking Report	A408174	AT, 29/10/15
ZC SysRS SyAD SwRS Verification Report	A436803	T, 15/10/15
ATC I0.5.5.4 Subsystem Delivery Sheet	UEVOL-R-3363	30/10/15
UEVOL ATC Safety Exported Constraints	UEVOL-1704	Release B2, 29/10/15
ATC Software Safety Assurance Report	A402620	Version EX, 29/10/15
ATC Hazard Log	UEVOL-1705	Release CC, 29/10/15
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	Release BH, 22/10/15
ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	Release O, 19/10/15
Architecture & Design ATC Subsystem to System Exported Constraints	UEVOL-1638	Release X, 15/10/15
ATC Software Exported Constraints	UEVOL-2442	Release Q, 23/9/15



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification & Validation Report ATC baseline 10.5.5.3		Release CQ, 21/10/15
Generic Application Safety Case ATC 10.5.5.4	UEVOL-0887	Release DG, 29/10/15
ATC Validation Allocation Table	UEVOL-1169	Release AS, 16/10/15
ATC Subsystem Impact Analysis	UEVOL-2408	Version BC, 21/10/15
Subsystem Validation Report	UEVOL-1275	Release AK, 27/10/15
Subsystem Requirements Test Description	UEVOL-0138	Release AB, 29/9/15
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	Release AC, 12/10/15
ATC Subsystem Integration Report	UEVOL-1046	Release AJ, 20/10/15
ATC Subsystem Integration Test Description	UEVOL-0137	Release AB, 23/9/15
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	Release AD, 8/10/15
Subsystem Requirements Test Plan	UEVOL-0103	Release E, 20/10/15
Carborne Controller Subsystem Tests Report	UEVOL-0140	Release DH, 20/10/15
Zone Controller Subsystem Tests Report	UEVOL-1186	Release BR, 26/10/15
ATC-2C Subsystem Requirements Test Description Verification Report	UEVOL-0827	Release BD, 19/10/15
Zone Controller Subsystem Tests Description	UEVOL-0969	Release BA, 17/10/15

ATC Baseline 11.3.0.8 Review (October – November 2015)

Table 60: Documents Reviewed for ATC Baseline 11.3.0.8

Title of Document	Alstom Reference	Release/Date
ATC delivery sheet for 11.3.0.8	UEVOL-R-3349	07/10/2015
ATC Subsystem Requirement Validation Table	UEVOL-3757	D, 02/10/15
ZC Software Requirements Specifications	A401380	CT, 23/09/15
CC Software Release Note	A402045	EH, 02/10/15
Sw Release Note Trackside	A402079	CB, 02/10/15
	A465332	V, 09/06/15
	A465333	V, 30/04/15
Software Module Test Description Verification Report	A402925	AL, 30/09/15
Software Module Test Report	A402291	AQ, 29/09/15
Urbalis Evolution – CC-ATP Software, Software Impact Analysis	A403516	DO, 23/09/15
ZC Software Impact Analysis	A404257	BU, 02/10/15
Urbalis Evolution – ZC, B Verification Reports	E136716	vl, 1/10/15
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAL, 17/9/15
ZC SysRS SyAD SwRS Verification Report	A436803	S, 24/09/15
ZC Sw Integration Test Description Verification Report	A402928	AH, 30/09/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AZ, 22/09/15
CC Critical Code Review Analysis Report	A402598	CO, 02/10/15
ZC Software Integration Tests Description	A402270	AI, 28/09/15
ZC Software Integration Tests Report	A402272	AI, 28/09/15



Title of Document	Alstom Reference	Release/Date
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AO, 01/10/15
CC - ATP Formal Proof Document	A402843	CA, 01/10/15
ATC SW U400 ZC Software, Formal Proof Document	A402844	BS, 23/09/15
UEVOL CC ATP, Source Code Verification Report	A402606	Bw, 30/09/15
UEVOL Trackside ZC Source Code Verification Report	A402912	AT, 30/09/15
CC Software Hazard Analysis	A401823	BP, 30/09/15
ZC S/w Hazard Analysis	A401824	BK, 29/09/15
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BO, 02/10/15
ZC - Software Safety Requirement Report	A402317	BM, 06/10/15
CC - Software Safety Requirement Report	A402319	CB, 02/10/15
ZC Software Requirements Tests Plan	A401691	BB, 22/10/15
CC-ATP Software Requirements Tests Description	A401878	BM, 30/09/15
CC ATP Software Requirements Test Description Verification Report	A402284	BL, 01/10/15
CC Software Requirements Test Report	A402285	BZ, 30/09/15
UEVOL ATC Software Release Note	A402307	GW, 07/10/15
ZC ASW, Software Requirements Tests Report	A402289	BN, 05/10/15
ZC Requirements Test Description Verification Report	A402921	BB, 08/10/15
Subsystem Impact Analysis	UEVOL-2408	BA, 30/09/15
CC Subsystem Requirements Test Description	UEVOL-0139	DB, 09/10/15
System Parameters Configuration Rules	UEVOL-0286	AU, 30/09/15
CC Subsystem Tests Report	UEVOL-0140	DG, 30/09/15
ATC ZC SsyRTP	UEVOL-0968	H, 29/09/15
ATC ZC Subsystem Requirements Test Description	UEVOL-0969	BE, 30/09/15
ATC Ssys Requirements Tests Report (ZC)	UEVOL-1186	BQ, 05/10/15
Sub-system V&V Report for CBTC Revenue Service	UEVOL-1171	CP, 06/10/15
Urbalis Evolution - ATC System: System Hazard Analysis	UEVOL-0831	AE Plus I, 07/10/15
ATC Generic Application Safety Case	UEVOL-0887	DF, 07/10/15
ATC-ZC Subsystem Reqs Test Description Verification Report	UEVOL-0827	BC, 29/09/15
ATC Software Safety Assurance Report	A402620	EW, 6/10/15
ATC Hazard Log	UEVOL-1705	CB, 5/10/15

ATC Baseline 9.4.2.1 Review (November - December 2015)

Table 61: Documents Reviewed for ATC Baseline 9.4.2.1

Title of Document	Alstom Reference	Release/Date
ATC Delivery Sheet	UEVOL-R-3298	31/01/15
ATC Delivery Sheet	UEVOL-R-3391	22/12/15
ATC Validation Allocation Table	UEVOL-1169	AQ, 10/07/15
ATC Tool Delivery Sheet	UEVOL-R-3177	10/02/15



Title of Document	Alstom Reference	Release/Date
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	U, 28/02/14
ZC Parameters Configuration Rules	UEVOL-0396	AP, 07/10/14
ATC Subdivision Rules	UEVOL-0395	AL, 19/01/15
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	Y, 11/02/15
Gen ATC Data - System Requirement Test Description	UEVOL-1671	Y, 11/02/15
Gen ATC Data – Test Lines Specification	UEVOL-0401	Y, 05/12/14
Gen ATC Data-System Requirement Test Report PART (for GAD2)	UEVOL-1672	Y, 11/02/15
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754	T, 05/02/15
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	S, 20/03/15
ATC GSD Gen RTS Module Software Requirements Test Report	UEVOL-2589	O, 30/03/15
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	S, 20/03/15
Gen PZ, Requirements Test Report	UEVOL-2588	E, 20/03/15
CC Subsystem Requirements Specification	UEVOL-0098	BM, 15/01/15
ZC Subsystem Requirement Specification	UEVOL-0114	BQ, 12/06/15
ZC-ZC Interface Description	UEVOL-0192	AZ, 12/06/15
ATC Interface Hazard Analysis	UEVOL-0431	AN, 04/08/15
Sub-system hazard analysis	UEVOL-0543	AW, 19/06/14
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	AL, 24/02/14
ATC Subsystem Requirements Specification Verification Report	UEVOL-0818	BB, 25/06/15
ATC Subsystem Impact Analysis	UEVOL-2408	AQ, 18/03/15
ATC subsystems Requirements Test Description	UEVOL-0138	Z, 31/07/15
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	AB, 09/07/15
Subsystem Validation Report	UEVOL-1275	AJ, 29/07/15
UEVOL ATC Safety Exported Constraints	UEVOL-1704	BU, 03/08/15
ATC Hazard Log	UEVOL-1705	BW, 07/08/15
ATC Subsystem V&V Report	UEVOL-1171	CL, 30/07/15
ATC Generic Application Safety Case	UEVOL-0887	CZ, 04/08/15
ATC Generic Application Safety Case	UEVOL-0887	CZ_Plus1, 22/12/15
ATC Design Verification Plan	UEVOL-1170	AB, 18/02/15
ATC Subsystem Requirements Specification	UEVOL-0270	AP, 22/01/15
ATC Architecture Description	UEVOL-0271	AP, 22/01/15
ATC Subsystem Requirements Test Plan	UEVOL-0113	E, 10/06/14
ATC Software Exported Constraints	UEVOL-2442	N, 24/02/15
Architecture & Design ATC Subsystem to System Exported	UEVOL-1638	U, 24/02/15
ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	L, 30/03/15
UEVOL ATC Software Release Note	A402307	GP, 31/07/15
Sw Release Note Trackside	A402079	BX, 28/07/15
UEVOL CC Software Release Note	A402045	EB, 24/02/15
CC Vital Software Requirements Specification	A401464	CV, 15/01/15



Title of Document	Alstom Reference	Release/Date
CC Software Impact analysis	A403516	DI, 20/02/15
UEVOL-CC-V: ATP and VESG, Software Module Test Report	A402314	AR, 13/02/15
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	BA, 18/11/15
UEVOL-CC-V: ATP and VESG, Software Module Test Report	A402314	BH, 13/02/15
ZC Software Impact Analysis	A404257	BQ, 02/07/15
Software Module Test Description Verification Report	A402925	AI, 13/07/15
ZC Software Module Test Report	A402291	AN, 09/07/15
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	BX, 22/06/15
CC Software, Architecture Description	A401446	BM, 22/10/14
ZC System Architecture Description	A401536	AU, 24/11/14
ZC Sw Integration TP	A402910	Q, 16/02/15
ZC and TDG Sw Integration TD	A402270	AG, 07/07/15
ZC Sw Integration Test Description Verification Report	A402928	AF, 08/07/15
ZC Application, Software Integration Test Report	A402272	AG, 07/07/15
CC-VITAL Sw Integration TP	A402308	X, 12/02/15
CC ATP Sw Integrated Test Description	A402309	AV, 12/02/15
CC Software Integration Test Description Verification Report	A402273	AT, 17/02/15
CC - ATP Software Integration Tests Report	A402310	AV, 12/02/15
ZC Sy Integrated Test Description	A401883	AS, 09/02/15
ZC subsystem Integration Test Description Verification Report	A402930	AQ, 17/02/15
CC Vital Software Architecture Description	A401466	BD, 10/12/14
UEVOL CC-Vital Software Source Code Verification Report	A402606	BR, 10/02/15
Urbalis Evolution – Trackside Software Architecture Description	A407321	AU, 23/06/15
UEVOL Trackside ZC, Source Code Verification Report	A402912	AQ, 06/07/15
ATC SW Urbalis Evolution CC Vital Formal Proof Document	A402843	BW, 09/02/15
UEVOL Zone Controller (ZC) Formal Proof Document	A402844	BM, 26/06/15
URBALIS 400 TDG Sw MD	A418523	AA, 24/11/14
TDG software Module Description Verification	A419763	O, 16/02/15
CC Software Hazard Analysis	A401823	BL, 13/02/15
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	BG, 30/07/15
Trackside Safety Requirement Report	A402317	BH, 30/07/15
CC Software Safety Requirement Report	A402319	BW, 13/02/15
Trackside SwRS/AD Verification Report	A402938	AN, 20/07/15
CC Software Requirements and Architecture Description Verification Report	A401804	AU, 10/02/15
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	O, 18/02/15
ZC SysRS SyAD SwRS Verification Report	A436803	O, 07/07/15
ZC Software Requirements Tests Plan	A401691	BA, 02/07/15



Title of Document	Alstom Reference	Release/Date
ZC Software Requirements Tests Report	A402289	BJ, 21/07/15
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	BH, 20/02/15
ZC Requirements Test Description Verification Report	A402921	AX, 27/07/15
ZC Software Requirement Test Description	A401881	BI, 21/07/15
CC VESG Critical Code Review Analysis Report	A406392	AQ, 06/02/15
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	O, 08/01/15
Zone Controller, Critical Code Review Analysis Report	A402528	BJ, 30/07/15
UEVOL – CC – V – ATP Critical Code Review Analysis Report	A402598	CJ, 13/02/15
CC ATP Software Requirements Test Description	A401878	BH, 20/02/2015
CC ATP Software Requirement Test Report	A402285	BV, 20/02/2015
CC-Vital Software Requirements Specification	A401464	CV, 15/01/2015
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BB, 25/6/15
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	AL, 28/1/15
Specific Safety Study on energy monitoring	A402326	L, 6/2/15
ATC Software Safety Assurance Report	A402620	EQ, 31/7/15
ATC Configuration Rules Safety Study	UEVOL-1574	AG, 24/11/14
ATC Subdivision Rules Specific Study	UEVOL-1027	Y, 4/11/14
B-Basic Machine Verification Report	A418801	V, 24/7/15
B-Basic Machine Verification Report	A418805	W, 17/2/15
Specific Safety Study on Trackside ATC Parameters	A402904	AC, 22/7/15
Specific Safety Study on UEVOL CC-V Parameters	A402903	AH, 6/2/15
Urbalis Evolution-CC-Vital Formal Proof Verification Report	A402916	BO, 17/2/15
Zone Controller (ZC) Formal Proof Verification Report	A402917	BE, 24/7/15
Urbalis Evolution-ZC B Specification Verification Report	A402914	BC, 24/7/15
Urbalis Evolution-CC-Vital B Specification Verification Report	A402892	BO, 17/2/15
Spot checking report	A408174	AR, 02/11/15
ATC Software Global V&V Report	A402597	BE, 26/10/15

ATC Baseline 10.5.5.5 Review (February - March 2016)

Table 62: Documents Reviewed for ATC Baseline 10.5.5.5

Title of Document	Alstom Reference	Release/Date
ATC 10.5.5.5 Delivery Sheet	UEVOL-R-3433	08/02/16
ATC Subsystem Impact Analysis	UEVOL-2408	BG, 21/01/16
ATC ZC SsyRTR	UEVOL-1186	BV, 29/01/16
CC Subsystem Hazard Analysis	UEVOL-0542	APplus1, 01/02/16
Urbalis Evolution - ATC System: System Hazard Analysis	UEVOL-0831	AJ, 04/02/16
Safety Hazard Log	UEVOL-1704	CD, 04/02/16
Exported Constraints	UEVOL-1705	CG, 04/02/16



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Verification and Validation Report	UEVOL-1171	CU, 01/02/16
CR analysis	UEVOL-1988	HP
ATC safety case	UEVOL-0887	DK, 08/02/16
LC ASw Sw Module Test Description	A402264	J, 01/12/15
ATC Software Release Note	A402307	HE, 03/02/16
Trackside Software Release Note	A402079	CG, 02/02/16
ZC Software Impact Analysis	A404257	BZ, 18/01/16
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BU, 02/01/16
Urbalis Evolution – ZC Software Safety Requirements Report	A402317	BS, 22/01/16
UEVOL ZC Formal Proof Document	A402844	BX, 06/01/16
ZC Sw Requirements Test Description Verification Report	A402921	BF, 29/01/16
ZC SwRTR	A402289	BQ, 04/01/16
ATC Global V&V Report	A402597	BL, 08/02/16
ATC Software Safety Assurance Report	A402620	FC, 03/02/16
ZC Software Requirement Test Report	A402289	BR, 25/01/16
Spot Checking Report	A408174	AY, 08/02/16
Urbalis Evolution – ZC, B Verification Reports	E136716	N, 21/01/16
ZC & LC Subsystems, ATC Configuration Rules Safety Study	UEVOL-1574	M, 04/02/16

ATC Baseline 11.3.2.1-1 Review (April - June 2016)

Table 63: Documents Reviewed for ATC Baseline 11.3.2.1-1

Title of Document	Alstom Reference	Release/Date
ATC 11.3.2.1 Delivery Sheet	UEVOL-R-3448	15/04/16
CC non-vital requirements test description verification report	A402920	BB, 30/11/15
ATC SyRSAD	UEVOL-3013	P, 28/01/16
LC Sub-system Requirements Specification and Architecture Description	UEVOL-2702	J, 24/03/16
CC Subsystem Requirements Specification and Architecture Description	UEVOL-2700	J, 23/03/16
ZC Sub-system Requirements Specification and Architecture Description	UEVOL-2701	M, 04/04/16
LC Sub-system Hazard Analysis	UEVOL-0430	W, 14/03/16
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	AV, 07/04/16
Sub-system hazard analysis	UEVOL-0543	BG, 05/04/16
ATC Interface Hazard Analysis	UEVOL-0431	AR, 06/04/16
ATC System Hazard Analysis	UEVOL-0831	AK, 19/02/16
ATC Safety Exported Constraints	UEVOL-1704	CF, 11/04/16
ATC Hazard Log	UEVOL-1705	CI, 11/04/16
CC-CC Interface Description	UEVOL-3139	E, 10/09/15
CC-ZC Interface Description	UEVOL-0185	AB, 30/09/15
ZC-ZC Interface Description	UEVOL-0192	AO, 30/09/15



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution, LC-CC Interface Description	UEVOL-0205	Q, 30/09/15
LC-ZC Interface Specification	UEVOL-0223	K, 30/09/15
Subsystem Impact Analysis	UEVOL-2408	BE, 30/11/15
Subsystem Impact Analysis	UEVOL-2408	BJ, 30/03/16
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	AN, 05/04/16
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	BY, 05/04/16
CC Subsystem Requirements Test Report	UEVOL-0140	DL, 05/04/16
ATC LC SsyRTR	UEVOL-1011	V, 08/12/15
ATC Subsystems ITR	UEVOL-1046	AK, 03/12/15
ZC-RIO INTERFACE DESCRIPTION	UEVOL-2382	F, 30/09/15
ATC Subsystems Requirement Test Description Verification Report	UEVOL-0824	AF, 10/03/16
ATC subsystems Requirements Test Description	UEVOL-0138	AE, 18/03/16
ATC LC Ssy RTD	UEVOL-0679	T, 19/12/15
Subsystem Requirements Test Plan	UEVOL-0103	G, 10/03/16
ATC – CC Ssy Requirements Test Description Verif. Report	UEVOL-0826	AX, 05/04/16
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	BH, 04/05/16
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	AG, 16/03/16
ATC Subsystem Integration Test Description	UEVOL-0137	AE, 18/03/16
ATC Subsystem Verification and Validation Report	UEVOL-1171	CWV, 01/04/16
UEVOL ATC Software Release Note	A402307	HH, 08/04/16
CC Software Release Note	A402045	EL, 06/04/16
Trackside Software Release Note	A402079	CI, 06/04/16
LC Software Impact Analysis	A405062	W, 17/11/15
CC Software Impact Analysis	A403516	DS, 24/02/16
LC ASw Sw Module Test Description	A402264	I, 20/01/15
LC Software Module Test Description Verification Report	A402926	P, 22/10/15
LC Software Module Test Report	A402265	U, 20/01/15
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	AY, 21/03/16
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	BH, 29/03/16
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402314	BO, 24/03/16
ZC Software Impact Analysis	A404257	CA, 17/02/16
ZC Software Module Test Description Verification Report	A402925	AP, 22/03/16
ZC Sw Module Test Report	A402291	AU, 18/03/16
LC Sw Integration TD	A402269	P, 12/10/15
LC Sw Integration TDVR	A402929	O, 14/10/15
LC Sw Integration TD	A402271	P, 12/10/15
CC-VITAL Sw Integration TP	A402308	AB, 17/03/16
CC Vital Software – Software Module Design	A406966	AG, 23/02/16
CC Software Integration Test Description	A402309	BB, 17/03/16



Title of Document	Alstom Reference	Release/Date
CC Software Integration Test Description Verification Report	A402273	BA, 21/03/16
CC Vital Software Integration Test Report	A402310	BC, 18/03/16
ZC ASw Sw Integrated Test Description	A402270	AN, 18/03/16
ZC Sw Integration Test Description Verification Report	A402928	AL, 28/03/16
ZC and TDG Sw Integration TR	A402272	AM, 21/03/16
LC Application, Software Requirements Specification	A401381	U, 24/02/15
Urbalis Evolution – ZC Application, Software Requirements Specification	A401380	CY, 29/01/16
CC Vital Software Requirements Specification	A401464	DE, 24/02/16
LC-Software Hazard Analysis	A401825	V, 04/12/15
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	BQ, 05/04/16
CC Software Hazard Analysis	A401823	BT, 25/03/16
Trackside SwSRR	A402317	BU, 05/04/16
LC - ASW Formal Proof Document	A402845	R, 08/10/15
ATC SW U400 ZC Software Formal Proof Document	A402844	BY, 08/02/16
Urbalis Evolution – CC ATP Formal Proof Document	A402843	CD, 30/03/16
UEVOL ATC Software Release Note	A402307	HH, 08/04/16
CC Vital Software Architecture Description	A401466	BF, 24/02/16
ZC Software Integration Architecture Design	A407321	BA, 07/10/14
UEVOL CC-Vital Software Source Code Verification Report	A402606	BZ, 24/03/16
UEVOL Trackside ZC Source Code Verification Report	A402912	AT, 23/03/16
UEVOL Trackside LC Source Code Verification Report	A402913	T, 15/10/15
CC-NV SCVR	A402911	L, 04/04/16
Critical Code Review Analysis Report, LC	A402322	AA, 19/10/15
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	R, 25/11/15
CC-ATC Critical Code Review Analysis Report	A402598	CR, 11/04/16
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BW, 05/04/16
CC Software Interface Description	A455727	E, 24/02/16
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AS, 23/03/16
CC software RS/AD Verification Report	A401804	BA, 22/03/16
ATC Software Global V&V Report	A402597	BN, 08/04/16
Spot Checking report	A408174	AZ, 08/04/16
ATC Design Verification Plan	UEVOL-1170	AD, 03/12/15
ATC Validation Allocation Table	UEVOL-1169	AU, 31/03/16
ATC Subsystem Requirement Validation Table	UEVOL-3757	H, 30/03/16
ATC Software Exported Constraints	UEVOL-2442	S, 23/03/16
Architecture & Design ATC Subsystem to System Exported	UEVOL-1638	Z, 24/03/16
Exported Constraint Verification Report	UEVOL-2525	Q, 04/04/16
ATC Tool Configuration Delivery Sheet	UEVOL-R-3442	21/04/16



Title of Document	Alstom Reference	Release/Date
<ATC Data Generation Procedure 1 st Chain>	UEVOL-1666	AF, 31/03/16
<ATC Data Generation Procedure 2 nd Chain>	UEVOL-1667	AE, 31/03/16
LC Parameter Configuration rules	UEVOL-0397	S, 24/03/16
ZC Parameter Configuration Rules	UEVOL-0396	AX, 24/03/16
ATC Subdivision Rules	UEVOL-0395	AR, 24/03/16
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	U, 21/04/16
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	U, 21/04/16
Urbalis Evolution – GAD Chain I Requirement Test Report	UEVOL-1754	X 23/04/16
DGC_GAD1.V12.2.8		
DGC_GAD2.V12.2.7		
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AB, 31/06/16
Gen ATC Data - System Requirement Test Description	UEVOL-1671	AB, 31/03/16
Gen ATC Data – Test Lines Specification	UEVOL-0401	AB, 31/03/16
Gen ATC Data-System Requirement Test Report PART (two parts)	UEVOL-1672	AB, 31/03/16
UEVOL ATC Software Release Note	A402307	GY, 10/12/15
LC Software Impact Analysis	A405062	U, 23/09/15
LC SYRS-SYAD-SWRS Verification Report	A444100	G, 04/04/16
ZC SysRS SyAD SwRS Verification Report	A436803	Y, 15/02/16
ZC Software Impact Analysis	A404257	BU, 02/01/15
ZC Requirements Test Description Verification Report	A402921	BG, 28/03/16
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	BU, 21/03/16
CC Software Safety Requirement Report	A402319	CF, 11/04/16
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	U, 25/03/16
CC-ATC Critical Code Review Analysis Report	A402598	CR, 11/04/16
CC VESG Critical Code Review Analysis Report	A406392	AV, 06/11/15
CC Software Impact Analysis	A403516	DQ, 09/10/15
CC ATP Software Requirement Test Report	A402285	CC 31/03/16
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	BO, 04/04/16
CC-NV Sw Requirements TR	A402286	CM, 04/04/16
CC ATO Software Requirements Test Description	A401879	BT, 05/04/16
UEVOL CC ATO Software Requirements Specification	A401463	X, 28/05/15
ZC ASw Sw Module Test Description	A402290	BD, 05/04/16
UEVOL-ATO Software: Architecture Description	A401467	AD, 24/03/16
ZC Software Impact Analysis	A404257	BW, 09/10/15
ZC Software Requirements Test Report	A402289	BS, 23/03/16
ATC safety case	UEVOL-0887	DN, 11/04/16
ATC safety case	UEVOL-0887	DQ, 26/05/16
CR analysis	UEVOL-1988	HX
ATC 11.3.2.1-I Delivery Sheet	UEVOL-R-3898	27/05/16



Title of Document	Alstom Reference	Release/Date
CC-NV Sw Requirements TR	A402286	CO, 05/05/16
ZC ASw Sw Module Test Description	A402290	BF, 05/05/16
CC-NV SCVR	A402911	N, 05/05/16
CC Software Impact Analysis	A403516	DX, 11/05/16
Project Name – SGD Validation Report	UEVOL-1088	vE, 5/8/16
Project Name – Beacon Layout Verification and Validation Report	UEVOL-1086	vF, 14/3/16
Project Name – LC Parameters Validation Report	UEVOL-1084	vE, 26/10/15
ATC Remotelo Configuration Validation Report Template	UEVOL-2061	vAB, 26/10/15
Template On-Board Data Verification & Validation Report	UEVOL-3814	vE, 26/10/15
ATC Configuration Rules Safety Study	UEVOL-1574	vAN, 5/4/16
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vH, 5/4/16
ATC Configuration Rules Safety Study	UEVOL-1574	vAN, 5/4/16
ATC Subdivision Rules Specific Study	UEVOL-1027	vAE, 6/4/16
Specific Study on Trackside ATC Parameters	A402904	vAF, 20/11/15
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAO, 8/4/16
Urbalis Evolution – ZC, B Verification Reports	E136716	vO, 29/2/16
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vJ, 13/5/16
ATC Configuration Rules Safety Study	UEVOL-1574	vAN+1, 13/5/16
Urbalis Evolution – LC, B Verification Reports	E136717	vF, 19/5/16
Urbalis Evolution – ZC, B Verification Reports	E136716	vP, 20/5/16
ATC Software Safety Assurance Report	A402620	FI, 01/06/16
UEVOL ATC Software Release Note	A402307	HM, 30/05/16
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BM, 29/3/16
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	AU, 25/3/16
Specific Safety Study - Automatic Protection	A402331	AF, 1/4/16

ATC Baseline 10.5.5.6-1 Review (June – August 2016)

Table 64: Documents Reviewed for ATC Baseline 10.5.5.6-1

Title of Document	Alstom Reference	Release/Date
ATC tools configuration Delivery Sheet v61	UEVOL-R-3926	30/06/16
ATC software Release Note	A402307	HP, 28/06/16
CC Software Release Note	A402045	ER, 27/06/16
UEVOL Wayside Software Release Note	A402079	CJ, 28/06/16
CC Software Impact Analysis	A403516	DY, 14/04/16
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	CZ, 07/04/16
CC Vital Software Requirements Specification	A401464	DF, 15/04/16
CC Software, Architecture Description	A401446	BR, 13/04/16
ZC Architecture Description	A401536	AX, 08/04/16



Title of Document	Alstom Reference	Release/Date
CC Vital Software – Software Module Design	A406966	AH, 15/04/16
CC Module Test Description	A402313	BB, 25/05/16
CC ATP SwModule Test DescriptionVR	A402266	BK, 27/05/16
CC-V Module Test Report	A402314	BR, 25/05/16
Urbalis Evolution – ZC Software, Software Impact Analysis	A404257	CB, 14/04/16
ZC Sw Module Test Description Verification Report	A402925	AR, 25/05/16
ZC Sw Module Test Report	A402291	AW, 23/05/16
CC-VITAL Sw Integration TP	A402308	Ad, 10/06/16
CC-VITAL Sw Integration TD	A402309	BE, 10/06/16
CC Software Integration Test Report	A402310	BF, 10/06/16
ZC Software Integration Test Description	A402270	AP, 01/06/16
ZC Sw Integration Test Report	A402272	AO, 01/06/16
CC Software Requirements Test Plan	A401462	AO, 14/04/16
CC-V Sw Requirements Test Description Verification Report	A402284	BR, 15/05/16
CC ATP Software Requirements Test Report	A402285	CF, 13/06/16
ZC Software Requirements Test Plan	A401691	BD, 26/04/16
ZC Software Requirements Test Report	A402289	BT, 16/06/16
U400 TDG Software Module Description	A418523	AG, 17/03/16
TDG Software Module Description Verification Report	A419763	S, 15/06/16
CC Vital Software, Architecture Description	A401466	BL, 15/04/16
ZC Software Integration Architecture Design	A407321	BD, 21/03/16
TRK Software Requirements and Architecture Description Verification Report	A402938	AT, 10/06/16
CC Software Requirements and Architecture Description Verification Report	A401804	BC, 14/06/16
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	W, 12/05/16
Urbalis Evolution – CC – ATP Formal Proof Document	A402843	CI, 14/06/16
UEVOL ZC Formal Proof Document	A402844	BZ, 31/03/16
UEVOL CC ATP Source Code Verification Report	A402606	CC, 10/06/16
UEVOL Trackside ZC Source Code Verification Report	A402912	BA, 23/05/16
CC-Vital Software Hazard Analysis	A401823	BQ, 15/06/16
ZC Software Hazard Analysis	A401824	BR, 13/06/16
Software Safety, Validation and Verification Plan	A401582	R, 09/10/15
CC-VESG Critical Code Review Analysis Report	A406392	AX, 14/06/16
UEVOL-CC-ATP-ASW Critical Code Review Analysis Report	A402598	CT, 07/06/16
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	U, 30/05/16
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	BY, 16/06/16
Urbalis Evolution – ZC Software Safety Requirements Report	A402317	BV, 17/06/16
CC Software Safety Requirement Report	A402319	CH, 17/06/16
ATC Ssy-Sw Requirement Specification VR (ZC)	A436803	Z, 14/04/16



Title of Document	Alstom Reference	Release/Date
Spot Checking Report	A408174	BC, 23/06/16
ATC Software Global V&V Report	A402597	BQ, 23/06/16
	E110963	T, 13/06/16
Urbalis Evolution – ATC Subsystem Requirements Specification	UEVOL-3013	Q, 29/03/16
CC Subsystem Requirements Specification	UEVOL-0098	BQ, 07/04/16
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	BU, 14/04/16
ATC Subsystem Impact Analysis	UEVOL-2408	BG, 10/06/16
ATC I0.5.5.6 Subsystem Delivery Sheet	UEVOL-R-3478	30/06/16
ATC Subsystem Impact Analysis	UEVOL-0123	G, 12/11/14
ATC Subdivision Rules	UEVOL-0395	AS, 09/06/16
ZC Parameters Configuration Rules	UEVOL-0396	AY, 09/06/16
ZC Subsystem Configuration Files Specification	UEVOL-0290	BC, 24/03/16
ATC Interface Hazard Analysis	UEVOL-0431	AS, 02/06/16
CC Subsystem Requirements Specification	UEVOL-0098	BQ, 07/04/16
Urbalis Evolution – ZC Sub-system Requirements Specification	UEVOL-0114	BU, 14/04/16
CC Subsystem Hazard Analysis	UEVOL-0542	AW, 31/05/16
ZC Subsystem Hazard Analysis	UEVOL-0543	BH, 13/06/16
ATC safety hazard analysis	UEVOL-0831	AL, 02/06/16
ATC Validation Allocation Table	UEVOL-1169	AX, 13/06/16
ATC Safety Exported Constraints	UEVOL-1704	CH, 30/06/16
ATC Hazard Log	UEVOL-1705	CL, 30/06/16
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AA, 14/06/16
Exported Constraint Verification Report	UEVOL-2525	S, 23/06/16
ATC Ssy Requirements Test Report	UEVOL-1275	AP, 16/06/16
ATC Subsystems Requirement Test Description Verification Report	UEVOL-0824	AH, 13/06/16
ATC subsystems Requirements Test Description	UEVOL-0138	AF, 20/06/16
ATC Subsystems Integration Tests Reports	UEVOL-1046	AN, 16/06/16
ATC Subsystem: SyITDVR	UEVOL-0825	AI, 06/06/16
ATC Subsystems Integration Tests Descriptions	UEVOL-0137	AF, 20/06/16
CC Subsystem Requirements Test Report	UEVOL-0140	DH, 20/10/15
CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	BA, 09/06/16
CC Subsystem Requirements Test Report	UEVOL-0140	DP, 16/06/16
CC Subsystem Requirements Test Description	UEVOL-0139	DE, 20/06/16
ATC ZC Subsystems Test Report	UEVOL-1186	CA, 16/06/16
ATC ZC Ssy RTD	UEVOL-0969	BJ, 20/06/16
ATC - ZC Ssy: SyRTDVR	UEVOL-0827	BJ, 09/06/16
ATC Subsystem Verification and Validation Report	UEVOL-1171	DA, 23/06/16
CC-Vital Setting Description	UEVOL-0643	AZ, 21/04/16
ATC Generic application Safety Case	UEVOL-0887	DS, 27/06/16



Title of Document	Alstom Reference	Release/Date
ATC Data Generation Procedure 2nd Chain	UEVOL-1667	AG, 30/06/16
ATC delivery sheet	UEVOL-R-3926	30/06/16
ATC Data Generation Procedure 1 st Chain	UEVOL-1666	AH, 30/06/16
GAD Chain I Requirements Test Report	UEVOL-1754	Z, 02/07/16
DGC_GAD1_v10.8.15		
DGC_GAD2_v10.8.22		
Gen ATC Data – System Requirement Test Description	UEVOL-1671	AE, 30/06/16
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AE, 30/06/16
Gen ATC Data – Test Lines Specification	UEVOL-0401	AE, 30/06/16
Gen ATC Data – System Requirement Test Report Part 1 (for GAD1)	UEVOL-1672	30/06/16
Gen ATC Data – System Requirement Test Report Part 2 (for GAD2)	UEVOL-1672	30/06/16
CC ATP Software Requirements Test Description	A401878	BS, 13/06/16
CC-V Sw Requirements Test Description Verification Report	A402284	BR, 15/06/16
ZC Software Requirements Test Description	A401881	BR, 16/06/16
ZC Sw Requirements Test Description Verification Report	A402921	BH, 16/06/16
ATC Generic application Safety Case	UEVOL-0887	DS_Plus_I, 29/07/16
ATC 10.5.5.6-I sub-system delivery sheet	UEVOL-R-3490	28/07/16
Specific Safety Study on Train Kinematics	A402218	G, 18/09/09
Specific Safety Study - Automatic Protection	A402331	AG, 16/6/16
ATC Software Safety Assurance Report	A402620	FL, 29/06/16
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BN, 13/6/16
Urbalis Evolution – ZC, B Verification Reports	E136716	vQ, 14/6/16
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vL, 13/6/16
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAQ, 3/6/16
Specific Safety Study on Trackside ATC Parameters	A402904	vAI, 16/6/16
ATC Subdivision Rules Specific Study	UEVOL-1027	vAF, 2/6/16
ATC Configuration Rules Safety Study	UEVOL-1574	vAO, 16/6/16

ATC Baseline 11.4.1.1-I Review (March – June 2017)

Table 65: Documents Reviewed for ATC Baseline 11.4.1.1-I

Title of Document	Alstom Reference	Release/Date
ATC Safety Exported Constraints	UEVOL-1704	CM 01/03/17
ATC Hazard Log	UEVOL-1705	CP 28/02/17
ATC Validation Allocation Table	UEVOL-1169	AZ 08/02/17
ATC Subsystem Requirement Validation Table	UEVOL-3757	K 08/02/17
ATC ZC SsyRTP	UEVOL-0986	H 29/09/15
ATC Subsystems Requirement Test Description Verification Report	UEVOL-0824	AK 13/02/16
Urbalis Evolution – ATC, Subsystem Validation Report	UEVOL-1275	AS 15/02/16



Title of Document	Alstom Reference	Release/Date
ATC Subsystems ITR	UEVOL-1046	AK 09/12/15
CC Subsystem Requirements Test Report	UEVOL-0140	DT 15/02/17
ATC – ZC Ssy Requirements Test Report	UEVOL-1186	CC 15/02/17
ATC subsystems Requirements Test Description	UEVOL-0138	AH 09/02/17
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	AL 13/02/17
ATC Subsystem Integration Test Description	UEVOL-0137	AH 09/02/17
ATC – CC Ssy Requirements Test Description Verif. Report	UEVOL-0826	BD 13/02/17
CC Subsystem Requirements Test Description	UEVOL-0139	DF 27/01/17
ATC-ZC: System Requirement Test Description Verification Report	UEVOL-0827	BM 13/02/17
ATC ZC Ssy RTD	UEVOL-0969	BR 31/01/17
ATC Subsystem Verification and Validation Report	UEVOL-1171	DG 15/02/17
ATC Software Exported Constraints	UEVOL-2442	Z 07/02/17
Architecture & Design ATC Subsystem to System Exported	UEVOL-1638	AF 09/02/17
Exported Constraint Verification Report	UEVOL-2825	X 14/02/17
CR analysis	UEVOL-1988	IM 01/03/17
ATC Subsystem Configuration Delivery Sheet	UEVOL-R-3561	23/02/17
UEVOL ATC Software Release Note	A402307	HU 23/02/17
Trackside Software Release Note	A402079	CM 17/02/17
Spot Checking report	A408174	BE 15/02/17
ATC Software Global V&V Report	A402597	BV 15/02/17
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	Z 07/02/17
CC Vital Software Requirements Specification	A401464	DK 18/11/16
ZC SysRS SyAD SwRS Verification Report	A436803	AC 27/01/17
Urbalis Evolution – ZC Application, Software Requirements Specification	A401380	DG 10/01/17
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	AW 03/02/17
CC software RS/AD Verification Report	A401804	BF 25/01/17
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	BT 21/02/17
CC Software Hazard Analysis	A401823	BX 09/02/17
Trackside SwSRR	A402317	BY 23/02/17
CC Software Safety Requirement Report	A402319	CN 10/02/17
U400 TDG Software Module Description	A418523	AJ 01/12/16
TDG Software Module Description Verification Report	A419763	V 15/02/17
Urbalis Evolution – ZC Critical Code Review Analysis Report	A402528	CB 22/02/17
Urbalis Evolution – TDG, Critical Code Review Analysis Report	A419074	W 10/02/17
CC-ATC Critical Code Review Analysis Report	A402598	CZ 27/01/17
CC VESG Critical Code Review Analysis Report	A406392	BC 29/12/16
ZC Software Impact Analysis	A404257	CE 06/01/17
ZC Software Module Test Description Verification Report	A402925	AT 08/02/17



Title of Document	Alstom Reference	Release/Date
ZC Sw Module Test Report	A402291	AY 08/02/17
ZC ASw Sw Integrated Test Description	A402270	AR 09/02/17
ZC Sw Integration Test Description Verification Report	A402928	AP 10/02/17
ZC and TDG Sw Integration TR	A402272	AQ 09/02/17
ZC Software Requirements Test Plan	A401691	BG 15/12/17
ZC Requirements Test Description Verification Report	A402921	BK 15/02/17
ZC Software Requirement Test Description	A401881	BU 10/02/17
ZC Software Requirements Test Report	A402289	BW 10/02/17
CC Software Impact Analysis	A403516	FF 31/01/17
CC ATP Software Requirement Test Report	A402285	CK 08/02/17
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	BG 01/02/17
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	BP 02/02/17
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402314	BW 01/02/17
CC-VITAL Sw Integration TP	A402308	AG 30/01/17
CC Software Integration Test Description	A402309	BL 30/01/17
CC Software Integration Test Description Verification Report	A402273	BH 03/02/17
CC Vital Software Integration Test Report	A402310	BJ 30/01/17
CC Software Requirements Test Plan	A401462	AR 31/01/17
CC - ATP Sw, Reqs Tests Description Verification Report	A402284	BW 08/02/17
CC Software Requirements Test Description	A401878	BW 31/01/17
CC Vital Software Architecture Description	A401466	BS 18/11/26
ZC Software Integration Architecture Design	A407321	BG 01/12/16
ATC SW U400 ZC Software Formal Proof Document	A402844	CF 31/01/17
Urbalis Evolution – CC ATP Formal Proof Document	A402843	CQ 03/02/17
UEVOL CC-Vital Software Source Code Verification Report	A402606	CH 01/02/17
UEVOL Trackside ZC Source Code Verification Report	A402912	BC 31/01/17
ATC safety case	UEVOL-0887	DY 24/02/17
ATC tool delivery sheet	UEVOL-0290	BH 07/02/17
ATC Tools Configuration Delivery Sheet	UEVOL-R-3949	24/02/17
<ATC Data Generation Procedure 1st Chain>	UEVOL-1666	AJ 23/02/17
<ATC Data Generation Procedure 2nd Chain>	UEVOL-1667	AL 23/01/17
ZC Parameter Configuration Rules	UEVOL-0396	BB PLUS1 01/02/17
ATC Subdivision Rules	UEVOL-0395	HT 14/10/16
ATC GSD GenRTS module, Software Requirements Test Report	UEVOL-2589	Q 08/03/17
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	W 08/03/17
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	W 08/03/17
Urbalis Evolution – GAD Chain I Requirement Test Report	UEVOL-1754	HA 03/03/17
	GAD1	12.2.16
	GAD2	12.2.13



Title of Document	Alstom Reference	Release/Date
Gen ATC Data – Test Lines Specification	UEVOL-0401	AF 23/02/17
Gen ATC Data - System Requirement Test Description	UEVOL-1671	AF 02/03/17
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AF 02/03/17
Gen ATC Data-System Requirement Test Report PART (two parts)	UEVOL-1672	AF 02/03/17
UEVOL-ATO Software: Architecture Description	A401467	BC 18/11/16
UEVOL CC ATO Software Requirements Specification	A401463	AB 23/11/16
CC ATO Software Requirements Test Description	A401879	CB 07/02/17
CC non-vital requirements test description verification report	A402920	BL 10/02/17
CC-NV Sw Requirements TR	A402286	CU 03/02/17
CC-NV SCVR	A402911	Q 01/02/17
Urbalis Evolution – ATC Subsystem Requirements Specification	UEVOL-3013	S, 06/09/16
CC Software Release note 11.4.1	A402045	EX, 17/11/17
Axle counter reset with train at ZC frontier	UEVOL-3205	3B, 3/5/17
Specific Safety Study – Automatic Protection	A402331	AJ, 2/2/17
ATC Software Safety Assurance Report	A402620	FR, 21/2/17
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BQ, 5/1/17
AP reduction with uncontrolled point at inter ZC	UEVOL-3203	B, 16/12/16
U400 – History of Inter ZC issues	UEVOL-R-3989	A, 5/6/17
ATC safety case	UEVOL-0887	DYplus1 14/06/17
ATC 11.4.1.1.-1 Delivery Sheet	UEVOL-R-3597	14/06/17

ATC Baseline 10.5.5.7-2 Review (July – October 2017)

Table 66: Documents Reviewed for ATC Baseline 10.5.5.7-2

Title of Document	Alstom Reference	Release/Date
ATC Requirements Specification and Architecture Description	UEVOL-3013	Z, 27/04/17
CC subsystem requirements specification	UEVOL-0098	BU, 02/05/17
ZC subsystem Requirement Specification	UEVOL-0114	BX, 03/05/17
ZC - ZC Interface Description	UEVOL-0192	AS, 22/11/16
LC Requirements Specification and Architecture Description	UEVOL-2702	O, 10/02/17
ZC Parameters Configuration Rules	UEVOL-0396	BC_PLUS2, 24/04/17
CC Vital setting Description CC SW 10.5.21 - ATC 10.5.5.7	UEVOL-0643	BE, 21/06/17
LC System Hazard Analysis	UEVOL-0430	W, 14/03/16
ATC Interface Hazard Analysis	UEVOL-0431	AV, 28/03/17
CC Sub-System Hazard Analysis	UEVOL-0542	BB, 06/06/17
ZC Sub-System Hazard Analysis	UEVOL-0543	BM, 01/08/17
ATC Subsystem : System Requirement Test Description Verification Report	UEVOL-0824	AM_PLUS1, 05/05/17
ATC Subsystem : System Integration Test Description Verification report	UEVOL-0825	AN_PLUS1, 05/05/17



Title of Document	Alstom Reference	Release/Date
ATC - CC Subsystem : System Requirement Test Description Verification Report	UEVOL-0826	BE, 12/07/17
ATC Safety and V&V Plan	UEVOL-0353	J_PLUS1, 19/01/17
ATC - ZC Subsystem : System Requirement Test Description Verification Report	UEVOL-0827	BP_PLUS2, 17/07/17
UEVOL ATC TOOLS Configuration Delivery Sheet v69	UEVOL-R-4023	31/07/17
ATC Data Generation Procedure 1st chain	UEVOL-1666	AK, 30/07/17
ATC Data Generation Procedure 2nd chain	UEVOL-1667	AJ, 18/07/17
ATC GenPar module evolution Software Requirements Test Report	UEVOL-2591	X, 05/07/17
GADI SwRTR	UEVOL-1754	ZC, 01/08/17
Gen ATC Data - System Requirement Test Plan	UEVOL-1670	AH, 18/07/17
Gen ATC Data - Test Lines Specification	UEVOL-0401	AH, 18/07/17
Gen ATC Data - System Requirement Test Description	UEVOL-1671	AH, 26/07/17
Gen ATC Data - System Requirement Test Report (two parts)	UEVOL-1672	AH, 18/07/17
GADI for 1st chain	GADI for 1st chain	10.8.17
GAD2 for 2nd chain	GAD2 for 2nd chain	10.8.26
U400 - CC Vital - SwRS CC 10.5.22	A401464	DQ, 12/05/17
U400 CC - Software Impacts Analysis 10.5.22	A403516	EH, 12/06/17
U400 CC Sw Release Note 10.5.22 Draft Release	A402045	FA, 29/06/17
Uevol CC SyAD - 10.5.22	A401446	BQ, 12/05/17
U400 - CC Vital - SwAD CC 10.5.18	A401466	BV, 12/05/17
U400 - CC CCRAR CC-ATP 10.5.17	A402598	DB, 12/05/17
U400 - CC - SwHA CC 10.5.16	A401823	BZ, 28/06/17
U400 - CC-Vital Sw Safety Requirements Report for CC Sw 10.5.22 (ATP 10.5.17, VESG 10.5.4)	A402319	CP, 28/06/17
URBALIS EVOLUTION - CC SW - SwRS/AD-VR CC 10.5.20/10.5.21	A401804	BH, 18/05/17
U400 ATC SW Release Note 10.5.13 - ATC 10.5.5.7-2	A402307	IB, 29/06/17
U400 Wayside Sw Release Note 10.5.24 Draft Release	A402079	CP, 28/06/17
ZC - Software Impact Analysis ZC 10.5.23	A404257	CJ, 16/02/17
U400 WS - SwRS ZC 10.5.22	A401380	DJ, 24/05/17
U400 WS - SwAD WS 10.5.21	A407321	BK, 06/06/17
U400 ZC SyRS - SwRS Verification Report 10.5.22	A436803	AE, 22/06/17
URBALIS EVOLUTION - CC SW - SwRS/AD-VR CC 10.5.20/10.5.21	A401804	BU, 29/06/17
U400 WS - Software Safety Requirements Report WS 10.5.24 (ZC 10.5.23)	A402317	CA, 30/06/17
U400 CC SyRS - SyAD - SwRS Verification Report 10.5.22	A444099	AB, 15/06/17
U400 CC_Vital - Direct ADA and MPC coding rules verification 10.5.17 ATP	A402606	CJ, 25/05/17
U400 TRACKSIDE ZC 10.5.23 SOURCE CODE VERIFICATION REPORT	A402912	BE, 07/06/17
U400 CC Vital Formal Proof Document CC 10.5.19	A402843	CS, 24/05/16
U400 WS - FPD ZC 10.5.22	A402844	CI, 09/06/17



Title of Document	Alstom Reference	Release/Date
Verification and Validation Plan-10.5.11	A401582	X, 15/06/17
U400 CC-V: ATP SOFTWARE MODULE TEST DESCRIPTION ATP 10.5.17	A402313	BI, 29/05/17
U400 CC Vital - SwMTDVR ATP 10.5.17	A402266	BU, 31/05/17
U400 CC-V: ATP SOFTWARE MODULE TEST REPORT ATP 10.5.17	A402314	CB, 30/05/17
U400 ZC & TDG- SwMTDVR 10.5.23	A402925	AV, 13/06/17
U400 ZC ASw AND TDG - SwMTR 10.5.23	A402291	BA, 12/06/17
U400 CC Vital - SwITP ATP 10.5.16	A402308	AI, 26/05/17
U400 CC Vital - SwITD ATP 10.5.17	A402309	BN, 26/05/17
U400 CC Vital - SwITDVR ATP 10.5.17	A402273	BJ, 02/06/17
U400 CC Vital - SwITR ATP 10.5.17	A402310	BL, 30/05/17
U400 ZC - SwITP 10.5.20	A402910	V, 12/06/17
U400 ZC - SwITD 10.5.23	A402270	AT, 12/06/17
U400 ZC - SwITDVR 10.5.23	A402928	AR, 14/06/17
U400 ZC - SwITR 10.5.23	A402272	AS, 13/06/17
U400 WS - CCRAR ZC 10.5.23	A402528	CD, 30/06/17
CC_ATP - SwRTDVR 10.5.17	A402284	BY, 21/06/17
CC_ATP - Software Requirements Tests Description 10.5.17	A401878	BY, 19/06/17
CC_ATP - SwRTR 10.5.17	A402285	CM, 20/06/17
U400-ZC ASw - SwRTR 10.5.22	A402289	BY, 15/06/17
U400 - ZC Sw - SwRTP ZC 10.5.20	A401691	BH, 12/06/17
U400 ZC - SwRTDVR 10.5.22	A402921	BM, 21/06/17
U400 ATC SW Global V&V Report - 10.5.12	A402597	BX, 22/06/17
U400 ATC SW Verification Spot Checking Report-10.5.12	A408174	BG, 22/06/17
U400 TK SwRSAD-VR 10.5.18	A402938	AT, 10/10/16
U400 ATC SW Release Note 10.5.13 - ATC 10.5.5.7-2	A402307	II, 13/09/17
U400 Wayside Sw Release Note 10.5.24 Draft Release	A402079	3CS, 08/09/17
ZC - Software Impact Analysis ZC 10.5.23	A404257	CM, 04/09/17
ZC - Software Impact Analysis ZC 10.5.23	A404257	CN, 11/09/17
U400 WS - SwRS ZC 10.5.22	A401380	DP, 30/08/17
U400 - ZC SwHA 10.5.23	A401824	BX, 05/09/17
U400 WS - Software Safety Requirements Report WS 10.5.24 (ZC 10.5.23)	A402317	CD, 01/09/17
U400 WS - CCRAR ZC 10.5.23	A402528	CG, 11/09/17
U400 ZC & TDG- SwMTDVR 10.5.23	A402925	AX, 13/09/17
U400 ZC ASw AND TDG - SwMTR 10.5.23	A402291	BC, 12/09/17
U400 ZC - SwITD 10.5.23	A402270	AV, 12/09/17
U400 ZC - SwITDVR 10.5.23	A402928	AT, 13/09/17
U400 ZC - SwITR 10.5.23	A402272	AU, 13/09/17
U400 ZC SyRS - SwRS Verification Report 10.5.22	A436803	AH, 06/09/17



Title of Document	Alstom Reference	Release/Date
U400-ZC ASw - SwRTR 10.5.22	A402289	CB, 06/09/17
U400 WS - FPD ZC 10.5.22	A402844	CM, 30/08/17
U400 TRACKSIDE ZC 10.5.23 SOURCE CODE VERIFICATION REPORT	A402912	BG, 11/09/17
ATC Sub-system impact analysis	UEVOL-2408	BT_PLUS1, 12/09/17
ATC Validation Allocation Table	UEVOL-1169	BB, 12/06/17
ATC Delivery Sheet 10.5.5.7-2	UEVOL-R-3643	22/08/17
Uevol CR analysis	UEVOL-1988	IU
CC subsystem validation tests report	UEVOL-0140	ED, 04/07/17
ZC Subsystem Requirements Test Report	UEVOL-1186	CI, 12/09/17
UEVOL ATC subsystem Requirements Test Report	UEVOL-1275	AX, 11/09/17
ATC subsystem Integration Report	UEVOL-1046	AR, 13/09/17
ATC Subsystem : System Requirement Test Description Verification Report	UEVOL-0824	AM_PLUS1, 11/09/17
UEVOL ATC subsystem Requirements Test Description document	UEVOL-0138	AM, 07/09/17
ATC Subsystem : System Integration Test Description Verification report	UEVOL-0825	AN_PLUS1, 11/09/17
ATC subsystem Integration Test Description	UEVOL-0137	AM, 09/06/17
ATC - ZC Subsystem : System Requirement Test Description Verification Report	UEVOL-0827	BP_PLUS2, 08/09/17
ZC Subsystem Requirements Test Description	UEVOL-0969	BP, 05/09/17
CC subsystem validation tests description	UEVOL-0139	DI, 13/09/17
ATC EXPORTED CONSTRAINTS	UEVOL-1704	CR, 13/09/17
ATC HAZARD LOG	UEVOL-1705	CU, 13/09/17
ATC V&V report	UEVOL-1171	DJ_PLUS1, 13/09/17
ATC Sub System Safety Case	UEVOL-0887	ED, 13/09/17
Specific safety study on wheel and train movement speed and acceleration estimation	A402218	G, 12/05/17
Specific Safety Study on Automatic Protection	A402331	AL, 27/06/17
Trainborne Software Assurance Report	A402620	GA, 08/09/17
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vR, 21/6/17
Urbalis Evolution, ATC Subdivision Rules Specific Study	UEVOL-1027	vAH, 12/5/17
ATC Configuration Rules Safety Study	UEVOL-1574	vAR, 5/5/17
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAS
Urbalis Evolution – ZC, B Verification Reports	E136716	vY, 6/9/17
Urbalis Evolution – CC Vital, B Verification Reports	E136715	vT, 7/8/17
U400 CC Sw Release Note 10.5.22 Draft Release	A402045	2FE, 18/09/17
U400 - CC Vital - SwRS CC 10.5.22	A401464	DT, 03/08/17
U400 CC - Software Impacts Analysis 10.5.22	A403516	EM, 03/08/17
U400 SW - Minor-Major decision matrix - ATC 10.5.5.7	UEVOL-3922	A, 28/06/17
Uevol CC SyAD - 10.5.22	A401446	BW, 01/08/17



Title of Document	Alstom Reference	Release/Date
U400 CC_Vital - Direct ADA and MPC coding rules verification 10.5.17 ATP	A402606	CM, 04/08/17
U400 - CC CCRAR CC-ATP 10.5.17	A402598	DD, 07/08/17
U400 - CC-Vital Sw Safety Requirements Report for CC Sw 10.5.22 (ATP 10.5.17, VESG 10.5.4)	A402319	CR, 11/08/17
U400 ATC SW Verification Spot Checking Report-10.5.12	A408174	BL, 13/09/17
U400 CC SyRS - SyAD - SwRS Verification Report 10.5.22	A444099	AD, 10/08/17
U400 CC-V: ATP SOFTWARE MODULE TEST DESCRIPTION ATP 10.5.17	A402313	BL, 09/08/17
U400 CC Vital - SwMTDVR ATP 10.5.17	A402266	BU, 10/08/17
U400 CC-V: ATP SOFTWARE MODULE TEST REPORT ATP 10.5.17	A402314	CB, 09/08/17
U400 CC Vital - SwITD ATP 10.5.17	A402309	BN, 08/08/17
U400 CC Vital - SwITDVR ATP 10.5.17	A402273	BM, 11/08/17
U400 CC Vital - SwITR ATP 10.5.17	A402310	BO, 08/08/17
CC_ATP - SwRTDVR 10.5.17	A402284	CB, 11/08/17
CC_ATP - SwRTR 10.5.17	A402285	CP, 11/08/17
U400 - ZC ASw - SwRTD 10.5.22	A401881	BY, 19/06/17
U400 ATC SW Verification Spot Checking Report-10.5.12	A408174	BL, 16/08/17
U400 ATC SW Global V&V Report - 10.5.12	A402597	CC, 13/09/17
U400 ZC - SwITD 10.5.23	A402270	AV, 12/09/17
U400 ZC - SwITDVR 10.5.23	A402928	AT, 13/09/17
U400 ZC - SwITR 10.5.23	A402272	AU, 13/09/17
U400 CC Sw Release Note 10.5.22 Draft Release	A402045	2FE, 16/08/17
U400 WS Specific Safety Study on Automatic Protection 10.5.21	A402331	AL_plus1, 09/10/17
ATC - ZC Subsystem : System Requirement Test Description Verification Report	UEVOL-0827	BP_plus3, 13/10/17
U400 WS - FPD ZC 10.5.22	A402844	CO, 30/08/17

ATC Baseline 11.3.3.1 Review (November 2017)

Table 67: Documents Reviewed for ATC Baseline 11.3.3.1

Title of Document	Alstom Reference	Release/Date
ATC Sub-system impact analysis	UEVOL-2408	BX, 11/10/17
ZC Sub-system Requirements Specification and Architecture Description	UEVOL-2701	M_plus1, 16/06/17
ATC Requirements Specification and Architecture Description	UEVOL-3013	P_plus1, 10/07/17
ZC-ZC Interface Description	UEVOL-0192	AT, 21/06/17
ATC Interface Hazard Analysis	UEVOL-0431	AR_Plus1, 11/10/17
ZC Sub-System Hazard Analysis	UEVOL-0543	BN, 15/09/17
UEVOL ATC Safety Exported Constraints	UEVOL-1704	CS, 18/10/17
ATC Hazard Log	UEVOL-1705	CV, 19/10/17



Title of Document	Alstom Reference	Release/Date
ATC Validation Allocation Table	UEVOL-1169	BE, 10/10/17
ATC Subsystem Requirement Validation Table	UEVOL-3757	M, 06/10/17
Software Maintenance Plan	A475244	B, 02/11/17
Software Project Management Plan	A407265	D, 06/06/17
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	DR, 25/09/17
UEVOL ATC Software Release Note	A402307	IL, 20/10/17
U400 Wayside Sw Release Note	A402079	Ct, 13/10/17
Trackside Software Requirements and Architecture Description Verification Report	A402938	AY, 04/10/17
U400 WS - SwAD WS	A407321	BO, 25/09/17
ZC - Software Impact Analysis ZC	A404257	CO, 28/09/17
U400 - ZC SwHA	A401824	BY, 16/10/17
U400 WS - Software Safety Requirements Report	A402317	CE, 16/10/17
U400 WS - CCRAR ZC	A402528	CH, 12/10/17
Verification and Validation Plan	A401582	Y, 03/07/17
U400 WS - FPD ZC	A402844	CQ, 26/09/17
U400 TRACKSIDE ZC SOURCE CODE VERIFICATION REPORT	A402912	BH, 03/10/17
U400 ATC SW Verification Spot Checking Report	A408174	BM, 11/10/17
U400 ATC SW Global V&V Report	A402597	CD, 11/10/17
U400 ZC & TDG- SwMTDVR	A402925	AY, 11/10/17
U400 ZC ASw AND TDG - SwMTR	A402291	BD, 10/10/17
U400 ZC - SwITD	A402270	AV, 05/10/17
U400 ZC - SwITDVR	A402928	AU, 06/10/17
U400 ZC - SwITR	A402272	AV, 06/10/17
U400 - ZC Sw - SwRTP ZC	A401691	BJ, 06/10/17
U400 ZC - SwRTDVR	A402921	BQ, 11/10/17
U400-ZC ASw - SwRTR	A402289	CC, 06/10/17
U400 ZC SyRS - SwRS Verification Report	A436803	AI, 10/10/17
UEVOL ATC subsystem Requirements Test Report	UEVOL-1275	AY, 11/10/17
ATC subsystem Integration Report	UEVOL-1046	AS, 11/10/17
UEVOL ATC subsystem Requirements Test Description document	UEVOL-0138	AL, 20/09/17
ATC subsystem Integration Test Description	UEVOL-0137	AL, 20/09/17
ATC Subsystem : System Requirement Test Description Verification Report	UEVOL-0824	AO, 10/10/17
ATC Subsystem : System Integration Test Description Verification report	UEVOL-0825	AP, 10/10/17
ZC Subsystem Requirements Test Report	UEVOL-1186	CJ, 09/10/17
ATC - ZC Subsystem : System Requirement Test Description Verification Report	UEVOL-0827	BQ, 10/10/17
ATC V&V report	UEVOL-1171	DL, 12/10/17
U400 SW - Minor-Major decision matrix - ATC 11.3.3.1	UEVOL-3922	C, 01/06/17



Title of Document	Alstom Reference	Release/Date
ATC Sub System Safety Case	UEVOL-0887	EE, 24/10/17
U400 - ZC ASw - SwRTD	A401881	BZ, 11/10/17
ZC Subsystem Requirements Test Description	UEVOL-0969	BS, 20/08/17
Uevol CR analysis	UEVOL-1988	IV
ATC 11.3.3.1 Sub System Configuration Delivery Sheet	UEVOL-R-3651	20/10/17

ATC Baseline 11.3.3.2 Review (June – July 2018)

Table 68: Documents Reviewed for ATC Baseline 11.3.3.2

Title of Document	Alstom Reference	Release/Date
U400 ATC SW Release Note	A402307	IX, 24/04/18
U400 CC - Software Impacts Analysis 11.3.18	A403516	EV, 02/04/18
ZC - Software Impact Analysis ZC 11.3.14	A404257	CP, 04/12/17
U400 - CC Vital - SwRS CC 11.3.17	A401464	EB, 19/03/18
U400 WS - SwRS ZC 11.3.14	A401380	DW, 30/11/17
U400 - CC Vital - SwAD CC 11.3.17	A401466	CF, 19/03/18
U400 - CC - SwHA CC 11.3.18	A401823	CC, 30/03/18
U400 - ZC SwHA 11.3.14	A401824	BZ, 05/12/17
U400 WS - Software Safety Requirements Report WS 11.3.14 (ZC 11.3.14)	A402317	CG, 13/12/17
U400 - CC-Vital Sw Safety Requirements Report for CC Sw 11.3.18 (ATP 11.3.12, VESG 11.3.3)	A402319	CW, 13/04/18
U400 CC-V: ATP SOFTWARE MODULE TEST DESCRIPTION ATP 11.3.11/11.3.12	A402313	BQ, 27/03/18
U400 CC Vital - SwMTDVR ATP 11.3.11/11.3.12	A402266	BZ, 29/03/18
U400 CC-V: ATP SOFTWARE MODULE TEST REPORT ATP 11.3.11/11.3.12	A402314	CG, 28/03/18
U400 WS - CCRAR ZC 11.3.14	A402528	CJ, 06/12/17
U400 - CC CCRAR 11.3.18 (CC-ATP 11.3.12)	A402598	DI, 13/04/18
U400 ZC SyRS - SwRS Verification Report 11.3.14	A436803	AJ, 08/12/17
U400 CC SyRS - SyAD - SwRS Verification Report 11.3.18	A444099	AI, 30/03/18
ATC 11.3.3.2 delivery sheet	UEVOL-R-3719	I6/04/18
ATC Sub-system impact analysis	UEVOL-2408	BY, 11/04/18
ATC Validation Allocation Table	UEVOL-1169	BK, 29/03/18
ZC Sub-system Requirements Specification and Architecture Description	UEVOL-2701	M_plus_2, 01/12/17
CC Subsystem Requirements Specification and Architecture Description	UEVOL-2700	J_plus1, 15/03/18
ZC Sub-System Hazard Analysis	UEVOL-0543	BN_plus_1, 07/12/17
CC Sub-System Hazard Analysis	UEVOL-0542	AV_plus_1, 09/04/18
ATC EXPORTED CONSTRAINTS	UEVOL-1704	CX, 18/04/18
ATC Subsystem Requirement Validation Table	UEVOL-3757	P, 03/04/18



Title of Document	Alstom Reference	Release/Date
ATC HAZARD LOG	UEVOL-1705	DC, 08/04/18
ATC V&V report	UEVOL-1171	DN, 12/04/18
ATC Sub System Safety Case	UEVOL-0887	EG, 20/04/18
UEVOL ATC subsystem Requirements Test Description document	UEVOL-0138	AS, 26/03/18
ATC Subsystem : System Requirement Test Description Verification Report	UEVOL-0824	AT, 28/03/18
ATC SW U400 CC Software Release note 11.3.18	T23-A402045	FM, 13/04/2018
ATC SW U400 Wayside Software Release Note 11.3.14	T23-A402079	CZ, 13/03/2018
ATC SW U400 CC Vital Formal Proof Document	A402843	CW, 06/04/2018
ATC U400 Zone Controller (ZC) Formal Proof Document	T23-A402844	CV, 30/11/2017
UEVOL CC – Vital Software Source Code Verification Report	T23-A402606	CR, 02/04/2018
Software Interface Description Urbalis Evolution CC Software	T23-A455727	K, 19/03/2018
Urbalis Evolution Carborne Controller Vital Software Software Integration Test Plan	A402308	AM, 26/02/2018
Urbalis Evolution CC Vital Software Integration Description Verification Report	T23-A402273	BR, 04/04/2018
Urbalis Evolution – Carborne Controller Vital Software Software Integration Test Description	A402309	BS, 04/04/2018
Urbalis Evolution – Carborne Controller Vital Software Software Integration Test Report	A402310	BT, 04/04/2018
ZC Application Software – Software Requirements Test Report	A402289	CD, 08/12/2017
Urbalis Evolution – CC – ATP, Software Requirements Test report	A402285	CU, 04/04/2018
Urbalis Evolution – ZC Software Requirements Test Description Verification Report	T23-A402921	BR, 12/12/2017
Urbalis Evolution CC ATP Software Requirements Test Description Verification Report	Y3-64 A402284	CG, 10/04/2018
Urbalis Evolution CC ATP Software Requirements Test Description	A401878	CF, 03/04/2018
Urbalis Evolution Carborne Controller – Subsystem Test Report	UEVOL-0140	EK, 06/04/2018
Urbalis Evolution ATC, Subsystem Validation Report	UEVOL-1275	BE, 06/04/2018
Urbalis Evolution – Zone Controller, Subsystem Test Report	UEVOL-1186	CQ, 04/04/2018
Urbalis Evolution ATC ZC, Subsystem Requirements Test Description Verification Report	UEVOL-0827	BW, 06/04/2018
ATC-CC Subsystems Requirements Test Description Verification Report	UEVOL-0826	BK, 09/04/2018
ATC Subsystems Integration Test Description Verification Report	UEVOL-0825	AU, 28/03/2018
Urbalis Evolution Zone Controller Subsystem Test Report	UEVOL-1186	CQ, 04/04/2018
Urbalis Evolution Carborne Controller, Subsystem Test Report	UEVOL-0140	EK, 06/04/2018
CC Subsystem Requirement Test Description Verification Report	UEVOL-0826	BK, 09/04/2018
Urbalis Evolution – ATC Software, Global V&V Report	A402597	CJ, 06/04/2018
Urbalis Evolution – ATC Software, Spot-checking report	A408174	BS, 06/04/2018
Urbalis Evolution – Zone Controller Subsystem Tests Description	UEVOL-0969	BY
Urbalis Evolution – Carborne Subsystem Tests Description	UEVOL-0139	DP



Title of Document	Alstom Reference	Release/Date
Trainborne Software Assurance Report	A402620	Release GK, 20/04/18
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	CB, 29/3/18
Safety Addendum STR 6.Y.Z.M	TRV1207018338	D, 13/3/18
CC non vital software requirement specification	A401763	DP, 12/01/18
CC-NV Sw Requirements TR	A402286	DD, 24/01/18
CC ATO Software Requirements Test Description	A401879	CJ, 18/01/18
CC non-vital requirements test description verification report	A402920	BT, 24/01/18
CC-NV SCVR	A402911	V, 14/02/18
Potential Ghost Train at ZC Frontier	UEVOL-4031	vB, 22/12/17
U400 ATC Software, Minor – Major Change Assessment	UEVOL-3922	vl, 20/3/18
Urbalis Evolution – CC Vital	E136715	vX, 6/4/18
Urbalis Evolution – ZC, B Verification Reports	E136716	vAB, 11/12/17

ATC Baseline 11.4.3.4 Review (June – August 2018)

Table 69: Documents Reviewed for ATC Baseline 11.4.3.4

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ATC Software Software Safety, Validation and Verification Plan	T-23 A401582	Z. 15/03/2018
ATC SW U400 CC Vital – Formal Proof Document	A402843	DB, 27/04/2018
U400 zONE CONTROLLER (ZC) – Formal Proof Document	T23-A402844	DI, 15/05/2018
Urbalis Evolution – ATC Software Global V&V Report	A402597	CK. 22/05/2018
Urbalis Evolution – CC Report	A403516	EQ. 28/11/2017
Urbalis Evolution – CC Software Impact Analysis	A403516	EX. 20/04/2018
Urbalis Evolution – ZC & TDG Software Impact Analysis	A404257	CU, 24/04/2018
Urbalis Evolution – ZC & TDG Software Impact Analysis	A404257	CK, 24/03/2017
Urbalis Evolution – Carborne Controller Vital Software Software Integration Test Description	A402309	BT. 19/04/2018
Urbalis Evolution – CC Vital Software Integration Test verification report	T-23 A402273	BS, 20/04/2018
Urbalis Evolution – Carborne Controller Vital Software Software Integration Test Plan	A402308	AN, 18/04/2018
Urbalis Evolution – Carborne Controller Vital Software Software Integration Test Report	A402310	BU. 19/04/2018
Urbalis 400 – TDG Software Module Description	A418523	AO, 08/11/2017
ATC SW U400 – ATC Software Release Note 11.4.5-1	T23-A402307	JA, 28/05/2018
ATC SW U400 - CC Software Release Note 11.4.	T23-A402045	FO, 25/05/2018
ATC SW U400 - Wayside Software Release Note 11.4.8	T23-A402079	DA. 25/05/2018
ATC Software U400 – Requirement Management Plan	T-23 A401827	D, 09/07/2013
Software Module Description Verification Report (for Track Data Generator)	A419763	AA. 03/05/2018
– Source Code Verification Report	T-23 A402606	CS. 08/04/2018



Title of Document	Alstom Reference	Release/Date
and TDG – Source Code Verification Report	T-23 A402912	BK, 17/05/2018
UEVOL CC – Vital Software – Source Code Verification Report	T-23 A402606	CS, 08/04/2018
Urbalis Evolution – ATC SW Spot-Checking Report	A408174	BT, 22/05/2018
Urbalis Evolution – CC_ATP SW Requirements Test Description Verification Report	Y3-64 A402284	CH, 27/04/2018
Urbalis Evolution – Carborne Controller Software Safety Requirement Report	A402319	CX, 14/05/2018
Urbalis Evolution CC_ATP – Software Requirements Test Description	A401878	CG, 24/04/2018
Urbalis Evolution – CC_ATP – Software Requirements Test Report	A402285	CV, 27/04/2018
Urbalis Evolution – Zone Controller Software Requirements Test Plan	A401691	BM, 03/05/2018
Urbalis Evolution – Trackside – Software Requirement Report	Y3-64 A402317	CL, 23/05/2018
Urbalis Evolution – Architecture & Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AG, 16/03/2017
Urbalis Evolution – ATC Interface Hazard Analysis	UEVOL-0431	AZ, 14/02/2018
Urbalis Evolution – ATC Subsystem Safety, Verification, and Validation Plan	UEVOL-0353	J_PlusI, 28/08/2017
Urbalis Evolution ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	Y, 20/03/2017
ATC I1.4.3.4 - ATC Sub system impact analysis	UEVOL-2408	CE, 22/05/2018
ATC I1.4.2.2 – ATC Sub system impact analysis	UEVOL-2408	BV, 31/08/2017
ATC I1.4.2.3 – ATC Sub system impact analysis	UEVOL-2408	BV_PlusI, 02/11/2017
Urbalis Evolution – ATC Subsystem Requirements Test Description	UEVOL-0138	AR, 03/05/2018
Urbalis Evolution – ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	AU, 17/05/2018
Urbalis Evolution ATC – Subsystem Validation Report	UEVOL-1275	BF, 07/05/2018
Urbalis Evolution – Carborne Controller Subsystem Test Report	UEVOL-0140	EL, 21/05/2018
Urbalis Evolution - ATC – CC Subsystem Requirements Test description Verification Report	UEVOL-0826	BM_PlusI, 25/05/2018
Urbalis Evolution – Carborne Controller Subsystem Test Description	UEVOL-0139	DM
Urbalis Evolution – ATC Subsystem Integration Test Description	UEVOL-0137	AR, 03/05/2018
Urbalis Evolution – ATC Subsystem Integration Report	UEVOL-1046	BF, 08/05/2018
Urbalis Evolution – ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	AV, 16/05/2018
URBALIS EVOLUTION – Zone Controller Subsystem Tests Report	UEVOL-1186	CR, 02/05/2018
URBALIS EVOLUTION – Zone Controller Subsystem Test Descriptions	UEVOL-0969	BX
URBALIS EVOLUTION – ATC ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	BX, 11/05/2018
URBALIS EVOLUTION – ZC-ZC Interface Description	UEVOL-0192	AW, 24/20/2017
Urbalis Evolution – CC Vital	E136715	vY, 17/5/18
Specific Safety Study on Trackside ATC Parameters	A402904	vAN, 10/4/18
ATC Configuration Rules Safety Study	UEVOL-1574	vAW+I
ATC Subdivision Rules Specific Study	UEVOL-1027	vAL, 27/4/18



Title of Document	Alstom Reference	Release/Date
Urbalis Evolution – ZC, B Verification Reports	E136716	vAG, 22/5/18
U400 ATC Software, Minor-Major Change Assessment	UEVOL-3922	vJ, 20/5/18
U400 ATC SW Release Note	A402307	JA, 28/05/18
U400 WS - SwRS ZC	A401380	EF, 20/04/18
UEVOL CC ATP Software Requirements Specification	A401464	EC, 16/04/18
U400 - CC Vital - SwAD CC	A401466	CG, 16/04/18
U400 WS - SwAD WS	A407321	BQ, 02/11/17
CC Software Impact Analysis	A403516	EX, 20/04/18
UEVOL CC-V: ATP and VESG, Software Module Test Description	A402313	BR, 19/04/18
ATC SW Urbalis Evolution – CC-Vital, Software Module Test Description Verification Report	A402266	CA, 20/04/18
UEVOL-CC-V: ATP and VESG Software Module Test Description	A402314	CH, 19/04/18
CC Software Hazard Analysis	A401823	CD, 24/04/18
ZC ASw AND TDG - SwMTD	A402290	C, 12/03/18
ZC Software Impact Analysis	A404257	CU, 24/04/18
ZC Software Module Test Description Verification Report	A402925	BB, 21/03/18
ZC Sw Module Test Report	A402291	BG, 12/03/18
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	BV, 19/07/17
	A401528	CO, 22/05/18
ATC Ssy-Sw Requirement Specification VR (CC)	A402598	DJ, 27/04/18
ZC SysRS SyAD SwRS Verification Report	A419074	AB, 04/04/18
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	UEVOL-3013	AC, 07/11/17
CC software RS/AD Verification Report	UEVOL-2700	Uplul, 15/03/18
U400 ATC Exported Constraints 11.3.2	UEVOL-2701	Wplus3, 24/04/18
ATC Ssy-Sw Requirement Specification VR (CC)	A444099	AJ, 07/05/18
ZC SysRS SyAD SwRS Verification Report	A436803	AO, 03/05/18
ZC Subsystem Architecture Description and Software Requirements Specification Verification Report	A402938	BB, 26/04/18
CC software RS/AD Verification Report	A401804	BJ, 29/11/17
U400 ATC Exported Constraints 11.3.2	E110963	AA, 08/02/17
Trackside SwSRR	A402317	CL, 23/05/18
CC Software Safety Requirement Report	A402319	CX, 14/05/18
ATC tools Configuration Delivery Sheet	UEVOL-R-4125	16/04/18
<ATC Data Generation Procedure 1st Chain>	UEVOL-1666	AL, 19/04/18
<ATC Data Generation Procedure 2nd Chain>	UEVOL-1667	AL, 19/04/18
ZC Parameter Configuration Rules	UEVOL-0396	IBFplus1, 31/10/17
ATC Subdivision Rules	UEVOL-0395	AWplus1, 19/04/18
LC Parameter Configuration rules	UEVOL-0397	T, 22/08/17
ATC tool delivery sheet	UEVOL-0290	BL, 24/10/17



Title of Document	Alstom Reference	Release/Date
CC Sub-system Hazard Analysis CC SSHA	UEVOL-0542	BF, 09/04/18
ZC Subsystem: Subsystem Hazard Analysis	UEVOL-0543	BR, 24/04/18
ATC System Hazard Analysis	UEVOL-0831	AS, 15/05/18
ATC Safety Exported Constraints	UEVOL-1704	CY, 30/05/18
ATC Hazard Log	UEVOL-1705	DD, 30/05/18
CC Subsystem Requirements Test Description	UEVOL-0139	DM, 04/05/18
ATC Subsystems Requirement Test Description Verification Report	UEVOL-0824	AU, 17/05/18
ATC Validation Allocation Table	UEVOL-1169	BH, 03/04/18
ATC subsystems Requirements Test Description	UEVOL-0138	AR, 03/05/18
CC Subsystem Requirements Test Description	UEVOL-0139	DLI, 18/04/18
ATC Subsystem Requirement Validation Table	UEVOL-3757	Q, 15/05/18
System Parameters Description	UEVOL-0248	CE, 22/05/18
ATC Subsystem Verification and Validation Report	UEVOL-1171	DT, 23/05/18
DGC_GADI_Tool v13.2.5		
DGC_GAD2_Tool v13.2.3		
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AL, 19/04/18
Gen ATC Data - System Requirement Test Description	UEVOL-1671	AL, 14/06/18
Gen ATC Data – Test Lines Specification	UEVOL-0401	AL, 16/06/18
Gen ATC Data - System Requirement Test Report (two parts)	UEVOL-1672	AL, 19/04/18
CR analysis	UEVOL-1988	JH
ATC safety case	UEVOL-0887	EM, 31/05/18
ATC 11.4.3.4 delivery sheet	UEVOL-R-3740	11/05/18
CC software RS/AD Verification Report	A401804	BJ, 29/11/17
UEVOL-ATO Software: Architecture Description	A401467	BI, 11/9/17
CC non-vital requirements test description verification report	A402920	BV, 29/03/18
CC Software Impact Analysis	A403516	EX, 20/04/18
U400 - CC-Non vital - SwRS CC 11.3.14	A401763	OQ, 06/02/18
CC ATO Software Requirements Test Description	A401879	CK, 23/03/18
CC-NV Sw Requirements TR	A402286	DE, 25/03/18
CC-NV SCVR	A402911	W, 06/03/18
ATC GSD GenRTS module, Software Requirements Test Report	UEVOL-2589	5R, 22/11/17
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	W, 12/04/18
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	10v, 11/12/17
Urbalis Evolution – GAD Chain 1 Requirement Test Report	UEVOL-1754	AB, 13/07/18
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	CE, 27/04/18
Data Prep Rule Traceability Verification	UEVOL-0164	F, 06/03/18
ATC Software Safety Assurance Report	A402620	GM, 30/5/18
Specific Safety Study – Automatic Protection	A402331	AK, 4/5/18
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818	BY, 27/4/18



Title of Document	Alstom Reference	Release/Date
ATC Subsystem Requirement Specification and Architecture Description Verification Report	UEVOL-0816	BG, 29/11/17

ATC Baseline 12.4.1.2 Review (July – October 2018)

Table 70: Documents Reviewed for ATC Baseline 12.4.1.2

Title of Document	Alstom Reference	Release/date
U400 Zone Controller (ZC), Formal Proof Document	A402844	DJ, 16/05/2018
ATC Sw U400 CC Vital Formal Proof Document	A402843	DC, 05/06/2018
ZC TDG Software, Software Impact Analysis	A404257	CV, 05/04/2018
CC Software – Software Impact Analysis	A403516	EY, 06/06/2018
UEVOL Trackside ZC and TDG Source Code Verification Report	A402912	BL, 25/05/2018
UEVOL CC Vital Software Source Code Verification Report	A402606	CT, 29/05/2018
UEVOL – Zone Controller Software Requirements Test Plan	A401691	BN, 05/06/2018
ZC_ASW Software Requirements Test Report	A402289	CJ, 31/05/2018
ATC Design Verification Plan	UEVOL-1170	AH, 24/03/2017
ATC Subsystem Impact Analysis	UEVOL-2408	CF, 14/06/2018
Carborne Controller Subsystem Test Report	UEVOL-0140	EM, 05/06/2018
ATC – CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	BN3, 06/06/2018
Zone Controller Subsystem Test Report	UEVOL-1186	CS2, 26/06/2018
ATC-ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	BY, 05/06/2018
Line Controller Subsystem Test Report	UEVOL-1011	AD1, 14/06/2018
Urbalis Evolution System ATC 12.412 – Subsystem Delivery Sheet	UEVOL-R-3762	27/06/2018
Urbalis Evolution ATC Subsystem Integration Report	UEVOL-1046	AY, 11/06/2018
Urbalis Evolution ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	AW, 08/06/2018
Urbalis Evolution ATC Subsystem Validation Report	UEVOL-1275	BG2, 27/06/2018
ZC-ZC Interface Description	UEVOL-0192	AY, 15/02/2018
ATC Interface Hazard Analysis	UEVOL-0431	BB, 25/05/2018
UEVOL ATC Safety Exported Constraints	UEVOL-1704	CZ, 27/06/2018
ATC Subsystem Impact Analysis – ATC 12.3.2.1	UEVOL-02408	BS, 15/05/2017
Interface Hazard Analysis (ATC)	UEVOL-0431	BB, 25/05/2018
ATC Sw U400 ATC Software Release Note 12.4.0-1	A402307	JD, 29/06/2018
ATC Sw U400 CC Software Release Note 12.4.2	A402045	FP, 22/06/2018
U400 Wayside Software Release Note 12.4.2	T23-A402079	DB, 22/06/2018
Urbalis Evolution ATC Subsystem Software Safety Validation and Verification Plan	A401582	WV, 23/03/2017
CBI REG 13.1.2 Sub-System Delivery Sheet	UEVOL-R-3763	03/07/2018
LC-ASW – Software Requirements Test Report	A402293	Y, 31/05/2018
CC_ATP Software Requirements Test Report	A402285	CW, 08/06/2018



Title of Document	Alstom Reference	Release/date
ZC_ASW Software Requirement Test Report	A402289	CJ, 31/05/2018
LC SW Requirements Test Description Verification Report	A402922	V, 04/06/2018
ZC Sw Requirements Test Description Verification Report	A402921	BY, 06/06/2018
CC_ATP SW Requirements Test Description Verification Report	A402284	CI, 11/06/2018
ZC Software Requirements Test Description	A401881	CG
CC ATP Software Requirements Test Description	A401878	CH
CC Subsystem Requirements Test Description	UEVOL-0139	
ATC Software Global V&V Report	A402597	CL, 08/06/2018
ATC SW Spot Checking Report	A408174	BU, 08/06/2018
ZC Sub System Requirement Test Description	UEVOL-0969	CAI
ATC Subsystem Integration Test Description	UEVOL-0137	AU
LC - Software Impacts Analysis 12.4.0	A405062	AC, 30/05/2018
U400 WS - SwRS ZC 12.4.0	A401380	DX, 27/02/2018
ZC - Software Impact Analysis ZC 12.4.2	A404257	CV, 05/04/2018
U400 WS - SwAD WS 12.4.0	A407321	BU, 27/02/2018
U400 Wayside SwRSAD-VR 12.4.2	A402938	BC, 01/06/2018
U400 WS - SwMD TDG 12.4.0	A418523	AR, 27/02/2018
U400 CC - Software Impacts Analysis 12.4.1	A403516	EY, 06/06/2018
U400 - CC Vital - SwRS CC 12.4.1	A401464	EE, 17/05/2018
U400 - CC Vital - SwAD CC 12.4.1	A401466	2CE, 25/05/2018
URBALIS EVOLUTION - CC SW - SwRS/AD-VR CC 12.4.2	A401804	BM, 06/06/2018
U400 CC-V: ATP SOFTWARE MODULE TEST DESCRIPTION ATP 12.4.1	A402313	BS, 04/06/2018
U400 CC Vital - SwMTDVR ATP 12.4.1	A402266	CB, 06/06/2018
U400 CC-V: ATP SOFTWARE MODULE TEST REPORT ATP 12.4.1	A402314	CI, 04/06/2018
U400 ZC 12.4.2 TDG 12.4.0 SwMTDVR	A402925	BC, 10/05/2018
U400 ZC 12.4.2/TDG 12.4.0 ASw- SwMTR	A402291	BH, 09/05/2018
U400 CC Vital - SwITP ATP 12.4.1/VESG 12.4.1	A402308	AO, 06/06/2018
U400 CC Vital - SwITD ATP 12.4.1/VESG 12.4.1	A402309	BU, 06/06/2018
U400 CC Vital - SwITDVR ATP 12.4.1/VESG 12.4.1	A402273	BT, 08/06/2018
U400 CC Vital - SwITR ATP 12.4.1/VESG 12.4.1	A402310	BV, 06/06/2018
U400 ZC 12.4.2/TDG 12.4.0- SwITD	A402270	BA, 29/05/2018
U400 ZC - SwITDVR ZC 12.4.2/TDG 12.4.0	A402928	AY, 30/05/2018
U400 ZC - SwITR 12.4.2/TDG 12.4.0	A402272	AZ, 29/05/2018
ATC Requirements Specification and Architecture Description	UEVOL-3013	AE, 14/02/2018
LC Requirements Specification and Architecture Description	UEVOL-2702	Q, 14/02/2018
CC Requirements Specification and Architecture Description	UEVOL-2700	X_PLUSI, 17/04/2018
ZC Requirements Specification and Architecture Description - ATC 12.4.1	UEVOL-2701	AD_PLUSI, 20/04/2018
LC Parameters Configuration Rules	UEVOL-0397	T, 22/08/2017



Title of Document	Alstom Reference	Release/date
ATC Subsystem Subdivision Rules - Baseline - bsl ATC 12.4.1	UEVOL-0395	AR_PLUS1, 29/05/2018
CC Vital setting Description CC SW 12.4.1 - ATC 12.4.0	UEVOL-0643	BI, 25/05/2018
ATC Safety Hazard Analysis	UEVOL-0831	AU, 17/04/2018
CC Sub-System Hazard Analysis	UEVOL-0542	BH, 24/05/2018
ZC Sub-System Hazard Analysis	UEVOL-0543	BU, 01/06/2018
ATC Subsystem RVT - Requirements Validation Table	UEVOL-3757	R, 16/06/2018
ATC Validation Allocation Table	UEVOL-1169	BJ, 11/06/2018
ATC Sub-system impact analysis	UEVOL-2408	CF, 14/06/2018
ATC V&V report	UEVOL-1171	DU, 18/06/2018
ATC HAZARD LOG	UEVOL-1705	DE, 15/06/2018
U400 - LC SyRSAD - SwRS Verification Report 12.4.0	A444100	L, 05/06/2018
U400 ZC SyRS - SwRS Verification Report 12.3.4	A436803	AB, 05/06/2018
U400 CC SyRS - SyAD - SwRS Verification Report 12.4.2	A444099	AK, 14/04/2018
URBALIS EVOLUTION - CC SW - SwRS/AD-VR CC 12.4.2	A401804	BM, 06/06/2018
U400 CC Non-vital SwAD CC 12.4.0	A401467	BN, 09/03/2018
U400 CC - Software Impacts Analysis 12.4.1	A403516	EY, 06/06/2018
CC_NV - Software Requirements Tests Description 12.4.0	A401879	CL, 05/06/2018
CC_NV - SwRTR 12.4.0	A402286	BF, 05/06/2018
CC_ATO - SwRTDVR CC-NV 12.4.0(CC_SW 12.4.1)	A402920	BW, 07/06/2018
U400 - CC-Non vital - SwRS CC 12.4.0	A401763	DS, 09/03/2018
U400 ATO and NVESG Source Code Verification Report 12.4.0	A402911	X, 16/05/2018
UEVOL ATC subsystem Requirements Test Plan	UEVOL-0113	E, 10/06/2014
ATC Subsystem : System Requirement Test Description Verification Report	UEVOL-0824	AV, 08/06/2018
UEVOL ATC subsystem Requirements Test Description document	UEVOL-0138	AU, 11/06/2018
ATC Sub-system impact analysis	UEVOL-2408	CF, 14/06/2018
ATC 12.4.1.2 Sub-System Delivery Sheet	UEVOL-R-3762	, 27/06/2018
Uevol CR analysis	UEVOL-1988	JJ, 16/07/2018
ATC Sub System Safety Case	UEVOL-0887	EN, 29/06/2018
U400 ATC SW Release Note 12.4.0-1 - ATC 12.4.1.2 Official Release for Revenue Service	A402307	JD, 29/06/2018
U400 - CC - SwHA CC 12.4.1	A401823	CE, 06/06/2018
U400 - ZC SwHA 12.4.2	A401824	CF, 04/06/2018
U400 - CC-Vital Sw Safety Requirements Report for CC Sw 12.4.2 (ATP 12.4.1, VESG 12.4.1)	A402319	CY, 20/06/2018
U400 WS - Software Safety Requirements Report WS 12.4.2 (ZC 12.4.2)	A402317	CM, 20/06/2018
U400 WS - CCRAR LC 12.3.1	A402322	AG, 11/05/2017
U400 WS - CCRAR ZC 12.4.2	A402528	CP, 20/06/2018
U400 - CC CCRAR 12.4.2 (CC-ATP 12.4.1)	A402598	DK, 20/06/2018
U400 WS CCRAR TDG 12.4.0	A419074	AC, 04/04/2018



Title of Document	Alstom Reference	Release/date
TDG SwMDVR 12.4.0	A419763	AB, 17/05/2018
U400 WS - SwMD TDG 12.4.0	A418523	AR, 27/02/2018
U400 CC - VESG - CCRAR (VESG 12.4.1)	A406392	BG, 20/06/2018
Specific Safety Study on UEVOL CC-V Parameters	A402903	vAW, 12/6/18
Specific Safety Study on Trackside ATC Parameters	A402904	vAO, 11/6/18
ATC Subdivision Rules Specific Study	UEVOL-I-27	vAM, 21/6/18
ATC Configuration Rules Safety Study	UEVOL-I574	vAX, 6/6/18
ATC WS SW Impact Analysis on MooN USB Key Generation with Respect to MooN R1.0.3.1 PI Release	UEVOL-R-3758	Rev. 02, 22/6/18
Software Compilation Validation ZC-LC Application	A404113	vF, 12/6/18
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	vG, 2/7/18
Urbalis Evolution – LC, B Verification Report	E136717	vL, 5/6/18
Urbalis Evolution – C C Vital	E136715	vZ, 8/6/18
U400 ATC Software, Minor-Major Change Assessment	UEVOL-3922	vK, 20/6/18
Urbalis Evolution – ZC, B Verification Report	E136716	vAH, 6/6/18
Specific Safety Study – Automatic Protection	A402331	AQ, 19/6/18
ATC Software Safety Assurance Report	A402620	GN, 27/6/18
ATC Subsystem requirement specification verification report	UEVOL-0818	CC, 30/4/18
MooN Generic Product Safety Case	TRV1372005539	E, 28/10/16
MooN ISA Safety Assessment Report	S.PI494.40.8	I.2, 23/11/16
Erroneous AP localization after point movement	UEVOL-4049	A, 19/10/18

ATC Baseline 11.4.3.5 Review (March 2019)

Table 71: Documents Reviewed for ATC Baseline 11.4.3.5

Title of Document	Alstom Reference	Release/date
Urbalis Evolution – ATC Subsystem Safety, Verification, and Validation Plan	UEVOL-0353	J_Plus_2, 31/07/18
Urbalis Evolution – GAD Chain I Requirement Test Report	UEVOL-1754	AD, 06/02/19
DGF_GAD I	UEVOL-0851	N,
Gen ATC Data - System Requirement Test Report (two parts)	UEVOL-1672	AP, 27/02/19
ATC Sub System Safety Case	UEVOL-0887	EU, 14/03/19
ATC 11.4.3.5 tool delivery sheet	UEVOL-R-4824	28/02/19
ATC 11.4.3.5 subsystem delivery sheet	UEVOL-R-3855	14/03/19
U400 ATC Software, Minor-Major Change Assessment	UEVOL-3922	12/02/19
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	F_plus_1, 25/03/19



ATC Baseline 10.5.5.8 Review (April - July 2019)

Table 72: Documents reviewed for ATC baseline 10.5.5.8

Title of Document	Alstom Reference	Release/date
ATC Parameters Process Hazard Analysis	UEVOL-0544	vM+3, 8/4/19
ATC RIO Parameter Process Hazard Analysis	UEVOL-2142	vD, 31/10/17
ATC Subdivision Rules Specific Study	UEVOL-1027	vAP, 30/1/19
ATC Configuration Rules Safety Study	UEVOL-1574	vBA, 16/4/19
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	vJ, 17/4/19
Specific Safety Study on Tracksides ATC Parameters	A402904	vAS, 6/3/19
Urbalis Evolution – LC, B Verification Reports	E136717	vM, 14/3/19
Specific Safety Study on UEVOL CC-V Parameters	A402903	vBA, 6/3/19
Urbalis Evolution – CC Vital	E136715	vAF, 22/3/19
Urbalis Evolution – ZC, B Verification Reports	E136716	vAM, 14/3/19
ATC Requirements Specification and Architecture Description	UEVOL-3013	AF_plus_1, 05/11/18
LC Requirements Specification and Architecture Description	UEVOL-2702	O_Plus_2, 05/11/18
ZC Subsystem Requirements Specification	UEVOL-0114	BX_plus_4, 05/11/18
CC Subsystem Requirements Specification	UEVOL-0098	BW_plus_3, 14/12/18
CC-Parameters Description	UEVOL-0643	BL, 24/10/18
CC Subsystem, Sub-system Hazard Analysis	UEVOL-0542	BI, 14/03/19
ZC Subsystem Hazard Analysis	UEVOL-0543	BW, 19/03/19
ATC System, System Hazard Analysis	UEVOL-0831	AV, 07/11/18
ATC Validation Allocation Table	UEVOL-1169	BM, 10/04/19
ATC delivery sheet	UEVOL-R-3871	19/04/19
UEVOL ATC Safety Exported Constraints	UEVOL-1704	DF, 16/04/19
ATC Hazard Log	UEVOL-1705	DJ, 16/05/19
ATC Verification & Validation Report	UEVOL-1171	EB, 12/04/19
ATC Verification & Validation Report	UEVOL-1171	EB_PLUS1, 5/07/19
ATC SwRN	A402307	KA, 16/04/19
CC SwRN	A402045	FZ, 15/04/19
Tk SwRN	A402079	DH, 15/04/19
CC Impact Analysis	A403516	FH, 11/04/19
Urbalis Evolution - ZC Software, Software Impact Analysis	A404257	DA, 26/10/18
Urbalis Evolution – ZC Application Software Requirements Specification	A401380	EP, 31/01/19
CC Vital Software Requirements Specification	A401464	EK,
CC Software Architecture Description	A401446	CC, 22/02/19
CC Impact Analysis	A403516	AY, 15/02/17
CC vital Software Architecture Description	A401466	CM, 21/12/18
U400 WS - SwAD WS	A407321	CB, 04/11/18
CC Software Hazard Analysis	A401823	CI, 15/03/19



Title of Document	Alstom Reference	Release/date
ZC Software Hazard Analysis	A401824	CJ, 20/03/19
U400 WS - CCRAR ZC	A402528	CW, 11/03/19
ZC: Software Safety Requirement Report	A402317	CS, 28/03/19
LC: Software Safety Requirement Report (note: title should refer to 'Carborne Controller')	A402319	DF, 27/03/19
ZC System Architecture Description and Software Requirements Specification Verification Report	A402938	BG, 11/03/19
ATC Sw Requirement Specification Verification Report	A401804	BR, 01/04/19
CC Vital Software, Software Module Design	A406966	AM, 26/10/18
CC SYRS-SYAD-SWRS VERIFICATION REPORT	A444099	AP, 11/04/19
ZC SysRS SyAD SwRS Verification Report	A436803	AT, 22/01/19
UEVOL Trackside ZC Source Code Verification Report	A402912	BP, 28/02/19
UEVOL Trackside LC Source Code Verification Report	A402913	Z, 28/02/19
ZC ASw Sw Module Test Description	A402290	F, 05/03/19
ZC Sw Module Test Description Verification Report	A402925	BG, 13/03/19
ZC Sw Module Test Report	A402291	BL, 05/03/19
LC Software Module Test Description	A402264	O, 05/03/19
LC Software Module Test Description Verification Report	A402926	V, 07/03/19
LC Software Module Test Report	A402265	AA, 05/03/19
Specific Safety Study - Automatic Protection	A402331	BY, 15/03/19
CC Software Module Test Description Verification Report	A402266	CH, 19/03/19
CC Software Module Test Report	A402314	CO, 18/03/19
List of baseline in maintenance	UEVOL-3921	A, 09/03/17
ATC tools configuration delivery sheet v10.5.5.8.2	UEVOL-R-4894	17/04/19
LC Parameters Configuration Rules	UEVOL-0397	S_plus_1, 26/03/18
ZC Parameters Configuration Rules	UEVOL-0396	BC_plus_3, 27/03/18
ZC Sub-system Configuration Files Specification	UEVOL-0290	BS, 01/10/18
LC Sub-system Configuration File Specification	UEVOL-0392	T, 01/10/18
Urbalis Evolution – GAD Chain I Requirements Test Report	UEVOL-1754	AC plus Z, 18/05/19
DGF_GAD1	UEVOL-0851	
ATC Gen Par Module Evolution Software Requirements Test Report	UEVOL-2591	Z, 23/04/19
DGC_GAD2_v10.8.2.7		
Gen ATC Data – System Requirement Test Plan	UEVOL-1670	AP, 19/04/19
Gen ATC Data – Test Lines Specification	UEVOL-0401	AP, 19/04/19
Gen ATC Data - System Requirement Test Description	UEVOL-1671	AP, 19/04/19
Gen ATC Data-System Requirement Test Report PART (for GAD2)	UEVOL-1672	AQ, 19/04/19
ATC Subsystem: Exported Constraint Verification Report	UEVOL-2525	AD, 06/03/19
CR analysis	UEVOL-1988	JR
Safety case	UEVOL-0887	EW, 17/04/19
UEVOL-ATO Software: Architecture Description	A401467	BV, 22/02/19



Title of Document	Alstom Reference	Release/date
UEVOL CC ATO Software Requirements Specification	A401463	AE, 11/02/19
CC ATO Software Requirements Test Description	A401879	CQ, 10/04/19
CC-NV Sw Requirements TR	A402286	DK, 11/04/19
CC non-vital requirements test description verification report	A402920	CB, 10/04/19
LC System Hazard Analysis	UEVOL-0430	Y, 19/03/19
CC-NV SCVR	A402911	AB, 05/04/19
CENELEC 50128_2011 traceability tables	E110574	B, 19/04/19
ATC Sw U400 ATC Software Release Note	T23-A402307	KA, 16/04/2019
ATC Sw U400, CC Software Release Note 10.5.42	T23-A402045	FZ, 15/04/2019
ATC Sw U400, U400 Wayside Software Release Note 10.5.34	T23-A402079	DH, 15/04/2019
Urbalis Evolution, TDG Software Module Description	A418523	AZ, 14/11/208
Urbalis Evolution TSG Software Module Description Verification Report (for track data generator)	A419763	AF, 11/03/2019
U400 Zone Controller (ZC) – Formal Proof Document	T23-A402844	DW, 31/01/2019
ATC Sw U400 CC Vital – Formal Proof Document	A4012843	DJ, 23/01/2019
Trackside ZC Source Code Verification Report	A4012912	BP, 28/02/2019
U400 CC-Vital Software, Source Code Verification Report	T-23 A4022602	CZ, 04/03/2019
Urbalis Evolution ATC Software Exported Constraints	E110963	AF, 22/02/2019
U400 Line Controller (LC), Formal Proof Document	T-23 A402845	V, 08/03/2018
ATC 10.5.5.8-3 Subsystem Delivery Sheet	UEVOL-R-3871	19/04/2019
ATC 10.5.5.8-4 Sub-System Delivery Sheet	UEVOL-R-4427	29/7/19
ATC Subsystem Impact Analysis 10.5.5.8	UEVOL-2408	CK+1, 12/04/2019
Urbalis Evolution ZC Subsystem Test Report	UEVOL-1186	CY, 15/04/2019
Urbalis Evolution – LC Subsystem Test Report	UEVOL-1011	AE, 10/04/2019
Urbalis Evolution – CC Subsystem Test Report	UEVOL-140	EH, 19/04/2019
Urbalis Evolution – ATC – ZC Subsystem Test Report Description Verification Report	UEVOL-0827	CD, 01/04/2019
Urbalis Evolution – ATC – LC Subsystem Requirement Test Description Verification Report	UEVOL-0828	AF, 18/04/2019
Urbalis Evolution – ATC – CC Subsystem Requirement Test Description Verification Report	UEVOL-0826	BT, 04/09/2019
Urbalis Evolution ATC Subsystem Integration Test Report	UEVOL-1046	BB, 15/03/2019
Urbalis Evolution ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BP, 19/04/2019
Urbalis Evolution – ATC Subsystem Validation Report	UEVOL-1275	BL, 05/05/2019
UEVOL – ATC Subsystem Test Description Verification Report	UEVOL-0824	BA, 19/04/2019
Urbalis Evolution ATC Interface Hazard Analysis	UEVOL-0431	BC, 07/12/2018
UEVOL – CC VESG Critical Code Review Analysis Report	A406392	BL, 11/03/2019
ZC and TDG Software, Software impact analysis	A404257	DA, 26/10/2018
ZC ASW Software Requirement Test Report	A402289	CO, 04/03/2019
Urbalis Evolution – CC_ATP Software Requirements Test Report	A402285	DC, 25/03/2019



Title of Document	Alstom Reference	Release/date
LC Software Requirement Test Report	A402293	Z, 06/03/2019
LC Software Requirements Test Description Verification Report	A402922	WT, 26/03/2019
CC_ATP Sw Requirement Test Description Verification Report	Y3-64 A402284	CO, 22/03/2019
Urbalis Evolution – ZC Sw Requirement Test Description Verification Report	A402921	CC, 26/03/2019
Urbalis Evolution, LC Software Requirements Test Plan	A402192	T, 27/02/2019
Urbalis Evolution, ZC Software Requirements Test Plan	A401462	AW, 18/02/2019
Urbalis Evolution, CC Software Requirements Test Plan	A401691	BR, 18/02/2019
Urbalis Evolution, LC ASw Software Requirements Test Report	A402293	Z, 06/03/2019
ZC Application TDG, Software Integration Test Description Verification Report	T-23 A402272	BD, 06/03/2019
CC Software Integration Test Report	A402310	CB, 15/03/2019
ZC Application and TDG Integration Test Description Verification Report	A402928	BC, 07/03/2019
LC Subsystem Integration Test Description Verification Report	A402929	UY, 11/03/2019
CC Vital Software Integration Test Description Verification Report	A402273	BZ, 20/03/2019
Software Integration Test Plan, CC-Vital	A402308	AR, 15/03/2019
Software Integration Test Plan, LC	A402268	L, 06/03/2019
ZC ASW and TDG Sw Integration Test Plan	A402910	Y, 05/03/2019
LC Application Software Requirements Specification	A401381	AE, 28/11/2018
LC Application Software Hazard Analysis	A401825	AA, 20/03/2019
Critical Cord Review Analysis Report	Y3-64 A402322	AI, 11/03/2019
ATC Software Global V&V Report	A402597	CS, 29/03/2019
ATC Software Spot Checking Report	A408174	CB, 29/03/2019
Urbalis Evolution Software Hazard Analysis - TDG	A419073	A, 08/09/2011
Critical Code Review Analysis Report - TDG	A419074	AG, 06/03/2019
Software Safety Verification and Validation Plan	A401582	AB, 20/03/2019
ZC System Requirement Test Descriptions	UEVOL-0969	CE
CC System Requirement Test Descriptions	UEVOL-0139	DQ
CC Software Requirement Test Description	A401878	CM
ATC Subsystem Requirement Test Description	UEVOL-0138	AY, 09/01/2019
ZC Application and TDG, Software Integration Test Description	T-23 A402270	BE, 05/03/2019
LC Software Application Test Description	A402269	W, 06/03/2019
CC Software Integration Test Description	A402309	CA, 15/03/2019
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AL, 04/03/2019
LC SyRSAD-SwRS Verification Report	A444100	N, 23/01/2019
Urbalis Evolution – CC Software Impact Analysis	A403516	EP, 17/10/2017
Urbalis Evolution – CC Software Impact Analysis	A403516	ER, 29/12/2017
Urbalis Evolution – CC Software Impact Analysis	A403516	EO, 02/10/2017
Urbalis Evolution – CC Software Impact Analysis	A403516	EM, 03/08/2017



Title of Document	Alstom Reference	Release/date
ZC and TDG Software Impact Analysis	A40427	CL, 07/08/2017
ZC and TDG Software Impact Analysis	A404257	CM, 04/09/2017
ZC and TDG Software Impact Analysis	A404257	CN, 11/09/2017
ZC and TDG Software Impact Analysis	A404257	CR, 06/03/2018
Specific Safety Study on train kinematics	A402218	J, 8/1/18
Specific Safety Study – Automatic Protection	A402331	AS, 15/2/18
ATC Software Safety Assurance Report	A402620	GY, 15/4/19
ATC Subsystem Requirement Specification Verification Report	UEVOL-0818sss	CH+I, 23/11/18
ATO + NVESG Software, Source Code Verification Report	A402911	AB, 8/4/19
CC-Non-vital Software Requirement Specification	A401763	ED, 5/4/19
Erroneous Train Protection Size at ZC Frontier	UEVOL-4037	vB, 10/4/19
ARC 10.5.5.7-3, ATC Subsystem Impact Analysis	UVEVOL-2408	vBZ, 03/01/2018
U400 Software Tools Safety Validation Report	UEVOL-4065	vA, 17/07/2019

ATC Baseline 11.4.4.1 Review (July - September 2019)

Table 73: Documents reviewed for ATC baseline 11.4.4.1

Title of Document	Alstom Reference	Release/date
Safety Study on UEVOL CC-V Parameters	A402903	vBB, 21/6/19
ATC Configuration Rules Safety Study	UEVOL-1574	vAW+I, 22/6/19
ATC Subdivision Rules Specific Study	UEVOL-1027	vAT, 1/7/19
Urbalis Evolution – CC Vital	E136715	vAI, 19/6/19
Urbalis Evolution – ZC, B Verification Reports	E136716	vAO, 19/6/19
ATC Generic Application Safety Case, 11.4.4.1	UEVOL-0887	vEY, 10/7/20
Potential Erroneous Train Localisation After Points Movement on Specific Configuration	UEVOL-4122	vA, 9/7/19
U400 ZC Formal Proof Document	T-23 A402844	EC, 14/06/2019
ATC Software U400, CC Vital Formal Proof Document	A402843	DS, 12/06/2019
ATC Software Safety Validation and Verification Plan	T-23 A401582	AD, 21/05/2019
Urbalis Evolution, ATC Software Spot Checking Verification Report	A408174	CF, 24/06/2019
Urbalis Evolution, ATC Software Global V&V Report	A402597	CW, 24/06/2019
Urbalis Evolution, CC Software Impact Analysis	A403516	FM, 14/06/2019
Urbalis Evolution CC ATP Software Requirement Test report	A402285	DG, 19/06/2019
ZC ad TDG Software Impact Analysis	A404257	DC, 13/05/3019
Urbalis Evolution, ZC ASW Software Requirement Test Report	A402289	CQ, 04/11/2019
UEVOL, CC-Vital Software Source Code Verification Report	T-23 A402606	DC, 14/06/2019
UEVOL Trackside and TDG, Source Code Verification Report	T-23 A402912	BR, 18/06/2019
CC ATP Software Requirement Test Plan	A401462	AX, 10/06/2019
ZC Software Requirement Test Plan	A401691	BT, 14/05/2019



Title of Document	Alstom Reference	Release/date
CC-ATP Software Requirement Test Description Verification Report	Y3-64 A402284	CS, 19/06/2019
Urbalis Evolution, ZC Application and TDG Software Integration Test Report	T-23 A402272	BF, 19/06/2019
Urbalis Evolution, Carborne Controller Vital Software Integration Test Report	A402310	CE, 17/06/2019
ATC 11.4.4.1 ATC Subsystem Impact Analysis	UEVOL-2408	CO, 04/06/2019
Urbalis Evolution Carborne Controller Subsystem Test Report	UEVOL-0140	EW, 04/07/2019
Urbalis Evolution Zone Controller Subsystem Test Report	UEVOL-1186	DA, 02/07/2019
ATC 11.4.4.1 Subsystem Delivery Sheet	UEVOL-R-4419	11/07/2019
UEVOL, ATC Subsystem Validation Report	UEVOL-1275	BN, 15/07/2019
UEVOL ATC Subsystem Integration Test Report	UEVOL-1046	BD, 15/07/2019
UEVOL, CC Subsystem Requirement Specification and Architecture Description	UEVOL-2700	AC_PLUS1, 29/03/2019
UEVOL, ZC Requirement Specification and Architecture Description	UEVOL-2701	W_PLUS5, 02/04/2019
UEVOL, ZC-ZC Interface Description	UEVOL-0192	AW_PLUS1, 19/02/2019
Urbalis Evolution, CC-ZC Interface Description	UEVOL-0185	AB_PLUS1, 19/02/2019
Urbalis Evolution, ATC Interface Hazard Analysis	UEVOL-0431	BF, 29/03/2019
Urbalis Evolution, ATC Hazard Log	UEVOL-1705	DN, 05/07/2019
Urbalis Evolution – CC Subsystem Hazard Analysis	UEVOL-0542	BM, 29/03/2019
Urbalis Evolution, ZC Subsystem Hazard Analysis	UEVOL-0543	BZ, 11/06/2019
UEVOL-3013 ATC Requirement Specification and Architecture Description	UEVOL-3013	AK_PLUS1, 29/03/2019
Urbalis Evolution, ATC Subsystem Hazard Analysis	UEVOL-0831	AZ, 29/03/2019
CC Software Requirement Specification	A401464	EN, 26/04/2019
Urbalis Evolution CC-Vital Software Hazard Analysis	A401823	CK, 18/06/2019
Urbalis Evolution, CC Software Safety Requirement Report	A4022319	DJ, 29/06/2019
Urbalis Evolution, CC_Vital Critical Code Review Analysis and Report	A402598	DV, 19/06/2019
U400, ZC Application Software Requirements Specification	A401380	EW, 17/06/2019
Urbalis Evolution ZC Software Hazard Analysis	A401824	CL, 18/06/2019
Urbalis Evolutions, Trackside Software Safety Requirement Report	Y3-64 A402317	CU, 04/07/2019
Urbalis Evolution CC Software Architecture Description	Y3-T A401466	CQ, 02/07/2019
Urbalis Evolution, Trackside Software Architecture Description	A407321	CE, 27/05/2019
Urbalis Evolution, CC Software Module Design	A406966	AT, 13/06/2019
UEVOL CC-V Software Module Test Report	T-23 A402314	CR, 13/06/2019
ATC Software Urbalis Evolution, Software Module Test Report ZC ASW and TDG	A402291	BN, 13/06/2019
CC SyRSAD-SwID-SwRS CC Data Verification Report	A444099	AR, 19/06/2019
Verification – ZCSyRSAD-SwRS Verification Report	A436803	AV, 17/05/2019
ATC Subsystem Verification and Validation Report, ATC Baseline 11.4.4.1	UEVOL-1171	ED, 25/06/2019



Title of Document	Alstom Reference	Release/date
ATC Subsystem Requirement Validation Table	UEVOL-3757	WV, 28/06/2019
ATC Exported Constraints	UEVOL-1704	DH, 05/07/2019
ATC Subsystem Exported Constraint Verification Report	UEVOL-2525	AG, 28/06/2019
UEVOL-CC-VESG, Critical Code Review Analysis and Report	T-23 A406392	BN, 14/06/2019
Urbalis Evolution ZC Critical Code Review Analysis and Report	A402528	CY, 08/06/2019
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BR, 14/06/2019
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	BC, 14/06/2019
ATC Tools Configuration Delivery Sheet, v 11.4.2	UEVOL-R-4289	25/06/2019
UEVOL-2590 ATC GSD Gen SGD Module Software Requirement Test Report	UEVOL-02590	2WV, 07/06/2019
Urbalis Evolution – GAD Chain 1 Requirement Test Report	UEVOL-1754	AE, 29/05/2019
DGC_GAD1_V_PLUS1_13.2.9		
DGC_GAD2_v13.2.4		
Urbalis Evolution Gen ATC Data 0 System Requirement Test Plan	UEVOL-1670	AR, 24/06/2019
Gen ATC Data – Test Lines Specification	UEVOL-0401	AR, 18/06/2019
Gen ATC Data System Requirement Test Description	UEVOL-1671	AR, 19/06/2019
Urbalis Evolution Gen ATC Data – System Requirement Test Report – PART 1 (for GAD1)	UEVOL-1692	AS, 19/06/2019
Urbalis Evolution Gen ATC Data – System Requirement Test Report – PART2 (for GAD2)	UEVOL-1672	AS, 19/06/2019
ATC – CC Subsystem Requirement Test Description Verification Report	UEVOL-0826	BV, 14/06/2019
ATC-ZC Subsystem Requirement Test Description Verification Report	UEVOL-0827	CG, 28/06/2019
Urbalis Evolution, ATC Subsystem Requirement Test Description	UEVOL-0138	Rel. BB, 02/07/2019
ZC Application and TDG Integration Test Description Verification Report	T-23 A402928	BE, 20/06/2019
CC Vital Software Integration test Description Verification Report	T-23 A402273	CC, 18/06/2019
Software Module Test Description Verification Report	Y-64 A402925	BI, 17/06/2019
ATC Software Release Note 11.4.8	T-23 A402307	KJ, 05/07/2019
Urbalis CC-V Software Integration Test Description	A402309	CD, 17/06/2019
Urbalis Evolution CC-NV Software Requirement Test Report	A4022886	DM, 08/05/2019
ATC Validation Allocation Table	UEVOL-1169	BH, 19/06/2019
CC Software Release Note 11.4.11	T23-A402045	GF, 05/07/2019
U400 WS Software Release Note 11.4.12	A402079	DK, 05/07/2019
ATC Software Safety Assurance Report	A402620	HE, 5/7/19
Specific Safety Study – Automatic Protection	A402331	AU, 26/6/19
ATO and NVESG Software Source Code Verification Report	A402911	AD, 30/4/19
ATC Subsystem Requirements Specification and Architecture Description Verification Report	UEVOL-0816	BQ, 8/4/19
CC Software Release Note 11.4.8	A402045	7FZ, 12/4/19
ATC Software Release Note 11.4.8	A402307	KJ_Plus1, 19/8/19



Title of Document	Alstom Reference	Release/date
ATC-CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	BV_Plus1, 21/8/19
ATC Subsystem Requirements Specification and Architecture Description Verification Report	UEVOL-0816	BQ_Plus2, 30/8/19
CR Safety Review	UEVOL-1988	JT, 11/07/2019
U400 ATC Software Minor-Major Change Assessment	UEVOL-3922	Q, 01/07/2019

ATC Baseline 12.5.1.2-1 Review (January - February 2019)

Table 74: Documents reviewed for ATC baseline 12.5.1.2-1

Title of Document	Alstom Reference	Release/date
ATC Subsystem Requirements Specification and Architecture Description	UEVOL-3013	AM, 22/05/2019
LC Subsystem Requirements Specification	UEVOL-2702	Q_PLUS1, 17/05/2019
CC Subsystem Requirements Specification and Architecture Description	UEVOL-2700	AE_PLUS2, 30/08/2019
ZC Subsystem Requirements Specification and Architecture Description	UEVOL-2701	AD_PLUS3, 23/05/2019
ATC Sw U400 CC-V Formal Proof Document	A402843	DW, 18/09/2019
U400 Zone Controller Formal Proof Document	A402844	EK, 06/11/2019
Trackside ZC and TDG Source Code Verification Report	A402912	BU, 12/11/2019
UEVOL CC Vital Software Source Code Verification Report	A402606	DH, 13/11/2019
ZC ASW Software Requirements Test Report	A402289	CT, 19/11/2019
CC ATP Software Requirement Test Report	A402285	DL, 19/11/2019
CC ATP Software Requirement Test Plan	A401462	BA, 15/11/2019
ZC Software Requirement Test Plan	A401691	BW, 18/11/2019
CC Software Architecture Description	A401466	CT, 09/08/2019
UEVOL TK Software Architecture Description	A407321	CJ, 24/09/2019
UEVOL ATC Sw Spot Checking Report	A408174	CN, 25/11/2019
ZC Software Requirement Test Descriptions Verification Report	A402921	CH, 22/11/2019
CC Software Requirement Test Descriptions Verification Report	A402284	CX, 22/11/2019
ATC 12.5.1.2 Subsystem Delivery Sheet	UEVOL-7504	B, 12/12/2019
ATC 12.5.1.2-1 Subsystem Delivery Sheet	UEVOL-7504	C, 2/3/20
ATC Exported Constraints	UEVOL-1704	DL, 05/12/2019
ATC CC Subsystem Impact Analysis	UEVOL-2408	CF, 18/11/2019
CC Subsystem Requirements Test Report	UEVOL-0140	FC, 05/12/2019
ZC System Requirement Test Report	UEVOL-1186	DD, 28/11/2019
ATC Subsystem Validation Report	UEVOL-1275	BQ, 21/11/2019
ATC Subsystem Integration Test Report	UEVOL-1046	BH, 21/11/2019
ATC Safety Verification and Validation Plan	UEVOL-0353	J_PLUS2, 31/07/2018
ATC Safety Hazard Log	UEVOL-1705	DR, 02/12/2019
ATC CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	BY, 29/11/2019



Title of Document	Alstom Reference	Release/date
ATC ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	CJ, 26/11/2019
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BU, 29/11/2019
ATC System Requirement Test Description Verification Report	UEVOL-0924	BF, 29/11/2019
ATC Subsystem Verification and Validation Report ATC 12.5.1.2	UEVOL-1171	EF, 26/11/2019
ATC Validation Allocation Table	UEVOL-1169	BU, 29/11/2019
ATC Design Verification and Validation Plan	UEVOL-1170	AK, 09/12/2019
ZC Critical Code Review Analysis and Report	A402528	DB, 26/11/2019
ZC Trackside Software Safety Requirement	A402317	CX, 27/11/2019
TDG Critical Code Review Analysis and Report	A419074	AJ, 25/11/2019
VESG Critical Code Review Analysis and Report	A406392	BT, 19/11/2019
CC Critical Code Review Analysis and Report	A402598	EA, 27/11/2019
CC Software Safety Requirement Report	A402319	DP, 27/11/2019
Safety Verification and Validation Plan	A401482	AC, 26/04/2019
CC Software Module Test Report	A402314	CW, 19/11/2019
ZC and TDG Software Module Test Report	A402291	BQ, 21/11/2019
ZC and TDG Software Module Test Description Verification Report	A402925	BL, 21/11/2019
CC Software Module Test Description Verification Report	A402266	CP, 20/11/2019
CC Software Integration Test Report	A402310	CJ, 18/11/2019
CC Software Integration Test Description Verification Report	A402273	CH, 19/11/2019
ZC and TDG Software Integration Test Report	A402272	BI, 18/11/2019
ZC and TDG Software Integration Description Verification Report	A402928	BH, 19/11/2019
ATC Software – Global V&V Report	A402597	DE, 25/11/2019
ATC Software U400, CC Software Release Note 12.5.1	A402045	GL, 05/12/2019
ATC Software U400, U400 WS Sw Release Note 12.5.2	A402079	DM, 05/12/2019
ATC Interface Hazard Analysis	UEVOL-0431	BJ, 22/10/2019
ATC Software Exported Constraints	E110963	AK, 14/11/2019
Architecture & Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AS, 15/11/2019
ATC Subsystem Exported Constraints Verification Report	UEVOL-2525	AJ, 29/11/2019
ZC SyRSAD-SwRS Verification Report	A436803	AY, 21/11/2019
ZC and TDF Software Impact Analysis	A40257	DF, 16/10/2019
CC SyRS-SwID-SwRS Data Verification Report	A444099	AV, 15/11/2019
SwRS - SwAD WS Verification Report	A402938	BJ, 18/11/2019
SwRS – SwAD CC Verification Report	A401804	BV, 14/11/2019
TDG Software Module Description Verification Report	A419763	AI, 13/11/2019
UEVOL ATC Tools Configuration Delivery Sheet 12.5.2	UEVOL-R-5018	28/11/2019
ATC Subdivision Rules	UEVOL-0395	BD, 08/08/2019
ZC Parameters Configuration Rules	UEVOL-0396	BR, 22/11/2019
ATC GSD Gen RTS Module Software Requirements Test Report	UEVOL-2589	IUA, 17/09/2019



Title of Document	Alstom Reference	Release/date
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	IUA, 16/09/2019
Urbalis Evolution GAD Chain I Requirements Test Report	UEVOL-1754	AK, 25/10/2019
DGC_UEVOL_0851-AG GAD I		
DGC_GAD2_V12.5.0		
Gen ATC Data System Requirement Test Plan	UEVOL-1670	AT, 29/11/2019
Gen ATC Data Test Line Spec	UEVOL-0401	AT, 29/11/2019
Gen ATC Data System Requirement Test Descriptions	UEVOL-1671	AT, 29/11/2019
Gen ATC Data-System Requirement Test Report – PART1 (GAD1)	UEVOL-1672	AV, 29/11/2019
Gen ATC Data-System Requirement Test Report – PART2 (GAD2)	UEVOL-1672	AV, 29/11/2019
ATC Subsystem Requirement Validation Table	UEVOL-3757	X, 22/11/2019
ZC Subsystem Requirement Test Plan	UEVOL-0968	J, 10/04/2018
CR Safety Review	UEVOL-1988	JW, 10/12/2019
CC Software Interface Description	A455727	O, 07/08/2019
ATC Subdivision Rules	UEVOL-0395	BD, 8/8/19
ZC Parameters Configuration Rules	UEVOL-0396	BR, 22/11/19
CC Vital Setting Description	UEVOL-0643	BV, 24/10/19
Specific Safety Study on UEVOL CC-V Parameters	A402903	BF, 14/11/19
ATC Subdivision Rules Specific Study	UEVOL-1027	AV, 3/12/19
U400 ATC Software, Minor-Major Change Assessment	UEVOL-3922	S, 23/10/19
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	G_Plus I, 12/12/19
Urbalis Evolution – CC Vital	E136715	AO, 19/11/19
ATC Generic Application Safety Case, 12.5.1.2	UEVOL-0887	FC, 6/12/19
ATC Configuration Rules Safety Study	UEVOL-1574	BF, 6/11/19
Urbalis Evolution – ZC, B Verification Reports	E136716	AR, 9/11/19
Urbalis Evolution – CC Vital	E136715	AO, 19/11/19
Specific Safety Study on Train Kinematics	A402218	Release K, 14/11/19
ATC Software Safety Assurance Report	A402620	Release HK, 04/12/19
Specific Safety Study on Automatic Protection	A402331	Revision AX, 19/11/19
ATC Sub-system Requirement Specification Verification Report	UEVOL-0818	Release CQ, 14/11/19
ATC Generic Application Safety Case, 12.5.1.2	UEVOL-0887	FC, 6/12/19
ATC Generic Application Safety Case, 12.5.1.2-1	UEVOL-0887	FC_Plus I, 28/02/20
Configuration and Change Management Process Audit and Inspection Checklist	UEVOL-5016	A, 14/10/19
STO_000015_ATC_U400_Ssy_Manage_Safety_Inspection	UEVOL-4110	A,
STO_000108_ATC_U400_Ssy_configuration_and_change_management_inspection	UEVOL-5017	A, 22/10/19



ATC Baseline 10.5.6.3-1 Review (October 2019 - July 2020)

Table 75: Documents reviewed for ATC baseline 10.5.6.3-1

Title of Document	Alstom Reference	Release/date
ATC Requirements Specification and Architecture Description	UEVOL-3013	AH_PLUS5, 30/07/2019
Carborne Controller, Subsystem Requirements Specification	UEVOL-0098	BZ_PLUS7, 25/09/2019
LC System Requirements Specification Architecture Description	UEVOL-2702	O_PLUS4, 26/09/2019
ZC System Requirements Specification and Architecture Description	UEVOL-0114	CC, 26/09/2019
ATC Hazard Log	UEVOL-1705	DP, 25/10/2019
LC Subsystem Hazard Analysis	UEVOL-0430	X, 10/10/2019
ZC Subsystem Hazard Analysis	UEVOL-0543	CA, 27/09/2019
UEVOL ATC Safety Exported Constraints	UEVOL-1704	DJ, 25/10/2019
ATC Subsystem Impact Analysis ATC 10.5.6.1	UEVOL-2405	CR, 25/10/2019
LC Subsystem Test Report	UEVOL-1011	AG, 18/10/2019
ZC Subsystem Test Report	UEVOL-1186	DB, 18/10/2019
ATC Subsystem Validation Report	UEVOL-1275	BO, 22/10/2019
ATC Subsystem Integration Test Report	UEVOL-1046	BE, 22/10/2019
ATC CC System Requirement Test Report	UEVOL-0140	EZ, 18/10/2019
ATC Subsystem Hazard Analysis	UEVOL-0831	BA, 28/03/2019
CC Subsystem Hazard Analysis	UEVOL-0542	BN, 16/09/2019
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BS, 25/10/2019
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	BD, 25/10/2019
ATC LC Subsystem Requirements Test Description Verification Report	UEVOL-0828	AH, 18/10/2019
LC System Requirement Test Plan	UEVOL-0678	E, 29/11/2016
ATC ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	CH, 15/10/2019
ATC CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	BW, 25/10/2019
ATC Validation Allocation Table	UEVOL-1169	BR, 25/10/2019
ATC Subsystem Verification and Validation Report ATC baseline 10.5.6.1	UEVOL-1171	EE, 25/01/2019
ATC Interface Hazard Analysis	UEVOL-0431	BG, 24/04/2019
ATC 10.5.6.1-3 Subsystem Delivery Sheet	UEVOL-7510/B	25/10/2019
ATC Subsystem Integration Test Description	UEVOL-0137	BC, 22/10/2019
CC ATP Software Requirements Test Report	A402285	DI, 12/09/2019
ZC ASW Software Requirements Test Report	A402289	CO, 04/03/2019
LC ASW Software Requirements Test Report	A402293	AA, 12/10/2019
ZC ASW Software Requirements Test Report	A402289	CR, 03/10/2019
U400 LC Formal Proof Document	A402845	X, 12/06/2019
ZC Formal Proof Document	A402844	EI, 26/09/2019
CC Vital Formal Proof Document	A402843	DY, 02/09/2019
CC-V Source Code Verification Report	A402606	DE, 03/09/2019



Title of Document	Alstom Reference	Release/date
Trackside ZC and TDG Source Code Verification Report	A402912	BS, 08/10/2019
LC Source Code Verification Report	A402913	AA, 02/07/2019
CC Software Safety Requirements Report	A402319	DM, 08/10/2019
ZC Software Safety Requirements Report	A402317	CV, 18/10/2019
CC-ATP Software Requirements Test Plan	A401462	AY, 12/09/2019
LC Software Requirements Test Plan	A401692	U, 03/05/2019
LC Software Requirements Test Descriptions Verification Report	A402922	X, 14/10/2019
CC ATP Software Requirements Test Descriptions Verification Report	A402284	CV, 19/09/2019
ZC and TDG Software Integration Test Plan	A402910	Z, 10/11/2019
ZC and TDG application, Software Integration Test Report	A402272	BG, 10/10/2019
ZC and TDG, Integration Test Description Verification Report	A402928	BF, 10/10/2019
CC Software Integration Test Report	A402310	CG, 06/09/2019
LC Software Integration Test Report	A402271	W, 25/09/2019
LC Integration Test Description Verification Report	A402929	V, 26/09/2019
CC Vital Software Integration Description Verification Report	A402273	CE, 09/09/2019
CC Vital Software Module Test Description Verification Report	A402266	CM, 11/09/2019
ATC Software LC Software Module Test Description Verification Report	A402926	W, 26/09/2019
ZC and TDG Software Module Test Description Verification Report	A402925	BG, 13/03/2019
CC-V Software Module Test Report	A402314	CT, 11/09/2019
LC ASW Software Module Test Report	A402265	AB, 25/09/2019
LC Critical Code Review Analysis and Report	A402322	AJ, 11/10/2019
ATC Software Spot Checking Report	A408174	CK, 22/10/2019
CC VESG Critical Code Review Analysis and Report	A406392	BQ, 17/09/2019
ZC Critical Code Review Analysis and Report	A402528	CZ, 10/10/2019
LC SyRSAD-SwRS Verification Report	A444100	O, 09/10/2019
ATC Software Global V&V Report	A4025297	DB, 22/10/2019
ATC Software Release Note 10.5.24-1	A402307	KT, 23/10/2019
ATC CC Software Release Note 10.5.49	A402045	GK, 23/10/2019
U400 WS Software Release Note 10.5.42	A402079	DL, 24/10/2019
CC Vital Critical Code Review Analysis and Report	A402598	DX, 08/10/2019
ZC SyRS-SyAD Verification Report	A436803	AW, 30/09/2019
ZC Software Impact Analysis	A404257	DD, 30/04/2019
LC and TDG Software Impact Analysis	A405062	AF, 02/05/2019
Trackside Software Architecture Description	A407321	CI, 21/08/2019
CC Software Impact Analysis	A403516	FU, 25/09/2019
CC Vital Software Architecture Description	A401466	CS, 29/07/2019
ATC Subsystem Exported Constraint Verification Report	UEVOL-2525	AH_PLUS1, 17/10/2019
ATC Subsystem to System Exported Constraints	UEVOL-1638	AP, 19/08/2019



Title of Document	Alstom Reference	Release/date
Urbalis CC-NV, Software Requirements Test Report	A402286	DQ, 25/09/2019
CC-NV Software Requirements Test Description Verification Report	A402920	CH, 16/09/2019
CC SyRS-SyAD-SwRS Verification Report	A444099	AT, 04/10/2019
LC Subsystem Requirement Test Descriptions	UEVOL-0679	AE, 21/12/2019
UEVOL ATC Tools Configuration Delivery Sheet v10.5.6.2	UEVOL-R-5015	22/10/2019
ZC Paramters Configuration Rules	UEVOL-0396	BN_PLUS5, 30/09/2019
ATC Subdivision Rules	UEVOL-0395	BB_PLUS1, 18/09/2019
Software Requirement Test Report ATC GSD GenSGD Module	UEVOL-2590	IU, 30/04/2019
ATC GenPar Module Evolution Software Requirement Test Report	UEVOL-2591	6AA, 14/10/2019
Urbalis Evolution GAD-I Requirements Test Report	UEVOL-1754	AG, 25/10/2019
DGC_UEVOL_0851_AC_PLUS2_10.9.5	UEVOL-0851	AC_PLUS2
DGC_GAD2_v10.9.6_PLUS1		PLUS1
Urbalis Evolution Gen ATC Data SyRTP	UEVOL-1670	AS, 15/11/2019
Gen ATC Data Test Lines Specification	UEVOL-0401	AS, 18/11/2019
Gen ATC Data System Requirement Test Description	UEVOL-1671	AS, 15/11/2019
Gen ATC System Requiriement Test Report PART1 (for GAD1)	UEVOL-1672	AU, 15/11/2019
Gen ATC Data System Requirement Test Report PART 2 (for GAD 2)	UEVOL-1672	AU, 15/11/2019
Urbalis Evolution TDG Critical Code Review Analysis and Report	A419074	AI, 10/09/2019
ZC Software Requirement Test Plan	A401691	BU, 01/05/2019
ZC Software Module Test Report	A402291	BO, 10/10/2019
ZC Software Module Test Description Verification Report	A402925	BJ, 10/10/2019
CC Software Requirement Specification Architecture Description Verification Report	A401804	BT, 06/09/2019
ZC Software Requirement Specification Architecture Description Verification Report	A402938	BI, 10/10/2019
ZC Software Requirement Test Description Verification Report	A402921	CF, 16/10/2019
LC Software Hazard Analysis	A401825	AB, 10/10/2019
ATO Architecture Descriptions	A401467	BZ, 02/08/2019
CC-V Software Module Design	A406966	AO, 17/04/2019
CC Software Architecture Description	A401446	CE, 29/07/2019
CR Safety Review 10.5.6.1	UEVOL-1988	JV, 30/10/2019
ATC Configuration Rules Safety Study	UEVOL-1574	vBD, 13/5/19
CC-Vital Setting Description	UEVOL-0643	vBN+3, 29/8/19
ZC Parameters Configuration Rules	UEVOL-0396	vBN+5, 30/9/19
ATC Subdivision Rules	UEVOL-0395	vBB+1, 18/9/19
ATC Subdivision Rules Specific Study	UEVOL-1027	vAS, 26/7/19
Generic Application Safety Case ATC 10.5.6.1-3	UEVOL-0887	vFB, 24/10/19
Specific Safety Study on UEVOL CC-V Parameters	A402903	vBD, 8/10/19
Urbalis Evolution – LC, B Verification Reports	E136717	vN, 10/10/19



Title of Document	Alstom Reference	Release/date
Urbalis Evolution – ZC, B Verification Reports	E136716	vAP, 4/10/19
Urbalis Evolution – CC-Vital, B Verification Reports	E136715	vAL, 14/9/19
Urbalis Evolution – ZC Subsystem, Sub-System Hazard Analysis	UEVOL-0543	vCA, 27/9/19
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	vCM, 10/10/19
UEVOL ATO and NVESG Source Code Verification Report	A402911	AG, 23/9/19

ATC Baseline 10.6.1.3-1 Review (June - August2020)

Table 76: Documents reviewed for ATC baseline 10.6.1.3-1

Title of Document	Alstom Reference	Release/date
Specific Safety Study on Tracksides ATC Parameters	A402904	vAW, 13/5/20
Generic Application Safety Case ATC 10.6.1.2	UEVOL-0887	vFN, 7/7/20
Generic Application Safety Case ATC 10.6.1.3-1	UEVOL-0887	vFN_Plus1, 4/8/20
Urbalis Evolution – LC, B Verification Reports	E136717	vQ, 19/6/20
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	vM_Plus1, 22/4/20
Urbalis Evolution – ZC, B Verification Reports	E136716	vAW, 5/6/20
Urbalis Evolution – CC Vital	E136715	vAS, 17/6/20
Urbalis Evolution – Line Controller, Software Hazard Analysis	A401825	vAE, 8/6/20
Urbalis Evolution – ATC System, System Hazard Analysis	UEVOL-0831	vBF, 19/2/20
Urbalis Evolution – ZC Subsystem, Sub-System Hazard Analysis	UEVOL-0543	vCF, 20/4/20
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	vCU, 11/6/20
CC-ZC Interface Description	UEVOL-0185	AI_PLUS2, 20/03/2020
ZC-ZC Interface Description	UEVOL-0192	AS_PLUS4, 20/03/2020
ATC Interface Hazard Analysis	UEVOL-0431	BM, 20/02/2020
Safety, Verification and Validation Plan	UEVOL-0353	K, 05/03/2020
ATC Requirements Specification and ATC Architecture Description	UEVOL-3013	AP, 08/10/2019
ATC Validation Allocation Table	UEVOL-1169	CA, 13/05/2020
ATC Subsystem Impact Analysis	UEVOL-2408	CX, 12/05/2020
ATC – ZC Subsystem Requirement Test Description Verification Report	UEVOL-0827	CN, 12/05/2020
ATC – CC Subsystem Requirements Test Description Verification Report	UEVOL-0824	BI, 13/05/2020
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BX, 13/05/2020
ATC Safety Exported Constraints	UEVOL-1704	DR, 27/05/2010
ATC Hazard Log	UEVOL-1705	DW, 19/05/2020
Architecture & Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AT, 28/02/2020
ATC Subsystem Exported Constraint Verification Report	UEVOL-2525	AK, 12/05/2020
LC Software – Software Requirement Test Description Verification Report	A402922	AA, 18/05/2020
ZC Software Requirement Test Description Verification Report	A402921	CL, 18/05/2020



Title of Document	Alstom Reference	Release/date
CC ATP Software Requirements Test Description Verification Report	A402284	DB, 12/05/2020
ZC Software Impact Analysis	A404257	DK, 11/05/2020
CC Software Impact Analysis	A403516	GE, 11/05/2020
LC Software Impact Analysis	A405062	AI, 11/02/2020
ATC Sw U400 Software Release Note 10.6.4-1	A402307	LM, 20/05/2020
ATC Subsystem – TDG Software – Software Module Description Verification Report (for TDG)	A419763	AL, 10/03/2020
CC Vital Software Architecture Description	A401460	DC, 22/04/2020
Trackside Software Architecture Description	A407321	CM, 05/02/2020
Software Requirements and Architecture Description Verification Report (for wayside)	A402938	BL, 10/03/2020
Software Requirement and Architecture Description Verification Report (for Carborne Controller)	A401804	BY, 05/05/2020
ZC Critical Code Review Analysis and Report	A402528	DF, 14/05/2020
TDG Critical Code Review Analysis and Report	A419074	AM, 14/05/2020
LC Application – Software Requirements Specification	A401381	AM, 04/02/2020
LC Software Hazard Analysis	A401825	AD, 05/05/2020
Trackside Software Safety Requirement Report	A402317	DB, 20/05/2020
LC Critical Code Review Analysis and Report	A402322	AM, 14/05/2020
CC VESG Critical Code Review Analysis and Report	A406392	BW, 18/05/2020
CC V ATP Critical Code Review Analysis and Report	A402598	EF, 20/05/2020
CC Software Safety Requirement Report	A402319	DU, 20/05/2020
ZC Software Requirement Specification	A401380	FJ, 27/02/2020
ZC Subsystem Requirement Specification	UEVOL-0114	CH, 20/03/2020
ZC SyRS-SyAD-SwRS Verification Report	A436803	BC, 16/05/2020
ZC Software Requirement Test Description	A401881	CU, 07/05/2020
ATC ZC Subsystem Requirement Test Descriptions	UEVOL-0969	3CN
CC SwRS-SyRS-SyAD Verification Report	A444099	BA, 07/05/2020
LC Software Requirement Test Plan	A401692	W, 14/05/2020
ZC Software Requirement Test Plan	A401691	CA, 10/10/2020
CC ATP Software Requirement Test Plan	A401462	BD, 11/05/2020
CC VS Software Integration Test Plan	A4022308	AT, 27/04/2020
LC Software Requirement Tests Description	A401882	AB, 14/05/2020
CC Software Requirement Test Description	A401878	CY, 30/04/2020
CC Subsystem Requirement test Description	UEVOL-0139	4DY
CCC Subsystem Requirement Specification	UEVOL-0098	CA_PLUS3, 20/03/2020
CC Software Requirement Specification	A40164	FE, 14/04/2020
ATC Configuration Rules Safety Study	UEVOL-1574	BH, 05/05/2020
LC Parameters Configuration Rules	UEVOL-0397	V, 18/01/2020



Title of Document	Alstom Reference	Release/date
ZC Parameters Configuration Rules	UEVOL-0396	BS_PLUS3, 02/04/2010
CC-VS Description	UEVOL-0643	BX, 05/02/2020
Specific Safety Study on CC-V Parameters	A402903	BI, 15/04/2020
ATC Subdivision Rules Specific Study	UEVOL-1027	AX, 27/04/2020
ATC Subdivision Rules	UEVOL-0395	BB_PLUS2, 20/02/2020
ATC Tools Configuration Delivery Sheet v10.6.1	UEVOL-R-5027	20/05/2020
GenPZ Requirements Test Report	UEVOL-2588	H, 12/05/2020
ATCGSD Gen RTS Module Software Requirements Test Report	UEVOL-2589	T, 05/02/2020
ATC GSD Gen SGD Module Software Requirements Test Report	UEVOL-2590	V, 12/05/2020
ATC GenPAR Module Evolution Software Requirements Test Report	UEVOL-2591	AB, 06/05/2020
Urbalis Evolution GADI Requirements Test Report	UEVOL-1754	AN, 06/07/2020
DGC_UEVOL-0851	UEVOL-0851	AX
DGC_GAD2		10.10.3_PLUS1
Gen ATC Data System Requirement Test Plan	UEVOL-1670	AX, 15/05/2020
Gen ATC Data – Test Lines Specification	UEVOL-0401	AX, 15/05/2020
Gen ATC Data System Requirement Test Description	UEVOL-1671	AX, 15/05/2020
Gen ATC Data – System Requirement Test Report – PART1 (for GADI)	UEVOL-1672	AL, 15/05/2020
Gen ATC Data – System Requirement Test Report – PART2 (for GAD2)	UEVOL-1672	AZ, 15/05/2020
Urbalis Evolution CC Software Architecture Description	A401446	CJ, 04/04/2020
CC Vital Software Module Design	T-23 A406966	AX, 05/02/2020
ZC ASw – Software Requirement Test Report	A402289	CY, 15/06/2020
CC_ATP – Software Requirement Test Report	A402285	DR, 18/05/2020
CC_ATP Software Impact Analysis	A403516	GH, 15/06/2020
LC ASw Software Requirements Test Report	A402293	AF, 15/06/2020
LC Software Impact Analysis	A405062	AK, 15/06/2020
ZC and TDG Software Impact Analysis	A404257	DL, 28/05/2020
LC Software Module Test Report	A402265	AE, 22/05/2020
LC Software Module Test Description Verification Report	A402926	Z, 26/05/2020
CC-V Software Module Test Report	A402314	DB, 09/06/2020
CC Software Module Test Description Verification Report	A402266	CU, 09/06/2020
LC Software Integration Test Plan	A402268	CN, 06/05/2020
LC Software Integration Test Report	A402271	Z, 26/05/2020
LC Subsystem Integration Test Description Verification Report	A402929	Y, 26/05/2020
CC Software Integration Test Plan	A402308	AT, 27/04/2020
CC Software Integration Test Report	A402310	CO, 10/06/2020
CC V Software Integration Test Description Verification Report	A402273	CM, 10/06/2020
ZC Software Integration Test Report	A402272	BM, 14/04/2020



Title of Document	Alstom Reference	Release/date
ZC Application and TDG Integration Test Description Verification Report	A402928	BL, 14/04/2020
ZC and RDG Software Module Test Report	A402291	BU, 14/04/2020
ZC and TDG Software Module Test Description Verification Report	A402925	BP, 14/04/2020
Trackside Software Architecture Description	A407321	CP, 12/05/2020
CC-V Formal Proof Document	A402843	EQ, 03/06/2020
LC Formal Proof Document	A402845	AA, 12/05/2020
ZC Formal Proof Document	A402844	EU, 28/04/2020
LC Source Code Verification Report	A402913	AD, 20/05/2020
CC Source Code Verification Report	A402606	DM, 04/06/2020
LC Critical Code Review and Analysis Report	A402322	AO, 12/06/2020
ZC Critical Code Review Analysis and Report	A402528	DG, 23/05/2020
Trackside Software Safety Requirement Report	A402317	DC, 23/06/2020
ATC Software Global V&V Report	A402597	DO, 23/06/2020
ATC Software Spot Checking Report	A408174	CX, 23/06/2020
LC Software Requirements Test Description Verification Report	A402922	AC, 18/06/2020
ATC Subsystem Impact Analysis, ATC 10.6.1.3	UEVOL-2408	DA, 24/06/2020
CC Subsystem Test Report	UEVOL-0140	FL, 03/07/2020
ZC Subsystem Test Report	UEVOL-1186	DJ, 03/07/2020
LC Subsystem Requirement Test Report	UEVOL-1011	AL, 03/07/2020
ATC Subsystem Integration Test Report	UEVOL-1046	BL, 17/06/2020
ATC Subsystem Validation Report	UEVOL-1275	BU, 12/06/2020
ATC – CC Subsystem Requirements Test Description Verification Report	UEVOL-0826	CD, 23/06/2020
ATC – ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	CP, 23/06/2020
ATC – LC Subsystem requirements Test Description Verification Report	UEVOL-0828	AK, 18/06/2020
ATC Subsystem Integration Test Description Verification Report	UEVOL-0825	BY, 23/06/2020
ATC Subsystem Requirement Test Description Verification Report	UEVOL-0824	BJ, 23/06/2020
ATC Validation Allocation Table	UEVOL-1169	CD, 29/06/2020
ATC Subsystem Verification & Validation Report ATC baseline 10.6.1.3	UEVOL-1171	EP, 03/07/2020
ATC Hazard log	UEVOL-1705	EB, 24/06/2020
ATC Safety Exported Constraints Verification Report	UEVOL-1704	DR_PLUS1, 06/07/2020
ZC SyRS-SyAD-SwRS Verification Report	A406803	BD, 16/06/2020
CC SyRS-SyAD-SwRS Verification Report	A444099	BB, 17/06/2020
LC SyRSAD-SwRS Verification Report	A444100	R, 12/05/2020
LC SyRSAD-SwRS-Verification Report	A444100	S, 16/06/2020
ZC Sw Requirements Test Description Verification Report	A402921	CM, 22/06/2020
CC-ATP Sw Requirements Test Description Verification Report	A402284	DC, 18/06/2020



Title of Document	Alstom Reference	Release/date
CC-VESG, Critical Code Review Analysis and Report	T-23 A406392	BX, 23/06/2020
CC-V Critical Code Review Analysis and Report	A402598	EH, 23/06/2020
CC Software Safety Requirement Report	A402319	DW, 19/06/2020
Specific Safety Study on UEVOL CC-V Parameters	A402903	BJ, 11/06/2020
ATC Sw U400 Software Release Note 10.6.8	A402045	GZ, 03/07/2020
U400 Sw Release Note 10.6.4	T-23 A402079	DV, 03/07/2020
ATC Software Release Note 10.6.5	T-23 A402307	LS, 03/07/2020
ATC 10.6.1.3 Subsystem Delivery Sheet	UEVOL-7512	E, 08/07/2020
ZC Subsystem Requirement Test Plan	UEVOL-0968	L, 04/03/2020
LC Subsystem Test Description	UEVOL-0679	AH, 12/06/2020
ATC Subsystem Integration Test Description	UEVOL-0137	BH, 28/04/2020
ATC Subsystem Requirements Test Description	UEVOL-0138	BH, 28/04/2020
CC System Requirement Test Description	UEVOL-0139	DY
ZC System Requirement Test Description	UEVOL-0969	CN
ZC Application Software – Software Requirements Test Description	A401881	CV, 15/06/2020
CC ATP Software Requirements Test Description	A401878	DA, 15/06/2020
LC Application Software – Software Requirements Test Description	A401882	AB, 14/05/2020
CC Non-Vital Software	A401763	EZ, 03/06/2020
CC NV Arcitecture Description	A401467	CE, 03/06/2020
CC NV Software Requirements Test Description Verification Report	A402920	CQ, 12/06/2020
CC NV Software Requirements Test Report	A402286	EA, 12/06/2020
CC NV Software Requirements Test Description Verification Report	A401879	DE, 10/06/2020
ATC Safety Exported Constraints	UEVOL-1704	DT, 29/06/2020
Architecture & Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AX, 02/06/2020
ZC Subsystem Requirement Test Plan	UEVOL-0968	L, 04/03/2020
LC Subsystem Test Description	UEVOL-0679	AH, 12/06/2020
ATC Subsystem Integration Test Description	UEVOL-0137	BH, 28/04/2020
ATC Subsystem Requirements Test Description	UEVOL-0138	BH, 28/04/2020
ATC Subsystem Exported Constraints Verification Report	UEVOL-2525	AN, 11/06/2020
ATC Software Safety Assurance Report	A402620	HW, 25/5/20
ATC Software Safety Assurance Report	A402620	IA, 2/7/20
Specific Safety Study on Automatic Protection	A402331	AZ, 22/04/20
Specific Safety Study on Automatic Protection	A402331	AZ_plus1, no date
Urbalis Evolution CC-Vital Software Hazard Analysis	A401823	CS, 20/05/2020
Urbalis Evolution CC-Vital Software Hazard Analysis	A401823	CT, 29/06/2020
ATC Sub-system Requirement Specification Verification Report	UEVOL-0818	CV, 14/05/20
ATC Sub-system Requirement Specification Verification Report	UEVOL-0818	CV_Plus1, 6/7/20
CC Subsystem Hazard Analysis	UEVOL-0542	BU_Plus1, 25/06/2020



Title of Document	Alstom Reference	Release/date
CC-Non-vital Software Requirement Specification	A401763	EZ, 3/6/20
UEVOL ATO and NVESG Source Code Verification Report	A402911	AN, 8/6/20
Global variables education analysis	No ref	3A, 21/7/20
RAR, Unexpected TSR removal after multiple channels restart of LC platform	UEVOL-4158	1B, 21/7/20
RAR, Unexpected TSR removal after multiple channels restart of LC platform	UEVOL-4158	2B, 28/7/20
CC-ATP Formal Proof Document	A402843	EQ, 9/6/2020
ZC Formal Proof Document	A402844	EU, 9/6/2020
CC Source Code Verification Report	A402606	DL, 11/05/2020
ZC and TDG Source Code Verification Report	A402912	BY, 27/03/2020
ATC Design Verification Plan	UEVOL-1170	AM_PLUS1, 04/08/2020
Generic Application Safety Case ATC 10.6.1.3-1	UEVOL-0887	FN_PLUS1, 04/08/2020
ATC Subsystem Verification & Validation Report – ATC baseline 10.6.1.3	UEVOL-1171	EP_PLUS1, 03/08/2020
ATC 10.6.1.3-1 Sub-system Delivery Sheet	UEVOL-7512/F	03/08/2020

ATC Baseline 11.4.5.2 Review (October – November 2020)

Table 77: Documents reviewed for ATC baseline 11.4.5.2

Title of Document	Alstom Reference	Release/date
ZC System Requirements Specification and Architecture Description	UEVOL-2701	W_PLUS6, 05/03/2020
LC System Requirements Specification and Architecture Description	UEVOL-2702	L, 06/09/2016
ATC System Requirements Specification and ATC Architecture Description	UEVOL-3013	AR, 28/02/2020
UEVOL ATC Safety Exported Constraints	UEVOL-1704	DV, 30/09/2020
ATC Hazard Log	UEVOL-1705	EF, 29/09/2020
ATC 11.4.5.2, ATC Subsystem Impact Analysis	UEVOL-2408	DC, 31/08/2020
UEVOL Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-1638	AZ, 09/07/2020
U400 ATC Software Exported Constraints	E110963	AS, 17/06/2020
ATC Subsystem Exported Constraint Verification Report	UEVOL-2525	AP, 20/08/2020
ATC Validation Allocation Table	UEVOL-1169	CE, 09/09/2020
CR Safety Review – ATC 11.4.5.2	UEVOL-1988	KB, 07/10/2020
Urbalis Evolution System ATC 11.4.5.2 Subsystem Delivery Sheet	UEVOL-7520/E	09/10/2020
ATC Subsystem Verification and Validation Report – ATC baseline 11.4.5.2	UEVOL-1171	ES, 15/09/2020
ATC Subsystem Requirements Validation Table	UEVOL-3757	W, 28/06/2019
ATC 11.4.4.3 – ATC Subsystem Impact Analysis	UEVOL-2408	CW, 30/03/2020
LC Subsystem Requirements Test Report	UEVOL-1011	AO, 14/09/2020



Title of Document	Alstom Reference	Release/date
ATC – LC System Requirements Test Description Verification Report	UEVOL-0828	AM, 06/10/2020
ZC System Requirements Test Report	UEVOL-1186	DG, 07/04/2020
ATC – ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	CM, 06/04/2020
ZC Software Requirements Specification	A401380	FL, 28/02/2020
Trackside Software Architecture Description	T-23 A407321	CS, 08/06/2020
LC Software Critical Code Review Analysis and Report	A402322	AN, 26/05/2020
ZC Sw Critical Code Review Analysis and Report	T-23 A402528	DD, 03/04/2020
ATC Sw Spot Checking Report	A408174	DD, 08/09/2020
Global V&V Report	A402597	DU, 08/09/2020
WS Sw Release Note – 11.4.14	A402079	ED, 05/10/2020
CC Sw Release Note – 11.4.14	A402045	HD, 05/10/2020
ZC and TDG Software Impact Analysis	A404257	DI, 20/03/2020
LC Module Test Report	A402265	AD, 21/05/2020
LC Software Module Test Description Verification Report	A402926	Y, 21/05/2020
ATC Sw Release Note 11.4.11-1	A402307	MC, 01/10/2020
CC Software Safety Requirements Report	A402319	DY, 29/09/2020
Trackside Software Safety Requirement Report	A402317	CZ, 03/04/2020
LC Software Impact Analysis	A405062	AN, 21/08/2020
ZC Software Requirements Test Plan	A401691	BY, 23/03/2020
CC-NV Software Requirement Test Plan	A401463	AJ, 18/08/2020
ZC SyRSAD-SwRS Verification Report	A436803	BA, 24/03/2020
ZC System Requirements Test Description	UEVOL-0969	CO
LC Subsystem Requirements Test Description	UEVOL-0679	AJ, 14/09/2020
ZC Software Requirements Test Description	A401881	CS, 24/03/2020
ATO Software Requirements Specification	T-23 A401763	FB, 10/08/2020
CC-NV Software Requirements Test Description	A401879	DF, 01/09/2020
U400 – ATC Software – Software Configuration Management Plan	T-23 A401469	E, 09/07/2020
U400 ATC Software, Minor – Major Change Assessment	UEVOL-3922	AE, 5/10/20
Urbalis Evolution – LC, B Verification Reports	E136717	P, 27/5/20
Urbalis Evolution – CC Vital	E136715	AU, 3/9/20
Urbalis Evolution – ZC, B Verification Reports	E136716	AT, 23/3/20
Urbalis Evolution – Zone Controller, Software Hazard Analysis	A401824	CS, 3/4/20
Urbalis Evolution – ZC Sub-System, Sub-System Hazard Analysis	UEVOL-0543	CH, 23/3/20
CC Vital Source Code Verification Report	A402606	DO, 13/10
LC Source Code Verification Report	A402913	AC, 13/10
CC Sw Integration TDVR	A492273	CO, 13/10
LC Sw Integration TDVR	A402929	X, 13/10
CC Vital Sw Integration TR	A402310	CQ, 13/10



Title of Document	Alstom Reference	Release/date
LC Sw Integration TR	A402271	Y, 13/10
CC ATP Sw Requirements TDVR	A402284	DE, 14/10
LC Sw Requirements TDVR	A402922	AB, 14/10
CC Software Requirements TR	A402285	DS, 14/10
LC Software Requirement TR	A402293	AE, 14/10
CC Vital Formal Proof Document	A402843	EO, 14/10
LC Formal Proof Document	A402845	AB, 14/10
CC Nv Sw Requirements TR	A402286	EC, 15/10
ZC Sw Requirements TDVR	A402921	CJ, 22/10
ZC Sw Requirements TR	A402289	CV, 22/10
ZC Formal Proof Document	A402844	EQ, 23/10
LC Sw Integration Test Plan	A402268	M, 27/10
CC Non-Vital Sw Requirements TDVR	A402920	CT, 27/10
Specific Safety Study – Automatic Protection	A402331	Release BA, 30/03/20
ATC Software Safety Assurance Report	A402620	Release IJ, 06/10/20
CC Software Hazard Analysis	A401823	Release CV, 23/09/20
ATC Subsystem Requirement Specification Report	UEVOL-0818	Release CZ, 14/09/20
CC Subsystem Hazard Analysis	UEVOL-0542	Release BV, 07/09/20
ATO and NVESG Software Source Code Verification Report	A402911	Release AO, 17/08/20
ATC Subsystem Requirements Specification and Architecture Description Verification Report	UEVOL-0816	Release BZ, 14/09/20

Arthur D Little

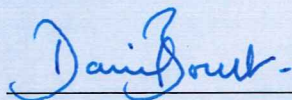
Independent Safety Assessment Certificate

This certificate is granted to:

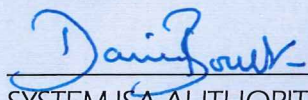
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Information Solutions

The UEVOL System version 1.1 1.2.6-2 (as defined in section 1.2 of the UEVOL System Safety Case UEVOL-1632, version DJ) has been subject to an independent review and is judged suitable for revenue service, subject to observation of and adherence to :

- the restrictions and safety related application constraints identified in Section 6 of the aforementioned safety case.
- the restrictions identified in section 8 of our ISA Report, reference P20001408/017rep

23/11/20

ISA ASSESSOR

23/11/20.

SYSTEM ISA AUTHORITY

CERTIFICATE REFERENCE: (Alstom/P20001408/018cer Issue 01)

For further details concerning the assessment results, and the conditions that apply to approval for revenue service, please see the associated ISA report Alstom/P20001408/017rep



Independent Safety Assessment of UEVOL: System

Summary Report for System I.II.2.6-2

Version 6.1 Issue 02

Report to
Alstom Transport

November 2020

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Reference P20001408/017rep



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Change history

Version	Date	Comment
1.1	26/6/09	ISAR aligned with System baseline 1.6.1
2.0	30/9/09	ISAR aligned with System baseline 1.6.2-1
2.1	12/11/2009	ISAR aligned with System baseline 1.6.2-2
2.3	29/7/10	ISAR aligned with System baseline 1.6.2-8
2.4	4/8/10	Updated ISAR aligned with System baseline 1.6.2-8
2.5	14/9/10	ISAR aligned with System baseline 1.6.6-6
2.6	1/12/10	ISAR aligned with System baseline 1.6.2-10
3.0	10/1/10	ISAR aligned with System baseline 1.6.6-6b
3.1	15/02/11	ISAR aligned with System baseline 1.6.6-9
3.2	31/3/11	ISAR aligned with System baseline 1.6.6-6c
3.3	3/7/11	ISAR aligned with System baseline 1.6.6-15
3.4	29/11/11	ISAR aligned with System baseline 1.6.6-21
3.5	16/3/12	ISAR aligned with System baseline 1.6.6-22
3.6	09/07/12	ISAR aligned with System baseline 1.6.6-25
3.7	23/7/12	ISAR aligned with System baseline 1.6.6-25 and taking into account the additional mitigations to address TORR issue/CR 290720
3.8	28/8/12	ISAR aligned with System baseline 1.6.6-25 and taking into account the further analysis on TORR issue reflecting the additional time available to implement mitigating actions
4.0	24/10/12	ISAR aligned with CLA System baseline 1.2.1.7
4.0a	18/01/13	ISAR for System baseline 1.10.1.6
4.1	14/03/13	ISAR for System baseline 1.10.1.8
4.1a	12/04/13	ISAR aligned with System baseline 1.6.6.-27b
4.2	23/04/13	ISAR aligned with CLA System baseline 1.2.2.1b
4.3	21/07/13	ISAR aligned with Regular System baseline 1.6.6.30b
4.4	18/10/13	ISAR aligned with CLA System baseline 1.2.2.3
4.5	30/1/14	ISAR aligned with REG System baseline 1.10.1.15-2
4.6	21/07/14	ISAR aligned with REG System baseline 1.10.1.17
4.7	14/11/14	ISAR aligned with REG System baseline 1.10.1.18
4.8	25/08/15	ISAR aligned with REG System baseline 1.10.1.19
4.9	30/09/15	ISAR aligned with REG System baseline 1.11.1.8-2.4
5.0	22/11/15	ISAR aligned with REG System baseline 1.11.1.8-2.5
5.1	07/01/16	ISAR aligned with P15001597/042rep for REG System baseline 1.10.3.3-1
5.1a	18/06/16	ISAR aligned with P15001597/054rep for REG System baseline 1.11.2.1-1
5.2	24/6/16	Updated ISAR aligned with P15001597/058rep for REG System baseline 1.11.2.1-1 with minor corrections
5.2a	27/06/17	ISAR aligned with P17000256/022rep for REG System baseline 1.11.2.2-1
5.3	11/07/18	ISAR aligned with REG System baseline 1.11.2.1-4



Version	Date	Comment
5.4	26/10/18	ISAR aligned with REG System baseline 2.12.4.2
5.5	14/12/18	ISAR aligned with REG System baseline 1.11.2.4
5.6	19/12/18	ISAR aligned with REG system baseline 1.11.2.4 with a minor correction of removing a resolved restriction
5.7	29/03/19	ISAR aligned with REG system baseline 1.11.2.4-S2
5.8	18/09/2019	ISAR aligned with REG system baseline 1.11.2.5
5.9	23/09/2019	ISAR aligned with REG system baseline 1.11.2.5 following a minor correction related to the report number
6.0	09/03/20	ISAR aligned with REG system baseline 2.12.5.2-1
6.1	23/11/2020	ISAR aligned with REG system baseline 1.11.2.6-2
6.1 Issue 02	24/11/20	Re-issue of version 6.1 with minor corrections following comments from Alstom

Authorisation for issue			
	Electronic signature	Electronic signature	Electronic signature
	François Kassel	David Boulton	David Boulton
24 November 2020	Written	Checked	Authorised
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Executive Summary

Background

Alstom has redeveloped its Urbalis metro train command, control and protection system. The redevelopment covered all elements of this system, including ATC, ATS, system functions, DCS, interlocking and maintenance equipment. Key aims of the redevelopment were to provide a more competitive solution and to minimise application deployment costs. The project is known as Urbalis EVOLution (UEVOL) and also U400. First deployments of U400 took place in Beijing, where two lines were fitted initially. All deployments in China use China-specific ATS and interlocking subsystems. The version of U400 developed for this market is called 888 and is now deployed on numerous metros across China. The generic version that is used for the majority of other markets is known as the Regular system and it is now deployed on a number of metros around the world. A further variant, Clasico, has been developed; this version is similar to the Regular variant but employs alternative interlocking signalling principles. This report relates to the assessment of the Regular variant of U400.

Alstom has divided the ISA activity associated with this development into a series of packages, denoted ISA 1 to ISA 6. The main work package, ISA 1, relates to the role of System ISA in combination with the assessment of the Automatic Train Control (ATC) system. Alstom has appointed Arthur D. Little as ISA 1. This role is applicable to the assessment of the Regular and Clasico systems. This document is the ISA Report (ISAR) for the UEVOL System (Regular variant)¹. The ATC and CBI Subsystem assessment activities conducted as part of ISA 1 are documented in separate reports [18], [22]. These reports detail the restrictions to be followed in deploying the ATC and CBI subsystems and should be viewed in conjunction with this system level report.

Aims of this Report

The aims of this summary report are to:

- Describe the independent safety assessment approach.
- Present the current status of this assessment.
- Identify key outstanding actions.
- Review the main findings of the assessment to date and detail how they have been addressed by Alstom.

Assessment Scope

The scope of the work undertaken by the UEVOL ISA 1 has been to review the development of the UEVOL Regular system in order to determine whether it is appropriate for revenue service. The assessment assumes that all restrictions given in the system safety case are fulfilled. The current assessment is based on a review of Regular System baseline 1.11.2.6-2.

Detailed activities carried out include:

- Review and cross acceptance of safety certificates and safety audit reports (SARs) for the:
 - ZC platform (2003)
 - LC platform (2003)
 - CC platform (UNIVIC)
 - SmartIO

¹ For full details of what has been assessed as part of this baseline, please refer to sections 4.3 and 4.4.

Independent safety assessment in accordance with the standards specified in section 5.10 of:

- System integration activities.
- All aspects of the ATC software development².
- Automatic Train Operation (Alstom have defined this as a SIL-2 sub-system, though it is noted that it does not contain or fulfil any safety requirements).
- ATC data preparation process and the associated tools used in this process².
- CBI subsystem-level activities.
- CBI data preparation process and the associated tools used in this process.
- DCS, MSS, DSU and DMI noting that these elements are not expected to have any safety requirements.
- The safety-related application conditions exported by other platforms and subsystems and checking that they are respected.
- The exporting of the necessary safety-related application conditions to such platforms and subsystems.
- The exporting of the necessary safety-related application conditions to application projects.
- All stages of the generic project development.

More generally, subject to the exclusions and cross-acceptance activities noted above, our assessment is to consider the correctness and completeness of all of the arguments and assertions made in the System safety case [19].

The list of all items that are excluded from assessment in this report is given below:

Use of the Lineside Electronic Unit (which relates to the 888 system baseline only).

Block mode operation (which does not form part of the UEVOL Regular or Clasico solutions).

STIBs, which are no longer considered as relevant to the Regular or Clasico solutions.

The Adapt Design Deployment Procedure.

Assessment Approach

In order to help Alstom deliver a generic UEVOL system that is acceptably safe, the ISA has carried out assessment/audit of Alstom's processes and the outputs from these processes. These assessments/audits aimed to verify, for the safety-critical elements of the system:

How necessary system and application engineering, and safety management activities are carried out.

The techniques and processes being used, including an evaluation of their adequacy.

The technical adequacy of the results of such processes and techniques.

Cross Acceptance

Cross acceptance activities have been carried out for the 2003 platform, SmartIO and the UNIVIC platform. No new cross-acceptance has been performed for this release.

Assessment Progress

Following the project kick-off meeting which took place in September 2006, twenty eight assessment audits have been completed, both at Alstom's premises in Saint Ouen and Meudon, and off-site. The last of these audits took place in June 2015.

² Such assessment activities are considered, more particularly, in our corresponding ATC ISA report [18].



Conclusion

The ISA endorses use of UEVOL system Regular baseline 1.11.2.6-2 in revenue service in CBTC mode of operation, subject to the following conditions:

The applicable versions of ATC and CBI to be used with this system baseline are ATC 11.4.5.2 and CBI 8.3.1 respectively.

All restrictions and conditions noted in section 8 of the ISA's corresponding ATC Subsystem ISAR [18] are fulfilled.

All restrictions and conditions noted in section 8 of the ISA's corresponding CBI Subsystem ISAR [22] are fulfilled.

All restrictions in Alstom's System Safety case [19], including sections 4.5 and 6, are observed.

- Application projects should note that in respect of atvcm00908269 and atvcm00563572, the Safety Case is in error and the delivery sheet is correct. The restriction associated with atvcm00563572 is not applicable and that associated with atvcm00908269 is applicable. Projects are to refer to the delivery sheet in respect of the restriction associated with CR atvcm00908269.

All further conditions and restrictions as set out below are observed:

- The applicable version for UEVOL-0657 is AR plus_50.
- The safety requirement SHA-1216 references the wrong change request (CR atvcm00733891). The correct reference should be (CR atvcm 00792217).
- It is an application project requirement to demonstrate compliance with the Guidelines for Project Deployment (GFPD) (UEVOL-0962- AP_PLUS_70) and RTI (UEVOL-0212- AF_PLUS_2).
- With respect to the RTI, projects should use the RTI excel part to identify parameter values, as it contains the correct values whereas there are errors in the associated RTI word document.
- Application projects should check the consistency between the "INDEX_OUTPUT_VALUES" sheet and the detailed individual RTI sheets.
- It is an application project responsibility to ensure compliance with the applicable system tools delivery sheet (UEVOL-2488, AP_Plus_71).
- Application projects should satisfy themselves that an appropriate process is in place to ensure compliance with the safety related rules identified in the GFPD, with the necessary level of confidence.
- Previous application projects have misunderstood GfPD rules, in design and/or verification. Application projects should therefore apply the following process:
 - All safety-related GfPD rules applicable to the project, and which are manually verified, should be reviewed by two engineers knowledgeable in the GfPD rules to identify those rules that may be at risk of misinterpretation. Where any such rule has been verified manually in double chain, and both chains conclude that the design is compliant with the rule, such rule should be verified in third chain by an expert designer.
- Each project should discuss project specific configuration aspects with the U400 product team when performing the gap analysis to ensure that such configuration aspects are fully covered by existing GfPD rules.
- Application projects should discuss their specific line configuration with the U400 product team, to ensure that all aspects of such configuration have already been fully taken into account in the U400 product design and/or modify the line configuration accordingly.
- Rule_TMS_Overlap_0033 applies to all types of overlap (Critical, Preferred, Not interlocked or, Reduced).
- The association of rules to scheme plan items in the 'Applicable Rules' tab of the Excel appendix of UEVOL-1628 (Scheme Plan Verification Guideline) is indicative only. Application projects are responsible for ensuring that the correct and complete set of rules is associated with each scheme plan item.
- The association of rules to TMS items in the 'Applicable Rules' tab of the Excel appendix of UEVOL-1637 (TMS Verification Guideline) is indicative only. Application projects are responsible to ensure that the correct and complete set of rules is associated with each TMS item.

- The rules identified in UEVOL-1627-Y, 1637-Y and 1628-Y as requiring verification shall be treated by application projects as indicative only. Application projects are, themselves, responsible for ensuring that the correct and complete set of rules is verified in accordance with the GfPD.
- Application projects making use of the SyDT (System Data Table) as an input to system data preparation should be aware that they are entirely responsible for the adequacy of the SyDT preparation and verification process. Projects should be aware of the significant effort and detailed process likely to be required for preparation and verification of the SyDT, in order to provide a comparable safety level when compared with the double chain data preparation, comparison and convergence process which is otherwise adopted when the SyDT is not used.
- We are aware that some application projects consider the SyDT modification and verification process to be effort intensive. When errors are identified in the SyDT, rather than correct the SyDT, such errors are sometimes therefore corrected in the SyDB directly. The full nominal U400 process for SyDB modification (double chain, GfPD rules verification) should be followed in such case.
- The ISA continues to recommend the following for future improvement:
 - System data activity recorder should distinguish between three classes of anomaly when making manual modifications to the data:
 - Manual modifications due to known tool errors specified by U400.
 - Manual modifications due to tool errors not specified by U400.
 - Manual modifications due to SyDT errors.
 - With respect to UEVOL-1236, K, the template ATC data activity recorder document does not provide for explicit confirmation that each individual manual modification (e.g. due to UEVOL-1666/1667, U400 AC or due to project-specific procedure) has been implemented by the respective DP chain or checked by the data validator. Each manual procedure might include multiple manual modifications. Therefore, the ISA recommend that the activity recorder should enforce that the project confirms which set of manual modifications have been applied and implemented in double chain.

With regards to CR757875, a bug exists in the report comparison functionality, which leads to the generation of an empty report after a comparison. The empty report does not mean that no differences have been found between two reports. Rather it means that the comparison function has malfunctioned. We recommend that project should discuss the issue with U400 team to bypass the error and to use a correctly generated comparison report.

Application projects should discuss all restrictions identified in section 6 of Alstom's System Safety case [19] with the UEVOL project team, to ensure that they are properly understood.

By its generic nature, the UEVOL system can be deployed in a diverse range of operational configurations and scenarios. It is therefore an application project responsibility to ensure that sufficient testing of its application (with its specific data) has been conducted, in its representative environment, to address its intended specific operational configuration and use.

Application projects should not use the "Approach_locking_partially_defined_in_UEVOL_available" option.

With respect to U400_SRAC_0922, this SRAC is correctly defined in UEVOL-2560- E_Plus I 6 and this version is to be followed not the corresponding definition in UEVOL-1926-R_Plus I (as given for UEVOL-Oper-SyExpC-0660).

It is Arthur D. Little's independent professional opinion that the UEVOL System as defined in [19], and subject to the issues identified in this report being addressed (as identified above):

By design protects against a wrong side failure to deliver the functionality given in [20] commensurate with a safety integrity level of SIL4 (as defined in [3]) subject to compliance with the restrictions of use detailed in the corresponding Alstom safety case [19].

Has software developed in compliance with the:

- SIL4 requirements in CENELEC 50128 [2], with respect to the ATP.

Shows that an appropriate level of compliance with the other CENELEC safety standards 50126 [1] and 50129 [3] has been achieved in accordance with the requirements for SIL4.



We confirm that we have considered all of the arguments presented in the corresponding safety case [19]. We support such arguments, subject to the open (but non-blocking) issues identified in our ISA Log of Findings [17] and issues lists [23] – [62].

It should be noted that Alstom have appointed:

Altran (formerly Praxis High Integrity Systems) as independent safety assessor of the 2oo3 platform upon which the ZC and LC subsystems are based.

Agence de Certification Ferroviaire (Certifer) as Independent Safety Assessor of the Smart IO, which is involved in communications between the Interlocking and PSDs.

The Alstom Bologna Site Safety Officer (SSO) as independent safety assessor of the Smartlock 400 BS platform upon which the CBI is based.

Our opinion above is therefore based, in part, upon the independent professional opinions reached by such parties. We have not performed independent safety assessment of such platforms/subsystems ourselves. Nevertheless, our assessment has considered and cross accepted Alstom's compliance with those restrictions raised by Altran, Certifer and the Alstom Bologna/Paris SSOs in their respective assessment reports, as well as Alstom's compliance with those restrictions and safety-related application conditions contained within the platform/subsystem safety cases; it is our opinion that an appropriate level of compliance has been demonstrated.

Our assessment has considered all of the elements required by CENELEC 50129 [3] to be included in the quality management, safety management and technical safety report sections of a safety case. It is our opinion that Alstom have demonstrated an appropriate level of compliance with such requirements. This opinion excludes consideration of the 2oo3 and Smartlock 400 BS platforms and the Smart IO, which, as noted above, have been subject to assessment by Altran, the Alstom Bologna and Paris SSOs and Certifer respectively. However, we confirm that the third party assessment reports associated with the 2oo3 platform, Smartlock400BS platform and Smart IO confirm their respective compliance with CENELEC 50129.

I. Introduction

I.1 Background

Alstom has redeveloped its Urbalis metro train command, control and protection system. The redevelopment covered all elements of this system, including ATC, ATS, system functions, DCS, interlocking and maintenance equipment. More recently the ATS subsystem has been removed from the development and is now not part of the U400 scope of supply. Key aims of the redevelopment were to provide a more competitive solution and to minimise application deployment costs. The project is known as Urbalis EVOLution (UEVOL).

The UEVOL system is intended to be generic, and includes:

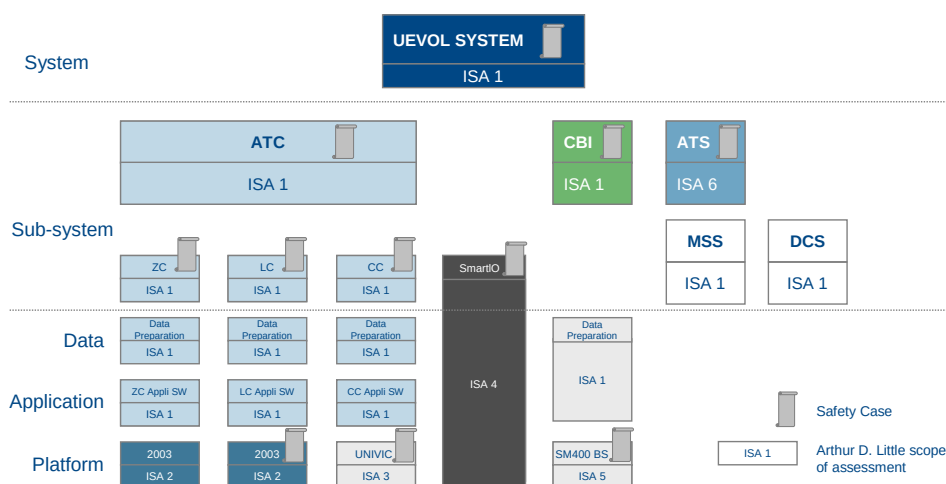
A new data preparation process that is as automated as possible, involving two data preparation ‘channels’ to ensure adequate diversity.

The ability for moving block operation.

The facility for centralised architecture, reducing the amount of equipment needed.

Alstom has divided the ISA activity associated with this development into a series of packages, denoted ISA 1 to ISA 6 (see Figure I). The main work package, ISA 1, relates to the role of System ISA in combination with the assessment of the Automatic Train Control (ATC) system. Alstom has appointed Arthur D. Little as the ISA for this work package, which is subsequently referred to in this document as ISA 1.

Figure I: Scope of Independent Safety Assessments



Source: Alstom

This document is the ISA Report (ISAR) for the System ISA. The ATC Subsystem assessment activities conducted as part of ISA 1 are documented in a separate report [18]. Full details of what has and has not been assessed as part of this baseline review are given in sections 4.3 and 4.4.



1.2 Aims of this ISA Summary Report

The aims of this summary report are to:

Describe the independent safety assessment approach.

Present the current status of such assessment.

Identify key outstanding actions.

Summarise the main findings of the assessment to date and detail how such findings have been addressed by Alstom.

1.3 Abbreviations

The following abbreviations are used within the report:

ADL	Arthur D. Little
AP	Automatic Protection
ATC	Automatic Train Control
ATO	Automatic Train Operation
ATP	Automatic Train Protection
ATS	Automatic Train Supervision
CBI	Computer Based Interlocking
CBTC	Communications Based Train Control
CC	Carborne Controller
CLA	Clasico
DCC	Depot Control Centre
DCS	Data Communications System
DSU	Data Storage Unit
EOA	End Of Authority
ERTMS	European Rail Traffic Management System
FMEA	Failure Mode and Effects Analysis
ISA	Independent Safety Assessment
ISAR	Independent Safety Assessment Report
IXL	Interlocking
LC	Line Controller
LEU	Line-side Electronic Unit
MSS	Maintenance Support System
NCCA	Non-Critical Code Analysis
OCC	Operating Control Centre
PSAM	Project Safety Assurance Manager
PSD	Platform Screen Doors
SAR	Safety Audit Report
SER	Signalling Equipment Room
SIL	Safety Integrity Level
SSO	Site Safety Officer
SSS	Specific Safety Study
SwHA	Software Hazard Analysis
TMS	Train Movement Specification
UEVOL	Urbalis Evolution
V&V	Validation and Verification
ZC	Zone Controller

2. Description of Signalling System

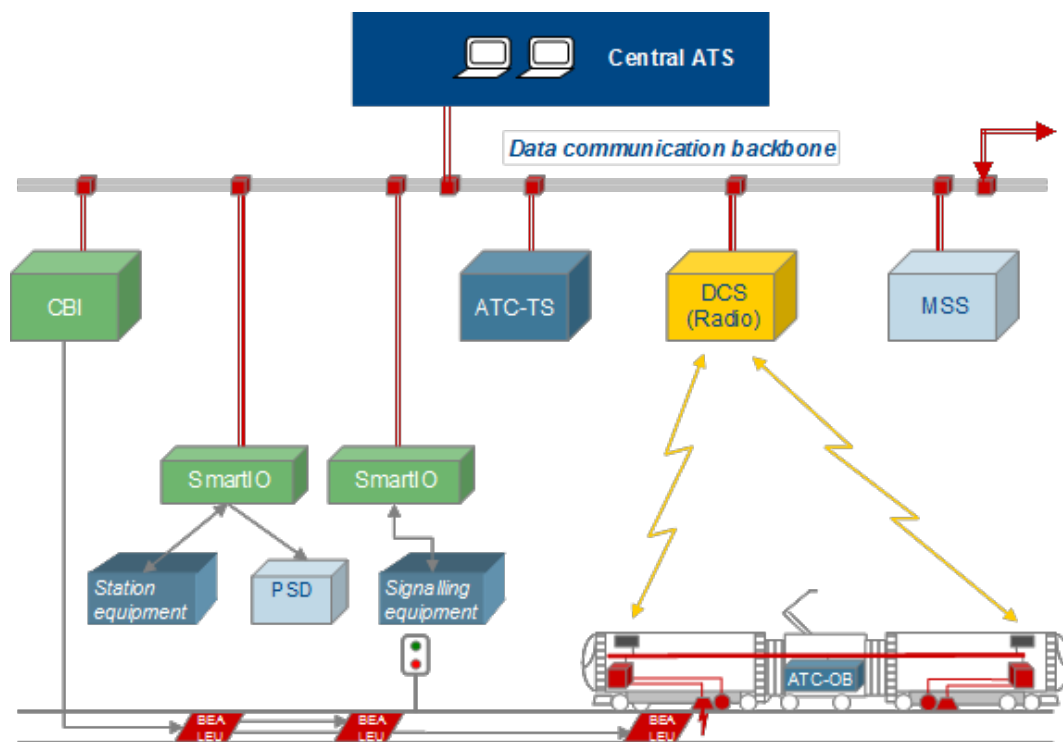
2.1 Overview

The UEVOL system is composed of the following sub-systems:

- Computer Based Interlocking (CBI)
- Automatic Train Control (ATC)
- Data Communication System (DCS)
- Maintenance Support System (MSS)

An ATS (Automatic Train Supervision) subsystem is also required but is not part of the U400 scope of supply. A schematic of the system and sub-system architecture is shown in Figure 2 below.

Figure 2: Schematic of the Signalling System Architecture



Source: Alstom - UEVOL System SV&V Plan

The system is intended to operate using a centralised architecture but can also operate using a distributed one if necessary. The main sub-systems are summarised below.

2.2 Subsystems

Automatic Train Supervision (ATS)

As has been noted, the ATS subsystem is now not part of the U400 scope of supply. Whichever ATS subsystem is selected to operate with U400, the corresponding equipment will be located in Operating Control Centres (OCC) or in Depot Control Centres (DCC) and is expected to provide a centralised sub-system that ensures traffic supervision through management of the line and its resources. Functionality includes route setting, managing timetables and providing train information to operators and passengers.



Computer Based Interlocking (CBI)

The CBI equipment is in localised Signalling Equipment Rooms (SER) and is also a centralised sub-system, controlling and commanding trackside equipment in accordance with the ATS route setting commands. The CBI communicates directly with the ATS and to the ATC, providing information such as traffic direction, position of points and signal status.

Automatic Train Control (ATC)

The ATC sub-system consists of trackside (TS) equipment located in Signalling Equipment Rooms (SERs) and of trainborne equipment. It determines the position of each train, ensures train protection and safe operation and consists of further sub-systems. The main ones are outlined below.

Zone Controller (ZC), responsible for monitoring train position, movement protection through providing trains with End Of Authority (EOA) movement limits, passenger and staff protection and communicating real time status of trackside signalling equipment (such as position of points, signal aspect etc.) to the trainborne equipment.

Line Controller (LC), delivering authorisation data, managing temporary speed restrictions, external interfaces and synchronisation with the ZC and CC.

Carborne Controller (CC), which operates trains according to run profiles, monitors train speed, energy and spacing and provides on-train protection through controlling train entry and departure at stations and operation of platform screen doors (PSD).

Data Communication System (DCS)

The DCS sub-system manages bi-directional communication between trackside and trainborne equipment. It consists of a communication backbone, which links together all trackside equipment, and also connects to radio units which then support trackside to trainborne communications. The DCS carries out no safety related functions and so is classified as SIL 0.

Maintenance Supervision System (MSS)

The MSS is a centralised sub-system located in an OCC or DCC and manages maintenance of the system. It carries out no safety related functions and so is classified as SIL 0.



3. About Arthur D. Little

For over forty years, Arthur D. Little has been a world-leader in safety and risk management consulting. Most noteworthy is the fact that our professional staff, responsible for key conceptual in-roads in the fields of safety and risk management, pride themselves on a practical hands-on approach.

Specific attributes that make us uniquely qualified to undertake this assignment are detailed below:

Working relationship with Alstom. We have developed a close working relationship with Alstom. In particular, we are currently acting as the independent safety assessor for the GATC system and the SBB SA-NBS application. We are therefore familiar with Alstom's design, development and safety management approaches, avoiding any "learning curve". Alstom are also familiar with our ISA approach.

Reputation. We have an established reputation in safety work, with particular strengths in systems for rail application. We have undertaken assignments for railway operators throughout the world, including most of those in Europe.

Established approach. Arthur D. Little has a well-established approach to conducting ISA work in the railway industry. We have developed much of the original methodology and techniques now used in such work.

Open and pragmatic assessment. We offer an open and pragmatic approach to Independent Safety Assessment. Our open approach better ensures that all key safety risks are identified and addressed. We also add value to our clients by providing a pragmatic assessment that avoids unnecessarily rigid adherence to industry standards where alternative approaches are equally effective.

Balance of independent assessment and guidance. We ensure that the value of an ISA is maximised by providing an appropriate balance of independence and guidance in addressing safety requirements, based upon good practice.

A wealth of previous experience. We can bring significant additional value through our experience gained from many other recent assignments with railways and other clients. These include:

- ISA since 1991 for the following Hong Kong MTRC signalling projects:
 - LAR
 - ATCR
 - driverless turnaround
 - QBR
 - TKE
 - 4-tracking
 - Penny's bay
- ISA for Hong Kong KCRC signalling and ATP replacement projects.
- ISA for the Delhi Metro signalling system.
- Assisting many signalling suppliers with the identification and development of solutions to address the requirements of the latest system development standards.
- Advising Railtrack on a more business-focused approach to the use of ISAs.
- Assisting Railtrack's strategic resignalling project teams with the approval of existing technologies for use in the UK.
- ISA to SNCB on TBL 2/3 system to be supplied for L96N.
- ISA for Alstom on generic ERTMS system and SBB SA-NBS application.

Continuity of team members. Arthur D. Little is committed to providing continuity of our team members throughout each ISA assignment. This enables us to:

- Develop and maintain our own understanding of the system under development, in the most cost-effective manner.
- Build a shared vision and a long-term relationship with our clients.



3.1 ISA Experience

Arthur D. Little has over 15 years' experience in independent safety assessment of signalling systems, and did much of the early work in this field. We still maintain most of the team of people who have done this work. We believe that the experience of the company and of the staff carrying out ISA reviews demonstrate our strong ability to deliver effective ISA services.

See Table 1 and Table 2 below for a list of the ISA work and similar projects that the company has carried out on signalling systems.

Table 1: Completed Projects

Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Westinghouse FS2000 ATP	MTRC/LUL (ATCR project and Central line project)	6 person-week on site pre-tender safety audit	1992	1.5
	MTRC/LUL. (ATCR project and Central line project)	Detailed 8 person-week on site hazard analysis	1992	2
	MTRC. (ATCR project)	Study of safety implications of adapting the system to the MTRC railway	1992	2
	KCRC. ATP project	Study of safety implications of adapting the system to the KCRC railway	1994	1
	LUL. Central line	Assessment against Interim Def-Stan 00-55.	1993	2
Westinghouse Westrace Interlocking	LUL. Central Line project	6 person-week on site safety audit	1993	1.5
	LUL. Central Line	Two projects, each 2-3 person weeks on site follow-up audits, including assessments against RIA 23 and Cenelec EN 50126/8/9	1994	1.5
Westinghouse Fixed block brake assured version of transmission based ATP system	MTRC. ATCR project	6 person-week on site pre-tender safety audit	1993	1.5
	MTRC. ATCR	Study of safety implications of adapting the system to the MTRC railway	1993	1
SEL Alcatel (Canada) SELTRAC ATP and Interlocking	MTRC/LUL. (ATCR project and Docklands project)	6 person-week on site pre-tender safety audit	1992	1.5
	MTRCL. Penny Bay Line	ISA for the signalling system for the new Penny Bay Line	2003–2005	12
SEL Alcatel (Germany) LZB ATP	KCRC. ATP project	6 person-week on site pre-tender safety audit	1994	1.5

Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Alstom SACEM ATP	MTRC/LUL. ATCR project	6 person-week on site pre-tender safety audit	1992	1.5
	MTRC. ATCR project	Study of safety implications of adapting the system to the MTRC railway	1992	1
	KCRC. ATP project	Study of safety implications of adapting the system to the KCRC railway	1994	1
	MTRC. ATCR project	Independent safety assessor on the contract to re-signal the existing lines	1994–1999	22
	MTRC. Lantau and Airport Railway	Independent safety assessor on the contract for the signalling of the new railway	1995–1998	9
	MTRCL YAM O station	ISA for the new YAM O signalling system	2003–2005	5
Alstom SSI Interlocking	MTRC. Lantau and Airport Railway	Independent safety assessor on the contract for the signalling of the new railway	1995–1998	5.5
	KCRC. ATP project	Independent safety assessor on the contract for the re-signalling of the existing railway	1995–1999	7
Alstom TBL ATP	KCRC. ATP project	6 person-week on site pre-tender safety audit	1994	1.5
	KCRC. ATP project	Study of safety implications of adapting the system to the new railway	1994	1
	KCRC. ATP project	Independent safety assessor on the contract for the re-signalling of the existing railway	1995–1998	11
Siemens/Matra LZB 700	MTRC/LUL. ATCR project	Full 6 person-week on site pre-tender safety audit	1992	1.5
	MTRC. ATCR project	Study of safety implications of adapting the system to the existing railway	1992	1
Various systems	Siemens/Matra	Independent assessment of the rail signalling technology of each partner as part of the joint venture due diligence	1995	1
Ansaldo Fail-safe microcomputer ATP systems	LUL. No project	3 person-week on site safety audit of existing systems	1994	.75
Proposed system for the TAV lines	TAV (Italy)	Technical risk assessment of the development and installation of the systems involved	1994	6
Interlocking	Railtrack. Manchester south re-signalling	Brief review into the safety of mainline interlocking systems	1997	0.25



Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
CSEE TVM 430 ATP	KCRC. ATP project	3 person-week on site pre-tender safety audit	1994	0.75
	KCRC. ATP project	Study of safety implications of adapting the system to the railway	1994	1
Other items	Railtrack. Nuneaton-Peterborough project	Study into the safety of a number of items of French signalling equipment (track circuits, point machines, etc.)	1998	2
	Railtrack. Nuneaton-Peterborough project	Ongoing assistance with gaining approval of French signalling equipment	1998–2000	2
Union Switch and Signal Microlok II	Railtrack Nuneaton-Peterborough project	3 person-week safety review of Microlok II interlocking	1998	0.75
	Railtrack. Nuneaton-Peterborough project	Ongoing assistance with gaining approval of Microlok I	1998–2000	2
GETS VHLC interlocking	Railtrack. Norwich-Cromer project	2 person week safety review of VHLC interlocking	1998	0.5
GETS HXP-3 level crossing controller	Railtrack Norwich-Cromer project	2 person week safety review of the HXP-3 level crossing predictor	1998	0.5
GRS Transport Management System for Control Room	KCRC. ATP project	On-going assessment as part of independent safety assessor activity (see Alstom TBL)	1995–1998	2
Westinghouse Westrace Interlocking	Iarnrod Eireann. HACM project	Independent safety assessor on the re-signalling project	2000–2001	1
Alstom SACEM	MTRC. Driverless Turnaround modification to the ATCR system	Independent safety assessor for modification to system	1999–2001	4.5
Alstom TBL2/3	SNCB. L96N project	Independent safety assessor on the L96N project	2000–2001	7.5
GETS VHLC interlocking	Railtrack. Norwich-Cromer project	Ongoing assistance with gaining approval of VHLC interlocking	1998–2001	6
GETS HXP-3	Railtrack. Norwich-Cromer project	Ongoing assistance with gaining approval of HXP-3	1998–2001	6
Bombardier	SBB, ERTMS pilot line	Independent project reviewer of the Swiss ERTMS level 2 pilot line	2001–2002	3
Alstom Tilt authorisation and speed supervision (TASS)	Railtrack/Virgin TASS project	Independent project reviewer of the West Coast Main Line TASS system	2000–2003	6.5
Siemens Sacem ATP and Sicas Interlocking	MTRC. Tsueng Kwan O line	Independent safety assessor on the contract for the Tsueng Kwan O line	1999–2003	17.5
Alstom, Sacem	MTRC 4 tracking project on LAR	ISA for 4-tracking of the LAR line	2001–2003	5



Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months Deployed
Westinghouse, new Interlocking	Next generation SSI	Independent project reviewer of the development	2002–2003	2.5
Alstom, Sacem ATP and ASCV interlocking	Delhi Metro	ISA for the new signalling system for the metro and rail lines of the Delhi Metro systems	2002–2006	25
Alstom, TBL ATP and SSI interlocking	KCRC East Rail extension	ISA for the upgrade to the East Rail signalling system	2002–2003	10
Alstom ERTMS	Alstom, Belgium, Swiss ERTMS system	Independent safety assessor on the Swiss application of the ERTMS project	2003–2007	10
Alstom ERTMS	Alstom Betuwe Route	New freight line linking Rotterdam with Germany	2002–2007	5
Siemens Sirius	Singapore DTL Assessment	Assessment of application engineering for Down Town Line development in Singapore	2009-2013	10
Alstom ERTMS	SA-NBS	Independent safety assessor on the Swiss application of the ERTMS project	2003 – 2018	10
Alstom U400	Amsterdam Metro assessment	Assessment of the application of Alstom's U400 CBTC system on the five lines of Amsterdam metro	2014-19	5

Table 2: Ongoing Projects

Manufacturer and System	Name of Project	Brief Description of Work	Period	Estimated Number of Person Months to be Deployed
Alstom ERTMS	GATC	Independent safety assessor of Alstom's development of the EVC and RBC ERTMS products	2000 – 2020	28
Alstom UEVOL	Generic UEVOL assessment	Assessment of Alstom's Urbalis Evolution metro CBTC system	2006-2020	12
Siemens LZB 700M	Assessment of Signalling and PSD system for Chennai Metro Rail Limited	Assessment of development, application engineering and IT&C associated with the signalling and PSD system to be supplied for the first three stages of the metro in development in Chennai.	2013-20	12

4. ISA Objectives and Scope

4.1 ISA Objectives

The ISA is responsible for assisting Alstom in safe delivery of the UEVOL signalling system, by carrying out independent safety reviews and audits throughout the project.

4.2 Relationship with Third Party Independent Safety Assessments

Table 3 details those applications and product safety cases that are in the scope of our assessment (ISA 1). Arthur D. Little will also be cross-accepting the work of the other ISAs 2-5. These assessments are within the scope of both Regular and Clasico baselines.

Table 3: Third Party Assessments within the Scope of URBALIS_{regular}

Safety Case	Independent Safety Assessor
UEVOL System Safety Case	ISA 1
CBI Sub-system Safety Case, including: Data preparation Interlocking principles	ISA 1
ATC Safety Case, including: ZC Safety Case LC Safety Case CC Safety Case	ISA 1
Smart I/O Safety Case	ISA 4
2003 Platform Safety Cases	ISA 2
UNIVIC Safety Case	ISA 3
SM400 BS Safety Case	ISA 5
MSS and DCS Safety Cases	SIL0 sub-systems, no ISA requirement expected

Cross-acceptance activities to date have been carried out on the 2003 platform and Smart I/O. The UEVOL ISA 1 is also the ISA for the UNIVIC platform, so this platform has also in effect been cross-accepted, as no additional assessment by the UEVOL ISA 1 has been needed. Cross-acceptance of the 2003 platform is considered in our corresponding ATC ISA report [18].

We fully support the principal of cross-acceptance and the need to avoid unnecessary duplication or repetition of independent safety assessment effort. We have not therefore sought to repeat any of the assessment activities undertaken by the other ISAs involved. We have, however, sought to fully understand:

The scope of the assessments undertaken by such parties.

The extent of completion of their assessments and any restrictions that such parties may have placed on the scope of any safety case endorsements that they provide.



It should be noted, however, that we have assumed that Alstom have satisfied themselves as to the competency of the third party organizations undertaking the assessments concerned. Our assessment scope has made little provision for review of the adequacy of those product assessments undertaken by third parties and we cannot therefore accept any liability associated with any potential deficiencies that may exist within such assessments.

4.3 Scope of Our Assessment

The scope of the work undertaken by the UEVOL ISA I has been to review the development of the UEVOL Regular and Clasico systems in order to determine whether they are appropriate for revenue service. The assessment assumes that all restrictions given in the system safety case are fulfilled. The current assessment is based on a review of Regular System baseline 1.11.2.6-2.

In carrying out the above scope of work, the following activities have been undertaken:

Review and cross acceptance of safety certificates and SARs for the:

- ZC platform (2003)
- LC platform (2003)
- CC platform (Univic)
- SmartIO
- CBI platform (SM400 BS)

Independent safety assessment in accordance with the standards specified in section 5.10 on:

- System integration activities.
- All aspects of the ATC software development³.
- Automatic Train Operation (Alstom have defined this as a SIL-2 sub-system, though it is noted that it does not contain or fulfil any safety requirements).
- ATC data preparation process and the associated tools used in this process².
- CBI subsystem-level activities.
- CBI data preparation process and the associated tools used in this process.
- DCS, MSS, DSU and DMI noting that these elements do not have any safety requirements.
- The safety-related application conditions exported by other platforms (e.g., CBI UNIVIC, 2003) and checking that they are respected.
- The exporting of the necessary safety-related application conditions to such platforms and subsystems.
- All stages of the generic project development.

Assessment of all stages of the generic project development including:

- Specifications, design, software development and the data preparation process.
- The associated verification and validation at system level, where the sub-systems are the ATC and CBI (in other words, the verification and validation that is associated with integration of sub-systems).

This assessment is limited to consideration of a generic application, therefore review of installation, testing and commissioning beyond its planning is not included in the scope of work.

ISA Audits. Carrying out audits of Alstom's engineering and safety management processes for design, development and testing of the software and data preparation. Such audits are undertaken on-site at Alstom premises. They aim to assess the adequacy of and verify the extent to which Alstom is complying with:

- The system requirements, including comments on the adequacy of any alternative approaches proposed by Alstom.
- Processes for application specification and design, integration, validation, and testing.
- Processes for data preparation.
- Processes for safety management and delivery of safety cases.

³ Such assessment activities are considered, more particularly, in our corresponding ATC ISA report [18].



- Relevant parts of key external safety standards and “good management practice”.

Project Management, Liaison and Reporting. Management of all UEVOL ISA I audits and other activities, including preparation of the following reports:

- Safety Audit Reports: detailing the results of each audit visit.
- ISA Project Management and Safety Audit Plan.
- Regular progress reports.
- Technical coordination meeting minutes.
- Independent Safety Assessment Reports (ISARs) supporting each safety case.

The scope of work also includes other communication, liaison and management activities as required, and ensuring that adequate resources and competent staff are assigned to all of the above activities.

The ISA scope is limited to system safety only and does not include occupational health and safety issues.

4.4 Areas Excluded from this Report

The list of all items that are excluded from assessment in this report is given below:

Use of the Lineside Electronic Unit (which relates to the 888 system baseline only).

Block mode operation (which does not form part of the UEVOL Regular or Clasico solutions.

STIBs which are no longer considered as relevant to the Regular or Clasico solutions.

The Adapt Design Deployment Procedure.

5. Overview of the ISA Approach and Programme

The ISA's key activities and approaches for carrying out the work are detailed in this section.

5.1 General Approach

Our approach has been based on what we consider to be an appropriate balance of off-site document review and on-site audit visits. Audit visits are a key aspect of our assessment approach, providing us with an opportunity to understand the expertise of the development team and to identify the real processes being applied (not necessarily exactly those that may be formally documented). We believe that this is also a more efficient means to discuss potential concerns that we have; it often allows issues to be satisfactorily resolved between us, without the need to raise formal findings (avoiding the consequent effort involved by both parties to formally document the response to, and closure of, such findings). It is for this reason that we have not generally provided formal comments on documents initially reviewed off-site. Rather, we have discussed these documents first during the audit visits, raising formal findings as necessary during the audit.

Through our work we have assessed:

- How all essential development is carried out, including design, coding, testing, verification and validation.
- What techniques are used, including evaluating their adequacy and how they respond to the standards.
- The compliance of Alstom with their own proposed procedures and techniques.
- The adequacy of the documentation of the results of Alstom's work from the point of view of traceability and assurance.

Key issues considered include:

- The architectural safety analysis.
- The sufficiency of the arguments for the SIL0 status of subsystems, modules and sub-assemblies.
- Demonstration of the appropriate integrity of the data preparation processes and, in connection with this, the demonstration of the appropriate integrity for those tools used in data preparation.
- Adequate demonstration that the generic development process supports the level of on-site testing that will follow for subsequent applications.

5.2 Launch Meeting

The launch (kick-off) meeting took place on 13–14 September 2006 at Alstom's premises in Saint Ouen. The results of the meeting are documented in the minutes dated 28 September 2006 [21].

5.3 Document Reviews

This activity included detailed review of key procedures and the results of application of those procedures, as well as safety analyses, prior to each audit visit.

5.4 ISA Audits

ISA audits have been undertaken according to the ISA's general methodology for safety audits (refer to Attachment I in ISA Project Management and Safety Audit Plan [6]). The aims of the ISA audits have been to:

- Understand the measures taken, both technically and managerially, by Alstom to ensure the safety of the system.
- Review the results of Alstom's activities, including their technical adequacy.
- Assess and verify any weaknesses or areas of non-compliance.
- Develop general recommendations for remedial action.



For each audit we have developed an audit protocol, prepared and submitted an audit plan, conducted the audit at Alstom's offices and prepared a Safety Audit Report (SAR), although in some cases the reports from more than one audit have been presented in a single report³.

In common with all audit methodologies, sampling techniques have been used to make assessments and verify evidence; we have not reviewed 100% of all safety-related documentation. The programme of audits is given in section 6.

The audits have recorded findings based on the ISA's judgment of good safety management practice. Each audit has been conducted by a team of three people. This has enabled the team to ensure completeness, by acting as a foil to each other and thus verifying that the understanding gained is complete and justifiable.

At the end of each audit, whilst still on site, we have briefed Alstom on the results of the audit and our recommendations. We have then taken any comments made by Alstom into account prior to preparation of the associated safety audit report.

5.5 Audit Reports

At the end of each audit visit, a Safety Audit Report (SAR) has been prepared⁴ [7]–[16]. These reports briefly describe the work carried out, the understanding gained and any findings raised or comments made on the documents reviewed.

5.6 Log of ISA Findings

It is important that an accurate log of all ISA findings and their current status is maintained. In the past, the Findings Log has formed the central mechanism for the management of ISA findings, and the most up-to-date release is Version 5.3, ref. Alstom/P09004088/39rep [17].

This log details all findings raised throughout the project and provides for each finding:

- Details of the original finding and ISA recommendation.

- Actions taken to address the recommendation, with cross-references to relevant documentation.

- The current status of the finding.

- Dates of relevant actions concerning the finding.

However, ISA findings have more recently been managed using issues lists. A full list of the lists used is given in Attachment B. For the current baseline, Regular System 1.11.2.6-2 the relevant system issues list is P20001408/013mem [62].

The status of open findings is reviewed during each audit for any potential changes (for example, the classification may change as partial resolution of a finding is made or as a finding increases in importance).

5.7 Independent Safety Assessment Report (ISAR)

An Independent Safety Assessment Report (ISAR) is provided to give a summary of the assessment position at key stages in the project. This document collates and summarises the findings of relevant audits, comments on the safety case and identifies those findings that block the application of the safety case (i.e. those that we consider so important that we cannot agree to the use of the system before their closure), if any. The report also provides our assessment of the adequacy of the overall development highlighting the strengths as well as the weaknesses. Separate ISARs are developed for the UEVOL System and each Subsystem. This document is the System ISAR.

⁴ No reports have been produced for audits 11 to 27. Results from each of these audits were incorporated into the relevant ISARs and individual audit reports were not seen to provide any additional benefit.



5.8 ISA Project Management and Safety Audit Plan

The ISA has developed and updated an ISA Project Management and Safety Audit Plan. Following the first audit, the Project Management and Safety Audit Plan was updated to include a detailed work schedule, reference 21202/032rep, and the latest issue is version 1.1 [6]. The Project Management and Safety Audit Plan will be updated as required throughout the project.

For the most recent phase of the assessment that has been undertaken (October – November 2020), the work carried out is described in Arthur D. Little proposal reference Alstom/209001408/009prp, dated September 2020. This work was carried out in accordance with the processes described in the ISA Project Management and Safety Audit Plan.

5.9 System Safety Case

The System Safety Case [19] has been assessed by the ISA. There are no open comments resulting from this assessment.

All comments made in this ISAR are on the understanding that restrictions in the System Safety Case and the associated Safety Related Application Constraints (SRACs) will be fulfilled i.e. those identified in sections 4.5 and 6 of the System Safety Case.

5.10 ISA Organisation

ISA Lead Assessor and Project Manager

The ISA Lead Assessor and Project Manager is David Boulton, who holds responsibility for managing the project and for day-to-day co-ordination, liaison and reporting. Contact between the ISA and Alstom relevant to the ISA work generally occurs via the ISA Project Manager.

Audit Team Leader

The ISA Project Manager acts as Audit Team Leader on the audits. The Audit Team Leader has been responsible for planning and resourcing each audit, leading the conduct of the audit on-site and for preparing Safety Audit Reports.

ISA Auditors

The Audit Team Leader is supported by ISA auditors from Arthur D. Little as appropriate for the tasks concerned. Precise staffing on each audit is included in each individual audit plan, with the core audit team consisting of:

- Clive Adams, Arthur D. Little (Associate Director)
- David Boulton, Arthur D. Little (Principal)
- François Kassel, Arthur D. Little (Consultant)

Administration

The ISA work is managed from Arthur D. Little's Cambridge, UK offices. The ISA Project Manager is assisted in administration by a Project Secretary, who maintains filing and document registration systems.

5.1.1 Applicable Standards

The relevant standards (with version details) are as follows:

[EN 50126] Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS), 1999.

[EN 50128] Railway applications – Communications, signalling and processing systems – Software for railway control and protections systems, 2011.

[EN 50129] Railway applications – Communication, signalling and processing systems – Safety related electronic systems for signalling, 2003.

[EN 50159-1] Railways applications – Communication, signalling and processing systems, Part 1: Safety related communication in closed transmission systems, 2001.

[EN 50159-2] Railways applications – Communication, signalling and processing systems, Part 2: Safety related communication in open transmission systems, 2001.

[Yellow Book 3] Application Note 4 – Independent Safety Assessment Issue 1.0.

6. Summary of ISA Audits

The following section summarises the key conclusions of each ISA audit visit completed as part of Phases A, B and C. The following table summarises the audits undertaken in these phases.

Table 4: Summary of Phase A, B, C and Post-C ISA Activities

Phase	Activity	Date	Days/Staffing
A	Launch meeting	13–14/09/2006	2 days, 1 staff
	Process definition audit (3 days Saint Ouen, 2 days Meudon)	8–12/01/2007	5 days, 3 staff
B	Specification and design audit – Software	06–08/03/2007 (Meudon)	3 days, 3 staff
	Specification and design audit – System	21–23/03/2007 (Saint Ouen)	3 days, 3 staff
C	Specification and design audit – Software	4–6/07/2007 (Meudon)	3 days, 3 staff
	Specification and design audit – System	11–12/9/2007 (Saint Ouen)	2 days, 2 staff
	Specification and design audit – Software	19–21/9/2007 (Meudon)	3 days, 2 staff
	Specification and design audit – System	17–19/10/2007 (Saint Ouen)	3 days, 2 staff
	Design and verification audit – Software	19–20/11/2007 (Meudon)	2 days, 3 people
	Design and verification audit – System	28–30/1/2008 (Saint Ouen)	3 days, 3 people
	Design and verification audit – Software	6–8/2/2008 (Meudon)	3 days, 2 people
	Design and verification audit – Software	15–17/7/2008 (Meudon)	3 days, 3 people
	Design and verification audit – System	22–24/7/2008 (Saint Ouen)	3 days, 3 people
Post C	Specification, design and verification audit – System and ATC	27–29/5/2009 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	8–10/6/2009 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	12–14/8/2009 (Saint Ouen)	3 days, 3 people
	Specification, design and verification audit – System and ATC	8–10/9/2009 (Saint Ouen)	3 days, 2 people
Baseln 1.6.2–5	CBI and System audit	5–6/5/2010 (Saint Ouen)	2 days, 1 day 2 people, 1 day 3 people
Baseln 1.6.6–6	Main focus on 1.6.6 but consideration of 1.6.2 residual issues	12–15/7/2010 (Saint Ouen)	3 days, 3 people
ATC 7.1.1-2	Specification, design and verification audit – ATC	10–11/3/11 (Saint Ouen)	2 days, 3 people
Baseln 1.6.6-22	Specification, design and verification audit – main focus was Clasico baseline but some time spent on 1.6.6-22	29/2/12 – 2/3/12 (Saint Ouen)	3 days, 3 people
Clasico	Specification, design and verification audit – ATC and CBI	21–23/3/12 (Saint Ouen)	3 days, 3 people
Clasico	Specification, design and verification audit – CBI	14/6/12 (Saint Ouen)	1 day, 2 people
Regular	Specification, design and verification audit – ATC and CBI	22–23/10/12 (Saint Ouen)	2 days, 2 people
Clasico	Specification, design and verification audit – System and CBI	16–17/4/13	2 days, 2 people
Regular	Specification, design and verification audit – System and CBI	17–18/05/14	2 days, 2 people
Regular	Specification, design and verification audit – ATC	16–18/06/15	3 days, 3 people



The key personnel interviewed and documents considered or reviewed in each audit are summarised in Annex A.

6.1 First Audit, January 2007

The main conclusion arising from the Phase A process definition audit was that Alstom is using a competent, experienced team that is undertaking work in a controlled manner.

The main areas of concern raised during the audit were:

It was unclear whether there was sufficient validation, for a SIL 4 process, of CBI data in the data preparation process.

It was unclear if there was sufficient end-to-end validation, for a SIL 4 process, of the ATC data preparation process.

6.2 Second Audit, March 2007

The main conclusion of the second audit, held in the Alstom offices in Meudon, was that Alstom has a team with appropriate expertise and competence in place for the development of the UEVOL application software and that the development work was being supported by appropriate safety analysis.

The main concerns raised during the audit were:

The timescales of the project were having an impact on the development leading to a concern with respect to concurrent development activities. There was insufficient evidence of additional controls being put in place or of a reconciliation activity being planned in order to manage the extra complexity that arises from such a development approach.

The traceability verification between software and sub-system level requirements appeared incomplete since child requirements did not always match the corresponding parent requirement, and vice versa.

6.3 Third Audit, March 2007

The conclusion from the third audit, held in Alstom offices in Saint Ouen, was that Alstom was using a competent and experienced team to undertake UEVOL system development and that this development work was being supported by appropriate safety analyses.

The main concern was of the analysis and corresponding safety requirements in the PHA that related to the odometry behaviour, especially in the detection of slip/slide.

6.4 Fourth Audit, July 2007

A significant number of findings arose in this audit, held in Meudon, the majority of which were classified as 'A'. These findings raised a concern in respect of delivering UEVOL in time for commencement of revenue service in December 2007. Other specific concerns raised included:

A lack of a well-defined set of operating principles for UEVOL, concerning both block mode and CBTC.

The mismatch in ATP specifications between sub-system level and software level, where there appeared to be significant areas that did not agree.

Lack of a clear strategy for achieving delivery for revenue service.

6.5 Fifth Audit, September 2007

The report from the fifth audit was combined with that from audit six, given the closeness in dates of the two. Please see the section below for a summary of the corresponding audit results.



6.6 Sixth Audit, September 2007

The main conclusion arising from audits five and six, looking at both system and subsystem issues, was that significant corrective actions were still required from Alstom in order to address outstanding findings. The feasibility of addressing necessary outstanding findings in time for the proposed commencement of revenue service also remained a concern. The most important outstanding issues were:

- The mismatch in ATP specifications between sub-system level and software level, where there appeared to be significant areas that did not agree.

- The lack of completeness of two-way requirements traceability between sub-system and software level specifications respectively.

- Requirements that were still untagged preventing the effective resolution of traceability issues.

As a result of the above points, an overall concern regarding the specification and consistency of the principles to be used for block mode and CBTC operation.

6.7 Seventh Audit, October 2007

The main conclusion arising from this system level audit was similar to the previous audit, in that a significant amount of work remained to be completed in advance of the December 2007 commissioning to address ISA findings and to complete development activities.

The area where the most significant amount of work was needed was still the specifications and in particular the link between sub-system and software level specifications.

6.8 Eighth Audit, November 2007

This audit considered subsystem issues only. Alstom staff were unavailable to support a system level audit. From this point on, the assessor was no longer considering the state of preparedness for the block mode commissioning in December 2007 but only the CBTC mode commissioning scheduled for February 2008. However, this change in consideration did not change the overall conclusion of the audit, which remained that a significant amount of work remained to be completed in advance of CBTC commissioning to address ISA findings and to complete development activities. The specific areas of concern had also not changed.

6.9 Ninth Audit, January 2008

The main conclusion arising from this audit, held in Saint Ouen, was that evidence was available that at system level, work was proceeding to address outstanding ISA findings. However, most of the major findings remained open. The reconciliation between subsystem and software level requirements specifications for the CC was underway in order to resolve the current lack of traceability between these levels. The ISA noted it would be necessary to review progress in more detail at the software level before concluding on the overall position with respect to UEVOL development.

6.10 Tenth Audit, February 2008

By the time this audit took place, the commissioning date for CBTC mode had moved to April 2008. The main conclusion arising from this subsystem level audit was that significant work still remained outstanding prior to commencement of CBTC revenue service and it was not clear how all necessary work would be completed by this date. Key concerns related to incomplete specification development and associated reconciliation and the need then to have a robust set of safety analyses to support final functionality.

It is further noted by the ISA that ATC subsystem software development activities were dependent on specification and analysis work at system level. At that time such system level activities remained incomplete.



6.11 Eleventh Audit, July 2008

By the time of this this system level audit, the commissioning date for CBTC mode had moved to July 2008. The main conclusion arising from this audit was that significant work still remained outstanding prior to commencement of CBTC revenue service. Progress had been made, particularly in the key area of specification completion and reconciliation, but this and many other areas still required work to close issues.

6.12 Twelfth Audit, July 2008

The main conclusion arising from this subsystem level audit was that significant work still remained outstanding prior to commencement of CBTC revenue service, reinforcing the results of the recent audit 11.

6.13 Thirteenth Audit, May 2009

The main conclusion arising from this audit was that significant work remained to be completed in order to demonstrate an appropriate level of safety prior to the Milano commissioning, scheduled for autumn 2009.

6.14 Fourteenth Audit, June 2009

The results of the fourteenth audit further reinforced the conclusions of audit thirteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to commissioning in Milano.

6.15 Fifteenth Audit, August 2009

The results of the fourteenth audit further reinforced the conclusions of audit fourteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to the requested endorsement date of mid-October 2009.

6.16 Sixteenth Audit, September 2009

The results of the sixteenth audit were the same as those of audit fifteen. The ISA expressed confidence in the capability of the team but noted both the number and nature of the open issues remaining, as well the additional development planned prior to the requested endorsement date of mid-October 2009.

6.17 Seventeenth Audit, May 2010

This audit mainly focused on CBI related matters and some system level issues as part of the assessment of baseline 1.6.2–2. Progress was made with respect to addressing issues preventing a generic endorsement and also with including the CBI subsystem within the endorsement. Further progress was needed to reach a point where endorsement could be provided but no major obstacles were identified.

6.18 Eighteenth Audit, July 2010

This audit addressed the assessment of baseline 1.6.6–6 but residual points regarding baseline 1.6.2 were also considered. In particular, the latent error discovered in relation to VESG and the calculation of compensated gradients was discussed. Agreement was reached on the actions needed for all open points.



6.19 Nineteenth Audit, November 2010

This audit addressed the assessment of ATC 5.1.1–3. The main purpose of the audit was to complete assessment of the principal documents of the baseline, which was largely achieved although several documents were still to be reviewed by the end of the audit. A number of queries remained at the end of the audit although none of these was considered to be likely to affect the target endorsement date of 19 November 2010. Agreement was reached on the actions needed for all open points. Subsequent to the audit all documents were reviewed and all necessary actions completed by Alstom.

6.20 Twentieth Audit, March 2011

This audit addressed the assessment of ATC baseline 7.1.1-2 but considered only the modifications to the CC. The audit was of two days duration and the majority of the corresponding documentation had been reviewed in advance of the audit. All significant issues were closed out in the course of the audit enabling the operation of the CC in block mode to be endorsed shortly after the end of the audit.

6.21 Twenty First Audit, February/March 2012

The main purpose of this audit was to review ATC issues relating to the Clasico baseline 9.2.1.2. By the end of the audit, many of the functional modifications associated with the Clasico baseline were understood by the ISA although as there were documents still to review, it was not possible to draw any firm conclusions in respect of this baseline.

One day was spent looking at system baseline 1.6.6-22 and the matching ATC baseline 7.2.2.14. Preliminary review of documentation was undertaken and an overview of the functional changes provided by Alstom. Again, by the end of the day, given the documents still to be reviewed it was not possible to reach any firm conclusions in respect of this baseline. However, during the subsequent assessment all issues were resolved.

6.22 Twenty Second Audit, March 2012

This audit considered ATC 9.2.1.2 and Clasico CBI 1.2.3. Significant progress with open issues was made during the audit. Following the audit, with respect to CBI, review of all necessary documents was completed as were all the associated actions Alstom was required to complete.

6.23 Twenty Third Audit, June 2012

This was a one day visit undertaken by the ISA to review changes to the Clasico CBI baseline as it evolved from 1.2.3 to 1.2.4.

6.24 Twenty Fourth Audit, October 2012

This audit covered the Clasico system baseline 1.2.1.7 and Regular CBI baseline 6.1.3. Those CBI documents that can only be reviewed at Alstom premises were examined and all the open points on the system baseline 1.2.1.7 were reviewed. For those that were not closed, actions were agreed.

6.25 Twenty Fifth Audit, April 2013

This audit considered Clasico CBI 1.3.3 and Clasico system 1.2.2. The changes involved in these baselines were discussed and all CBI documents that require to be examined at Alstom's office were reviewed.



6.26 Twenty Sixth Audit, December 2013

This audit considered Regular CBI 7.3 and Regular system 1.10.1.15. The changes involved in these baselines were discussed and all CBI documents that require to be examined at Alstom's office were reviewed. Outstanding CR related points connected to baseline 1.10.1.15 were successfully resolved and all necessary on-site CBI documentation was examined. No major concerns arose as a result of the audit.

6.27 Twenty Seventh Audit, May 2014

This audit also concentrated mainly on CBI issues, looking at baseline 8.1. In particular, documentation available only on site at Saint Ouen was examined (ticked control tables and principles, as well as the principles themselves). Time was also spent looking at the remaining issues on system baseline 9.3.6.2, which were successfully resolved.

6.28 Twenty Eighth Audit, June 2015

The main purpose of this audit was to review ATC issues relating to the Regular baseline 11.3.X. By the end of the audit, many of the functional modifications associated with the baseline were understood by the ISA although as there were documents still to review, it was not possible to draw any firm conclusions in respect of this baseline. One day was also spent reviewing the ATO with a view of understanding how well its development aligned with the requirements of SIL 2. Some corresponding issues were raised for Alstom's attention.

6.29 Twenty Ninth Audit, November 2016

This audit concentrated on CBI baseline 12.1, which is essentially a porting of CBI baseline 8.1 to the Moon platform. In particular, it considered the changes to the data and principles verification and validation processes which have led to the removal of manual ticking activities from these processes.



7. Outstanding Issues

Outstanding issues, all of which are non-blocking, are detailed in our ISA Findings Log [17] and issues lists [23] – [62].

8. Conclusions

The ISA endorses use of UEVOL system Regular baseline 1.11.2.6-2 in revenue service in CBTC mode of operation, subject to the following conditions:

The applicable versions of ATC and CBI to be used with this system baseline are ATC 11.4.5.2 and CBI 8.3.1 respectively.

All restrictions and conditions noted in section 8 of the ISA's corresponding ATC Subsystem ISAR [18] are fulfilled.

All restrictions and conditions noted in section 8 of the ISA's corresponding CBI Subsystem ISAR [22] are fulfilled.

All restrictions in Alstom's System Safety case [19], including sections 4.5 and 6, are observed.

- Application projects should note that in respect of atvcm00908269 and atvcm00563572, the Safety Case is in error and the delivery sheet is correct. The restriction associated with atvcm00563572 is not applicable and that associated with atvcm00908269 is applicable. Projects are to refer to the delivery sheet in respect of the restriction associated with CR atvcm00908269.

All further conditions and restrictions as set out below are observed:

- The applicable version for UEVOL-0657 is AR plus_50.
- The safety requirement SHA-1216 references the wrong change request (CR atvcm00733891). The correct reference should be (CR atvcm 00792217).
- It is an application project requirement to demonstrate compliance with the Guidelines for Project Deployment (GFPD) (UEVOL-0962- AP_PLUS_70) and RTI (UEVOL-0212- AF_PLUS_2).
- With respect to the RTI, projects should use the RTI excel part to identify parameter values, as it contains the correct values whereas there are errors in the associated RTI word document.
- Application projects should check the consistency between the "INDEX_OUTPUT_VALUES" sheet and the detailed individual RTI sheets.
- It is an application project responsibility to ensure compliance with the applicable system tools delivery sheet (UEVOL-2488, AP_Plus_71).
- Application projects should satisfy themselves that an appropriate process is in place to ensure compliance with the safety related rules identified in the GFPD, with the necessary level of confidence.
- Previous application projects have misunderstood GfPD rules, in design and/or verification.

Application projects should therefore apply the following process:

- All safety-related GfPD rules applicable to the project, and which are manually verified, should be reviewed by two engineers knowledgeable in the GfPD rules to identify those rules that may be at risk of misinterpretation. Where any such rule has been verified manually in double chain, and both chains conclude that the design is compliant with the rule, such rule should be verified in third chain by an expert designer.
- Each project should discuss project specific configuration aspects with the U400 product team when performing the gap analysis to ensure that such configuration aspects are fully covered by existing GfPD rules.
- Application projects should discuss their specific line configuration with the U400 product team, to ensure that all aspects of such configuration have already been fully taken into account in the U400 product design and/or modify the line configuration accordingly.
- Rule_TMS_Overlap_0033 applies to all types of overlap (Critical, Preferred, Not interlocked or, Reduced).
- The association of rules to scheme plan items in the 'Applicable Rules' tab of the Excel appendix of UEVOL-1628 (Scheme Plan Verification Guideline) is indicative only. Application projects are responsible for ensuring that the correct and complete set of rules is associated with each scheme plan item.
- The association of rules to TMS items in the 'Applicable Rules' tab of the Excel appendix of UEVOL-1637 (TMS Verification Guideline) is indicative only. Application projects are responsible to ensure that the correct and complete set of rules is associated with each TMS item.

- The rules identified in UEVOL-1627-Y, 1637-Y and 1628-Y as requiring verification shall be treated by application projects as indicative only. Application projects are, themselves, responsible for ensuring that the correct and complete set of rules is verified in accordance with the GfPD.
- Application projects making use of the SyDT (System Data Table) as an input to system data preparation should be aware that they are entirely responsible for the adequacy of the SyDT preparation and verification process. Projects should be aware of the significant effort and detailed process likely to be required for preparation and verification of the SyDT, in order to provide a comparable safety level when compared with the double chain data preparation, comparison and convergence process which is otherwise adopted when the SyDT is not used.
- We are aware that some application projects consider the SyDT modification and verification process to be effort intensive. When errors are identified in the SyDT, rather than correct the SyDT, such errors are sometimes therefore corrected in the SyDB directly. The full nominal U400 process for SyDB modification (double chain, GfPD rules verification) should be followed in such case.
- The ISA continues to recommend the following for future improvement:
 - System data activity recorder should distinguish between three classes of anomaly when making manual modifications to the data:
 - Manual modifications due to known tool errors specified by U400.
 - Manual modifications due to tool errors not specified by U400.
 - Manual modifications due to SyDT errors.
 - With respect to UEVOL-1236, K, the template ATC data activity recorder document does not provide for explicit confirmation that each individual manual modification (e.g. due to UEVOL-1666/1667, U400 AC or due to project-specific procedure) has been implemented by the respective DP chain or checked by the data validator. Each manual procedure might include multiple manual modifications. Therefore, the ISA recommend that the activity recorder should enforce that the project confirms which set of manual modifications have been applied and implemented in double chain.

With regards to CR757875, a bug exists in the report comparison functionality, which leads to the generation of an empty report after a comparison. The empty report does not mean that no differences have been found between two reports. Rather it means that the comparison function has malfunctioned. We recommend that project should discuss the issue with U400 team to bypass the error and to use a correctly generated comparison report.

Application projects should discuss all restrictions identified in section 6 of Alstom's System Safety case [19] with the UEVOL project team, to ensure that they are properly understood.

By its generic nature, the UEVOL system can be deployed in a diverse range of operational configurations and scenarios. It is therefore an application project responsibility to ensure that sufficient testing of its application (with its specific data) has been conducted, in its representative environment, to address its intended specific operational configuration and use.

Application projects should not use the "Approach_locking_partially_defined_in_UEVOL_available" option.

With respect to U400_SRAC_0922, this SRAC is correctly defined in UEVOL-2560- E_Plus I 6 and this version is to be followed not the corresponding definition in UEVOL-1926-R_Plus I (as given for UEVOL-Oper-SyExpC-0660)

It is Arthur D. Little's independent professional opinion that the UEVOL System as defined in [19], and subject to the issues identified in this report being addressed (as identified above):

By design protects against a wrong side failure to deliver the functionality given in [20] commensurate with a safety integrity level of SIL4 (as defined in [3]) subject to compliance with the restrictions of use detailed in the corresponding Alstom safety case [19].

Has software developed in compliance with the:

- SIL4 requirements in CENELEC 50128 [2], with respect to the ATP.

Shows that an appropriate level of compliance with the other CENELEC safety standards 50126 [1] and 50129 [3] has been achieved in accordance with the requirements for SIL4.



We confirm that we have considered all of the arguments presented in the corresponding safety case [19]. We support such arguments, subject to the open (but non-blocking) issues identified in our ISA Log of Findings [17] and issues lists [23] – [62].

It should be noted that Alstom have appointed:

Altran (formerly Praxis High Integrity Systems) as independent safety assessor of the 2oo3 platform upon which the ZC and LC subsystems are based.

Agence de Certification Ferroviaire (Certifer) as Independent Safety Assessor of the Smart IO, which is involved in communications between the Interlocking and PSDs.

The Alstom Bologna Site Safety Officer (SSO) as independent safety assessor of the Smartlock 400 BS platform upon which the CBI is based.

Our opinion above is therefore based, in part, upon the independent professional opinions reached by such parties. We have not performed independent safety assessment of such platforms/subsystems ourselves. Nevertheless, our assessment has considered and cross accepted Alstom's compliance with those restrictions raised by Altran, Certifer and the Alstom Bologna/Paris SSOs in their respective assessment reports, as well as Alstom's compliance with those restrictions and safety-related application conditions contained within the platform/subsystem safety cases; it is our opinion that an appropriate level of compliance has been demonstrated.

Our assessment has considered all of the elements required by CENELEC 50129 [3] to be included in the quality management, safety management and technical safety report sections of a safety case. It is our opinion that Alstom have demonstrated an appropriate level of compliance with such requirements. This opinion excludes consideration of the 2oo3 and Smartlock 400 BS platforms and the Smart IO, which, as noted above, have been subject to assessment by Altran, the Alstom Bologna and Paris SSOs and Certifer respectively. However, we confirm that the third party assessment reports associated with the 2oo3 platform, Smartlock400BS platform and Smart IO confirm their respective compliance with CENELEC 50129.

9. References

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- [5] Railway Applications – Communication, Signalling and Processing Systems – Part 2: Safety Related Communication in Open Transmission Systems, EN50159-2 (2001)
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- [9] ISA of UEVOL: Phase B Audit 3 SAR, Alstom/21202/060rep, March 2007
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- [12] ISA of UEVOL: Phase C Audits 7 SAR, Alstom/21202/081rep, December 2007
- [13] ISA of UEVOL: Phase C Audits 8 SAR, Alstom/21202/089rep, January 2008
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- [17] ISA Findings Log for UEVOL, Version 5.3, Alstom/P09004088/039rep, July 2010
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- [19] UEVOL System Generic Application Safety Case Variant Regular, UEVOL-I632, Version DJ, 22/10/2020
- [20] UEVOL System Requirements Specification and Architecture Design – ALL Variant, UEVOL-I922, version Q_PLUS_4, 10 March 2020
- [21] Minutes from the Kick-Off Meeting Held 13–14 September 2006, Document Reference Alstom/21202/024mem, 28 September 2006.
- [22] Independent Safety Assessment of UEVOL: CBI Sub-system, Summary Report, Version 4.11, Alstom/PI9001510/019rep.docx, March 2020
- [23] Baseline 1.6.2–5 System Issues List, P09004088/035mem
- [24] Baseline 1.6.2–5 CBI Issues List, P09004088/022mem
- [25] Baseline 1.6.2–5 ATC Issues List, 09004088/014mem
- [26] Baseline 1.6.6–6 System Issues List, PI0003124/023mem
- [27] Baseline 1.6.6–6 ATC Issues List, PI0003124/024mem
- [28] Baseline 1.6.6–6 Software Issues List, PI0003124/017mem
- [29] Baseline 1.6.6–6 Middleware Issues List PI0003124/030mem



- [30] Baseline 1.6.6–6b Issues List PI0003434/012mem
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- [32] Baseline 1.6.6–9, ATC 5.2.1–2 (Software 7.0.12) Issues List, PI0002591/045mem
- [33] Baseline 1.6.6–6c and ATC Baseline 4.2.2–2 Issues List PI1000766/012mem
- [34] Baseline 1.6.6–15 System Issues List, Alstom/PI1001820/016mem
- [35] Baseline 1.6.6–21 System Issues List, Alstom/PI1002414/019mem
- [36] ATC Baseline 7.2.2.14 Issues List, Document Reference PI2000202/014mem, version 10
- [37] Baseline 1.6.6–25 System Issues List, Alstom/PI2000998/011mem
- [38] Baseline CLA 1.2.1 System Issues List, Alstom/PI2002414/031mem, version 13
- [39] Baseline 1.10.1.6 System Issues List, Alstom/PI2002094/032mem, version 14
- [40] Baseline 1.10.1.8 System Issues List, Alstom/PI3000195/24mem, version 02
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- [43] Baseline 1.6.6.30b System Issues List, Alstom/PI3001341/011mem, version 05
- [44] Baseline Clasico 1.2.2.3 system issues list, Alstom/PI3001656/025, issue 05
- [45] Baseline Regular 1.10.1.14 system issues list, Alstom/PI3001656/31, issue 12
- [46] Baseline Regular 1.10.1.15 system issues list, Alstom/PI3001656/36, issue 07
- [47] Baseline Regular 1.10.1.17 system issues list, Alstom/PI4003375/36, issue 05
- [48] Baseline Regular 1.10.1.18 system issues list, Alstom/PI4004370/15, issue 03
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- [51] Baseline Regular 1.11.1.8-2.5 system issues list, Alstom/PI5001597/021mem, issue 03
- [52] Baseline Regular 1.10.3.3 system issues list, Alstom/PI5001597/039mem, issue 14
- [53] Baseline Regular 1.11.2.1-1 system issues list, Alstom/PI5001597/054mem, issue 11
- [54] Baseline Regular 1.11.2.2-1 system issues list, Alstom/PI7000256/014mem, issue 11
- [55] Baseline Regular 1.11.2.1-3 system issues list, Alstom/PI7010068/031mem, issue 05 (non-endorsed baseline)
- [56] Baseline Regular 1.11.2.1-4 system issues list, Alstom/PI8000318/021mem, issue 07
- [57] Baseline Regular 2.12.4.2 system issues list, Alstom/PI8001130/020mem, issue 10
- [58] Baseline Regular 1.11.2.4 system issues list, Alstom/PI8001130/017mem, issue 08
- [59] Baseline Regular 1.11.2.4 system tool 16.2.1 issues list, Alstom/PI8001130/028mem, issue 04
- [60] Baseline Regular 1.11.2.1-4 system issues list, Alstom/PI8000318/021mem, issue 07
- [61] Baseline Regular 2.12.5.2-1 system issues list, Alstom/PI9001510/064mem, issue 13
- [62] Baseline Regular 1.11.2.6-2 system issues list, Alstom/P20001408/064mem, issue 09



A. Personnel Interviewed and Documents Reviewed or Considered

A.1 Personnel Interviewed

The key personnel interviewed during our ISA audit visits are detailed below.

Brice Ah-Tiane	System Data Preparation V&V
Victor Andritoiu	FIVP Testing
Jean-Paul Arcanjo	System Engineer
Eric Aubertin	System Data Preparation
Arneau Bercegeay	System specifications
Alain Blas	Site safety officer Meudon and Saint Ouen
Julian Le Bot	Site measurement/testing
Josiane Bouby	Test Line and V&V
Catherine Bouchut	System Data Preparation V&V
Phillipe Bozoian	System Parameter Validation
Christian Brixy	Verification and Validation Manager
Christine Brizec	System parameters configuration rules safety analysis
Robert Capel	Safety Assurance Management
Lionel Carneriro	ATC Tool validation
Helder Cerqueira	ATC Tool validation
Patrick Le Chatelier	Safety Engineer (ZC responsibility) and Project Safety Assurance Manager (Meudon)
Michelle Le Corre	On-site testing
Pascal Cuzange	CBI Data Preparation
Vincent Decanter	Validation Manager
Jean-Charles Didier	VESG safety analysis
Laurent Dissez	Quality Manager (Meudon)
Nicolas Drouet	ATC safety analyses
Christophe Evariste	Quality Manager (Saint-Ouen)
Gerard Frenisy	Change Control
Gilles Gabard	System Work Package Owner
Jean-Charles Glinkowski	Sub-contractor verification,
Marie-Laure Gnemmi	VESG safety analysis
François Hadacek	Project Software Safety Assurance Manager (Meudon) and System Work Package leader (Saint Ouen)
Chrirstian Hardion	System safety engineer
Eric Hautot	Project Safety Assurance Manager (Saint-Ouen)
Jeremie Houdan	Safety Engineer (LC responsibility)
Jean-Rene Hulot	Software Work Package Owner
Eric Huvé	Design Engineer (CC)
Abderrahmane Kettani	Software safety engineer
Jean-Michel Kluth	System Engineer
Frederic Mazabraud	System safety analysis
Mohammed Medjoub	B Development
Fernando Mejia	B Development and Validation
Jeremie Messeca	V&V Manager
Muiri Miabala	Safety Engineer (Parameters Hazard Analysis)



Luciano Milano	Signalling Safety Manager
Abdelkrim Mous	Design Authority and Technical Leader
Thibault Navette	System specifications
William Orsat	ATC Data Preparation
Gaelle Ovensange	ICONIS PSAM
Jocelyn Perrot	CBI Data Preparation
Michel Polvorel	Odometry
Pascal Poisson	Software verification and validation
Christophe Pruvost	Software verification and validation
M Ramondou	Safety Engineer
Ewen Raulo	Validation Manager
Leopoldo Scaglione	ATC Verification and Validation
Roberto Semprini	RAMS Department Head
Bruno da Silva	Data preparation tools
Fernando de Silva	Site safety officer Saint Ouen
Naguib Takouche	Product Engineering IDF Department Head
Jean-Christophe Van Den Hende	B development
Khalid Logerot	V&V Manager
David Basson	Verification and Validation
Hachem Yousfi	Software Safety Analysis
Valerie Torcelli	CBI Safety Assurance Manager
Eléonore Terraz	CBI Safety Assurance Manager

A.2 Documents Reviewed

The following section summarises the key documents reviewed or considered during each audit/visit. Only system level documents are included. For ATC subsystem level documents reviewed or considered during our assessment, please see our corresponding ATC subsystem assessment report [18].

Kick-Off Meeting (August 2006)

Table 5: Documents reviewed or considered during the Kick-off Meeting

Title of Document	Alstom Reference	Release/Date
Safety, Verification and Validation Plan	UEVOL-0219	Release B, 05/07/06
System Architecture Description	UEVOL-225	Release B, 30/06/06
System Requirements Specification	UEVOL-224	Release B, 30/06/06
System Parameters Specification	UEVOL-248	Release B, 12/07/06
System Parameters Deployment Process	UEVOL-350	Release A, 31/08/06



Audit Visit 1 (January 2007)

Table 6: Documents reviewed or considered during First Audit

Title of Document	Alstom Reference	Release/Date
Requirements Management Plan	UEVOL-0273	Release A
Safety, Verification & Validation Plan	UEVOL-0219	Release B
System Parameters Deployment Process, 6 October 2006	UEVOL-0350	Release B
Safety Requirements for Data Preparation Tools Development	UEVOL-0529	Release A, 16/10/06
Safety, Verification and Validation Plan	UEVOL-0219	Release C, 07/12/06
Kick-off meeting (11/01/07) presentations: UEVOL ATC Software ISA ADL Audit UEVOL System Overview (software) UEVOL ATC Software ISA ADL Audit Safety Processes	No references	No version number
Preliminary Hazard Analysis	UEVOL-263	Release B, 06/04/06
System Hazard Analysis	UEVOL-0421	Release A, 30/11/06
Test and Commissioning Plan	UEVOL-0566	Release A, 30/11/06
System Parameters Deployment Process	UEVOL-350	Release B, 06/10/06
Requirements Management Plan	UEVOL-0273	Release A, 06/12/06
System Parameters Process Hazard Analysis	UEVOL-0422	Release A, 22/09/06
Interface Hazard Analysis	UEVOL-0367	Release A, 16/06/06

Audit Visit 2 (March 2007)

Table 7: Documents reviewed or considered during Second Audit

Title of Document	Alstom Reference	Release/Date
Safety, Verification & Validation Plan, 05/07/06	UEVOL-0219	Release B



Audit Visit 3 (March 2007)

Table 8: Documents reviewed or considered during Third Audit

Title of Document	Alstom Reference	Release/Date
Preliminary Hazard Analysis, 06.04.06	UEVOL-0263	Release B
System Hazard Analysis, 30.11.06	UEVOL-0421	Release B
Interface Hazard Analysis, 19/01/07	UEVOL-0367	Release B
UEVOL Hazard Log_v1_ALT	n/a	I
UEVOL System User Needs	UEVOL-0070	Release C, 13/10/06
Interface Hazard Analysis	UEVOL-0367	Release 1B, 19/01/07
UEVOL Preliminary Hazard Analysis Block-Mode	UEVOL-0829	Release 3A, 07/03/07
UEVOL Hazard Log	HL-v1A-ALT	Excel spreadsheet, 23/03/07
System 888: System Architecture Verification Report	Appendix A – no specific reference	
UEVOL FIVP Strategy	UEVOL-0547	Release A, 20/12/06
System Requirements Specification Variant 888	UEVOL-0624	Release A, 28/02/07
System Parameters Configuration Rules	UEVOL-0286	Release B, 28/02/07
RTI: Real Time Issues	UEVOL-0212	Release A, 24/04/06
Configuration Management Plan	UEVOL-0232	Release 2A, 05/09/05
System Parameters Description	UEVOL-0248	Release E, 28/02/07
System Architecture Description Variant 888	UEVOL-0604	Release A, 28/02/07
UEVOL Typical Requirements Management Plan	UEVOL-0815	Release 2A, 05/03/07
Platform and Subsystem Configuration Management Process	BPGIS-0045	Rev 6A, 19/10/06
Project Management Plan	UEVOL-0068	Release B, 11/09/06,
Document Control Plan	UEVOL-0003	Release C, 02/11/06
UEVOL Quality Assurance Plan	UEVOL 0060	Release B, 02/11/06
Urbalis Platform: Platform and Subsystem Configuration Management Plan	UEVOL-0418	Release A, 03/11/06
Safety Requirements for Data Preparation Tools' Development, 16/10/06	UEVOL-0529	Release A
System Parameters Process Hazard Analysis, 22/09/06	UEVOL-0422	Release A
System Parameters Description, 17/11/06	UEVOL-0248	Release E



Audit Visit 04 (July 2007)

Table 9: Documents reviewed or considered during Fourth Audit

Title of Document	Alstom Reference	Release/Date
None at system level		

Audit Visit 05 (September 2007)

Table 10: Documents reviewed or considered during Fifth Audit

Title of Document	Alstom Reference	Release/Date
System Parameters Deployment Process	UEVOL-0350	Release C, 01/08/07
PHA Block Mode	UEVOL-0829	Release B, 13/06/07
Hazard Log v1A, excel spreadsheet	No ref	
System Delivery Plan	No reference	Revision 03/09/07 – Draft
System Requirements Specification Variant 888	UEVOL-0624	Release C, 11/08/07
Memo: Exigence Safety Sur Le Commentateur CBTC-BIO or Mode Block Mode Description – 5B SYRS888	UEVOL-0351 UEVOL-0624-B	24/05/07
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release 1A, 21/06/07
System Parameters Process Hazard Analysis	UEVOL-0422	Release A, 22/09/07
Urbalis Evolution Block Mode Description	UEVOL-0351	Release 5B, 05/04/07
UEVOL-PARAMS Evolution – System Parameters Data Entry Tool and Calculation Tool Software Module Description	UEVOL-1077	31/07/07
System Parameters Description	UEVOL-0248	Release H, 02/08/07
System Architecture Description Verification Report – Variant 888	UEVOL-0808	19/07/07

Audit Visit 06 (September 2007)

Table 11: Documents reviewed or considered during Sixth Audit

Title of Document	Alstom Reference	Release/Date
None at system level		



Audit Visit 07 (October 2007)

Table 12: Documents reviewed or considered during Seventh Audit

Title of Document	Alstom Reference	Release/Date
System Parameters Deployment Process	UEVOL-0350	Release 1D, 11/10/07
System Generic Application Safety Case Variant 888	UEVOL-0888	Release 1A
System Requirements Specification Variant 888	UEVOL-0624	Release C, 11/08/07
Memo: Safety Verification of Inputs Document for Data Preparation Activities	UEVOL 024	28/09/07
Safety Requirement for Data Preparation Tools Development	UEVOL-0529	Release A, 16/10/06
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release 1A, 21/06/07
System Architecture Description Variant 888	UEVOL-0604	Release C, 10/08/07
System Requirements Specification Verification Report, Variant 888	UEVOL-0807	Release C, 19/07/07
System Architecture Description (Verification) Report – Variant 888	UEVOL-0808	Release 1D, 02/10/98
Project Delivery Process Implemented in ADVITIUM	BPGIS-0062	Revision A, 31/01/06
Platform and Subsystem Delivery Process Implemented in ADVITIUM	BPGIS-0063	Revision A, 30/01/07

Audit Visit 08 (November 2007)

Table 13: Documents reviewed or considered during Eighth Audit

Title of Document	Alstom Reference	Release/Date
None at system level		

Audit Visit 09 (January 2008)

Table 14: Documents reviewed or considered during Ninth Audit

Title of Document	Alstom Reference	Release/Date
System Architecture Description Variant 888	UEVOL-604	Release E, 05/12/07
System Requirements Specification Variant 888	UEVOL-0624	Release E, 04/12/07
Interface Hazard Analysis Variant 888	UEVOL-0747	Release C, 20/12/07
System Hazard Analysis Variant 888	UEVOL-0793	Release D, 29/11/07
System Hazard Analysis Variant 888	UEVOL-0793	Release E, 16/01/08
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release A, 16/11/07
Specific Safety Study Block-Mode	UEVOL-0829	Release E, 16/01/08
System Parameters Description	UEVOL-0248	Release J, 07/12/07
System Parameters Configuration Rules	UEVOL-0286	Release F, 07/12/07
Memo: Memo Safety UEVOL 026, KSlides Tests		27/02/07
System Requirements Specification Variant 888	UEVOL-0624	Release E, 04/12/07
System Architecture Description Variant 888	UEVOL-0604	Release E, 05/12/07
System Architecture Description (Regular)	UEVOL-0225	Release E, 14/12/07
Urbalis Evolution SV&V Plan	UEVOL-0219	Release D, 24/09/07



Title of Document	Alstom Reference	Release/Date
ATC-ZC Subsystem Requirements Test Description Verification Report	UEVOL-0827	Release B, 30/11/07
System Parameters Deployment Process	UEVOL-0350	Release D, 05/12/07
Project Delivery Process Implemented in Advituin	BPGIS-0062	Revision A, 30/01/08
Platform and Sub-System Delivery Process Implemented in Advituin	BPGIS-0063	Revision A, 30/01/08

Audit Visit 10 (February 2008)

Table 15: Documents reviewed or considered during Tenth Audit

Title of Document	Alstom Reference	Release/Date
UEVOL V&V Presentation, (PowerPoint)		06/02/08
Memo PMT08-0015, from Brice Ah-Tiane, Subject: CR de la réunion de design du 14/01	PMT08-0015	17/01/08
Memo PR07-0413fr, from Brice Ah-Tiane, Subject: CR réunion sur la gestion des modes	PR07-0413fr	23/10/07

Audit Visit 11 (July 2008)

Table 16: Documents reviewed or considered during Eleventh Audit

Title of Document	Alstom Reference	Release/Date
System Parameters Description	UEVOL-0248	Release M, 07/12/07
System Parameters Configuration Rules	UEVOL-0286	Release I, 05/02/08
System Data Preparation Validation Rule Test Description	UEVOL-0XXX	Release IA, 04/06/08
System Architecture Description and Software Requirements Specification Verification Report for CC Sub-system	A402937	Release A, 09/05/08

Audit Visit 12 (August 2008)

Table 17: Documents reviewed or considered during Twelfth Audit

Title of Document	Alstom Reference	Release/Date
System Parameters Scheme Plan XML Files Format	UEVOL-0517	Release K, 05/02/08
System Parameters XML Scheme Files	UEVOL-0569	Release K, 05/02/08
System Parameters Data Entry Tool and System Parameters Calculation Tool Software Acceptance Plan	UEVOL-1298	Release A, 19/06/08
System Data Preparation Verification Rules Test Plan	UEVOL-XXXX	02/02/08
System Parameters Data Entry Tool User Manual	UEVOL-0670	Release B, 27/09/07
System Parameters Data Entry Tool Installation Manual	UEVOL-0671	Release B, 27/09/07
System Parameters Calculation Tool User Manual	UEVOL-0676	Release B, 27/09/07
System Parameters Calculation Tool Installation Manual	UEVOL-0677	Release B, 27/09/07
System Database User Manual	UEVOL-0956	Release C, 01/02/08
Urbalis Evolution Guidelines for Project Deployment	UEVOL-0962	Release G, 05/02/08
RTI: Real Time Issues Variant 888	UEVOL-0712	Release F, 28/11/08



Title of Document	Alstom Reference	Release/Date
RTI: Real Time Issues Variant 888 Verification Report	UEVOL-0963	Release A, 22/5/07
System Requirement Specification Verification Report variant 888	UEVOL-0807	Release G, 11/04/08
System Architecture Description Verification Report variant 888	UEVOL-0808	Release G, 18/04/08
Interface Hazard Analysis, Variant 888	UEVOL-0747	Release D, 04/02/08
Preliminary Hazard Analysis	UEVOL-0263	Release C, 07/02/08
System Hazard Analysis Variant 888	UEVOL-0793	Release E, 16/01/08
System V&V – Variant 888 – Block Mode Revenue Service	UEVOL-1172	Release C, 02/04/08
Specific Safety Study UEVOL Evacuation Process	URBALIS-0960	Release C, 07/01/08
System and ATC: T&C Procedures Verification Report	UEVOL-1191	Release A, 07/11/07
Urbalis Evolution, Options Management	UEVOL-0987	Release E, 21/12/07
System Integration Tests Description Verification Report	UEVOL-0809	Release E, 11/04/07
System Requirements Test Description Verification Report Variant 888	UEVOL-0810	Release F, 15/05/08
System Validation Allocation Table	UEVOL-1044	Release B, 30/03/08
System: Exported Constraint Verification Report	UEVOL-1147	Release A, 15/11/07
System: User's Constraints Verification Report	UEVOL-1148	Release B, 23/11/07
System and ATC: T&C Procedures Verification Report	UEVOL-1191	Release A, 07/11/07
Safety Verification and Validation Plan	UEVOL-0219	Release D, 28/09/08
Hazard Log, Baseline System 1.4.5.17	UEVOL-888-1188	Release 5B

Phase 2 Review (January–June 2009)

Table 18: Documents reviewed or considered during Post-Phase C Review

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution Options Management	UEVOL-0987	Release I, 16/09/08
Urbalis Evolution, Guideline for Project Deployment	UEVOL-0962	Release J, 22/10/08
Specific Safety Study UEVOL Evacuation Process	URBALIS-0960	Release D, 06/06/08
Specific Safety Study on Standstill Initialisation	UEVOL-1040	Release 4B
System Hazard Analysis	UEVOL-0421	Release D, 23/01/09
Systems Requirements Specification	UEVOL-0224	Release G, 21/10/08
System Safety Verification and Validation Plan	UEVOL-0219	Release C, 07/12/06
Specific safety study on wheel and train movement speed and acceleration estimation	A402218	Version 1C
Specific safety study on energy	A402362	Release 1D
Specific safety study on automatic protection	A402331	Release 2D
Specific safety study on synchronization	A402602	Release B, 21/02/08
Specific Safety Study on Energy Monitoring	A402326	Release 1D, 20/04/09
ZC-CBI Interface Description Variant Regular	UEVOL-0220	Release E, 02/10/08
Specific Safety Study on Automatic Protection	A402331	Release D, 4/5/09
System Hazard Log	UEVOL-1188	Release 1C, 01/09/08
System Parameters Deployment Process	UEVOL-0350	Release G, 21/10/08



Title of Document	Alstom Reference	Release/Date
Safety Requirements for Data Preparation Tools Development	UEVOL-0529	Release C, 10/09/08
System Parameters Process Hazard Analysis	UEVOL-0422	Release B, 16/09/08
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release B, 03/03/09
System Parameters XML Scheme Files	UEVOL-0569	Release Q, 22/10/08
System Parameters ATC XML File Format	UEVOL-0511	Release Q, 22/10/08
RTI: Real Time Issues Variant Reg	UEVOL-0212	Release D, 21/10/08
RTI: Real Time Issues Variant Reg, Verification Report	UEVOL-1504	Release B, 27/03/09
System Architecture Description	UEVOL-0225	Release G
System Exported Operational Constraints regular variant	UEVOL-1436	Release A
Urbalis Platform SBS/PBS	UEVOL-0715	Release 7A
Preliminary Hazard Analysis	UEVOL-0263	Release 2D
Interfaces Hazard Analysis	UEVOL-0367	Release D
System Parameters Description	UEVOL-0248	Release Q
System Parameters Configuration Rules	UEVOL-0286	Release M
System Database User Manual	UEVOL-0956	Release F
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release B
System Parameters Process Hazard Analysis	UEVOL-0422	Release B
System Parameters Deployment Process	UEVOL-0350	Release G
ATC Hazard Log	UEVOL-1705	Release A
PAT_5, Trackside ATC Static Test Procedure	UEVOL-0684	Release C
Track Survey Procedure	UEVOL-0688	Release B
PAT10, Balise Programming Test & LEU Static Tests Procedure	UEVOL-0689	Release A
SIT12, SGD Track Data Checking Test Procedure	UEVOL-0701	Release 7A
SIT13, Trackside Dynamic Test Procedure – Low Speed Block Mode & CBTC	UEVOL-0702	Release 4B
Adapt Design & Design Application for Urbalis Platform	EXD-IS-PRO-002	2/12/2008
Guideline for Project Deployment	UEVOL-0962	Release J, 22/10/2008
System and ATC: T&C Procedures Verification Report	UEVOL-1191	Release C, 7/05/2009
Typical Verification + Validation Plan and Guidelines	UEVOL-1080	Release IC, 15/01/2009
ZC-CBI correspondence tests	UEVOL-0692	Release A, 6/08/09
CC Static Tests Procedure	UEVOL-0699	Release IB, 22/04/2009
CC Dynamic Tests Procedure	UEVOL-0700	Release IB, 24/04/2009
ATC F3/F4 System Function acceptance tests procedure	UEVOL-0708	Release 7A, 1/05/2008
SIG-RS Interface Description	UEVOL-0101	Release L, 22/10/2008
ATC Validation and Verification Report	UEVOL-1171	Release H
System Validation and Verification Report	UEVOL-1439	Release A
System Test Report	UEVOL-1516	
System Validation and Verification Plan	UEVOL-0219	Release G
System Requirement Test Description Verification Report	UEVOL-1366	Release B
System Design Verification Plan	UEVOL-1368	Release A



Title of Document	Alstom Reference	Release/Date
System Integrated Test Description Verification Report	UEVOL-I365	Release B
System Validation Allocation Table	UEVOL-I367	Release B
System Exported Constraints Verification Report	UEVOL-I446	Release C
System Architecture Description Verification Report	UEVOL-I295	Release B
System Requirement Specification Verification Report	UEVOL-I294	Release C
UEVOL PARAM TOOLS – System Parameters Calculation tool, REQUIREMENTS TEST DESCRIPTION	UEVOL-0674	Release I, 27 March 2009
UEVOL PARAM TOOLS – System Parameters Calculation tool, REQUIREMENTS TEST REPORT	UEVOL-0675	Release K, 27 March 2009
System Parameters Data Entry Tool and System Parameters Calculation Tool Software Acceptance Plan	UEVOL-I572	Release B, 14 April 2009
System Parameter Tool, Requirements Test Description	UEVOL-I019	Release 4B, 18 May 2009
System Parameter Tool	UEVOL-I020-4	Release B, 9 May 2009

Phase 2 Review (June 2009–September 2009)

Table 19: Documents reviewed for Baseline 1.6.2–I

Title of Document	Alstom Reference	Release/Date
System Parameters Deployment Process	UEVOL-0350	Release N, 25/06/09
System Parameters Process Hazard Analysis	UEVOL-0422	Release C, 27/02/09
Project System Configuration Rules (SyCR) Verification Guidelines	UEVOL-I627	Release A, 24/04/09
System Parameters Description	UEVOL-0248	Release T, 13/02/09
System Parameters Configuration Rules	UEVOL-0286	Release P, 13/02/09
System and ATC: T&C Procedures Verification Report	UEVOL-I191	Release D, 07/07/09
System Generic Application Safety Case Variant Regular	UEVOL-I632	Release 1B, 23/07/09
Project System Configuration Rules (SyCR) Verification Guideline	UEVOL-I627	Release A, 24/04/09
Project Name, <System Project Configuration Rule>	UEVOL-I549	Release A
Guideline for Project Deployment	UEVOL-0962	Release M, 13/02/09
Train Movement Specification Verification Guideline	UEVOL-I637	Release A, 24/04/09
Scheme Plan Verification Guideline	UEVOL-I628	Release A, 24/04/09
System Database User Manual	UEVOL-0956	Release I, 29/01/09
Urbalis System – Infrastructure Interface Description	UEVOL-I558	Release A, 13/02/09
UEVOL Testing & Commissioning Plan	UEVOL-0566	Release B, 28/06/09
SGD Track Data Checking Test Procedure, SIT 12	UEVOL-0701	Release B, 18/03/09
Trackside Dynamic Test Procedure – Low Speed Block Mode & CBTC, SIT 13	UEVOL-0702	Release C, 17/03/09
Mission Profile	UEVOL-0313	Release A, 10/03/06
Hazard Log Report Variant Regular	UEVOL-I643	Release A, 28/07/09
System Validation Allocation Table Variant Regular	UEVOL-I367	Release C, 26/6/09
System Architecture Description	UEVOL-0225	Release H, 13/02/08
System Requirements Specification	UEVOL-0224	Release H, 13/02/09



Title of Document	Alstom Reference	Release/Date
Generic System Interface Description	UEVOL-0201	Release O, 26/01/09
Exported Operational Constraints	UEVOL-1436	Release B, 13/02/09
Preliminary Hazard Analysis	UEVOL-0263	Release D, 29/01/09
System Requirement Specification Verification Report	UEVOL-1294	Release D, 2/06/09
System Requirements Test Description Verification Report	UEVOL-1366	Release C, 16/07/09
System Test Plan	UEVOL-1415	Release D, 8/06/09
System Architecture Description Verification Report	UEVOL-1295	Release C, 4/05/09
System Integration Tests Description Verification Report	UEVOL-1365	Release C1, 16/07/09
System Test Report	UEVOL-1516	v.1.6.2.1 – 20/07/09
Interface Hazard Analysis	UEVOL-0367	Release E, 20/03/09
SIG-RS Interface Description	UEVOL-0101	Release O, 13/02/09
System Safety, Validation and Verification Plan	UEVOL-0219	Release H, 16/06/09
System Verification and Validation Report	UEVOL-1369	Release B, 20/07/09
System Engineering Management Plan	UEVOL-0066	
System Program Quality Plan	UEVOL-0060	
System Safety Exported Constraints	UEVOL-1727	Release 1A, 27/07/09
System Maintenance Plan – variant Regular, Appendix	UEVOL-1386	4/9/09
DVP_Sys_Reg 162_C_v1.xls		
UEVOL System Safety Review Report	UEVOL-1645	
Train Movement Specification (Typical)	UEVOL-0344	Release J, 12/2/09
Request for Proposal, “Height Evolution of System Parameters Data Entry & Calculation Tool”	UEVOL-1560	19/2/09
Request for Proposal, “Evolution 8 of System Parameters Data Entry & Calculation Tool”	UEVOL-1559	Release A, 19/2/09
UEVOL Param Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669	Release K, 11/6/09
UEVOL Param Tools – System Parameters Calculation Tool Requirements Test Report	UEVOL-0675	Release L, 11/6/09
System Parameter Tool Software Test Report	UEVOL-1020	Release 4B, 19/5/09
System Data Preparation Tool, Traceability Matrix Between Rules & Tests	UEVOL-1759	Release 2A, 26/6/09
Tools Evolution & Validation Report	UEVOL-1725	Release 2A, 23/7/09
Options Management	UEVOL-0987	Release K, 21/01/09
SIG-RS Interface Description	UEVOL-0101	Release O, 13/02/09
ZC-CBI System Interface Description Variant Regular	UEVOL-0220	Release F, 09/02/09
External ESP-SPKS-PATOS System Interface Description	UEVOL-1375	Release B, 13/02/09
Specific Safety Study on Evacuation Process	UEVOL-0960	Release E, 25/02/09
System Hazard Analysis	UEVOL-0421	Release E, 20/03/09
ZC/CBI Correspondence Tests	UEVOL-0692	Release B, 14/01/08
ATC F3+F4 System Function Acceptance Tests Procedure	UEVOL-0708	Release 1B, 11/05/09
ZC-CBI Interface Test Plan Variant Regular	UEVOL-0465	Release E, 25/06/09
UEVOL Configuration Management Plan	UEVOL-0418	Release 1B, 20/03/08



Title of Document	Alstom Reference	Release/Date
System Operating and Support Hazard Analysis	UEVOL-I573	Release IA

1.6.2–2 Review (September 2009-October 2009)

Table 20: Documents reviewed for Baseline 1.6.2–2

Title of Document	Alstom Reference	Release/Date
System Parameters Deployment Process	UEVOL-0350	Release P, 21/09/09
System Data Activities Recorder	UEVOL-I377	Release B, 18/09/09
System Parameters Process Hazard Analysis	UEVOL-0422	Release D, 21/09/09
Safety Requirements for Data Preparation Tools Development	UEVOL-I813	Release A, 24/09/09
System Data Preparation Tool Delivery Sheet N° 012	UEVOL-I153	07/07/09
Urbalis System – Exported Installation Constraints	UEVOL-I808	Release B, 23/09/09
System Database User Manual	UEVOL-0956	Release N, 17/09/09
System and ATC: T&C Procedures Verification Report	UEVOL-I191	Release D, 01/10/09
Typical Requirements Management Plan	UEVOL-0815	Release A, 28/05/07
RTI: Real Time Issue Variant Reg	UEVOL-0212	Release J, 14/09/09
Memo about RTI Methodology/Obs 10	Memo_Safety_UEVOL 036	07/07/09
RTI: Real Time Issues Variant Reg Verification Report	UEVOL-I504	Release C, 06/10/09
Analysis for CR Alpha I43246	I43246	
Architecture and Design ATC Subsystem to System Exported Constraints	UEVOL-I638	Release B, 18/09/09
Memo: Alignment of Driving Mode REG 1.6.2 Specifications	UEVOL-I799	Release A, 31/07/09
Excel Spreadsheet: Documentation de Déploiement, Version de Travail	UEVOL-0931	Release IA
Program Management Plan	UEVOL-0068	Release C, 17/10/08
System Engineering Management Plan	UEVOL-0066	Release B, 15/12/06
UEVOL Platform and Subsystem Configuration Management Plan	UEVOL-0418	Release B, 26/10/09
UEVOL Platform and Subsystem Change Control Plan	UEVOL-I266	Release 2B, 27/10/09
Requirements Management Plan	UEVOL-0273	Release B, 04/04/08
SIG-RS Interface Description	UEVOL-0101	Release O, 13/12/09
Memo: PSD-SIG REG 1.6.2 from Julien Boyer	UEVOL-I821	Release A, 05/10/09
Guideline for Project Deployment	UEVOL-0962	Release Q, 18/09/09
Fault Tree Analysis	UEVOL-I093	Release A, 30/04/09
System Program Quality Plan	UEVOL-0060	Release C, 14/11/08
System Regular Hazard Log	UEVOL-I643	Release B, 27/10/09
System Safety Exported Constraints	UEVOL-I727	Release B, 08/09/09
System Test Report	UEVOL-I516 v.1.6.2.2	29/09/09
System Exported Constraints Verification Report	UEVOL-I446	Release B, 27/05/09



1.6.2–2 Review (April 2010–July 2010)

Table 21: Further Documents reviewed for Baseline 1.6.2–2

Title of Document	Alstom Reference	Release/Date
System Generic Application Safety Case Variant Regular	UEVOL-1632	Release E, 16/3/10
Safety, Verification & Validation Plan	UEVOL-0174	Release B, 10/2/10
System Parameter Tool Software Test Report	UEVOL-1020	Release 4B, 19/5/09
System Parameters Tool Software Acceptance Plan	UEVOL-1760	Release A, 12/8/09
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669	Release L, 17/7/09
UEVOL PARAM Tools – System Parameters Launcher Tool Requirements Test Report	UEVOL-1569	Release A, 19/2/09
UEVOL PARAM Tools – System Parameters Calculation Tool Requirements Test Report	UEVOL-0675	Release 6M, 16/9/09
UEVOL – System Parameters Tools-Configuration Reg 1.6.2.5.x4		
Urbalis Evolution <Tools Evolution & Validation Report>	UEVOL-1725	Release 5A, 15/9/09
System Data Preparation Tool Delivery Sheet No. 017	UEVOL-1153-017	17/12/09
RTI: Real Time Issues Variant Reg	UEVOL-0212	Release Q, 31/3/10
RTI: Real Time Issues Variant Reg Verification Report	UEVOL-1504	Release F, 2/4/10
System Generic Application Safety Case variant Regular	UEVOL-1632	Release F, 1/6/10
RTI: Real Time Issue Variant Reg Verification Report	UEVOL-1504	Release Fbis, 9/6/10
System Verification & Validation Report	UEVOL 1369	Release D, 1/04/2010
Memo: Review with PTM of Verification CR on Baseline REG 1.6.2, K. Logerot		13/04/10
UEVOL System Generic Application Safety Case variant Regular	UEVOL-1632	J, 28 July 2010
System Parameter Tool, Software Test Report	UEVOL-1020	Release 5B, 18/8/09
System Generic Application Safety Case Variant Regular	UEVOL-1632	Release H, 6/7/10
System Generic Application Safety Case Variant Regular	UEVOL-1632	Release J, 6/7/10
UEVOL System Regular 1.6.2.7 Delivery Sheet No. 0017	UEVOL-R-1178-17	7/7/10
UEVOL System Regular 1.6.2.8 Delivery Sheet No. 0020	UEVOL-R-1196	29/7/10



1.6.6–6 Review (June–September 2010)

Table 22: Documents reviewed for System Baseline 1.6.6–6

Title of Document	Alstom Reference	Release/Date
System Regular I&V Test Report	UEVOL-1516	1.6.6.2, 07/06/10
Options Management	UEVOL-0987	Release L, 22/07/09
Alignment of Driving Mode Specifications	UEVOL-1799	Release B, 31/07/09
SIG-RS Interface Description	UEVOL-0101	Release R, 21/07/09
Generic System Interface Description	UEVOL-0201	Release Q+, 22/03/10
System Safety Verification and Validation Plan	UEVOL-0219	Release J, 26/02/10
Specific Safety Study UEVOL Evacuation Process	UEVOL-0960	Release G, 02/06/10
Specific Safety Study on Standstill Initialisation	UEVOL-1040	Release D, 07/05/10
System Hazard Analysis	UEVOL-0421	Release H+, 10/05/10
Interface Hazard Analysis	UEVOL-0367	Release H+, 10/05/10
ZC-CBI System Interface Description Variant Regular	UEVOL-0220	Release H+, 23/03/10
Urbalis System/External ESP-SPKS-PATOS System Interface Description	UEVOL-1375	Release D, 17/07/09
Generic and Specific Signatures for SACEM Vital Checksums	UEVOL-0246	Release K, 18/12/09
System Data Preparation Tool - Traceability Matrix Between Rules and Tests	UEVOL-1758	Release B, 24/05/10
UEVOL Param Tools – System Parameters Data Entry Tool Requirements Test (Report)	UEVOL-0669	Release S, 21/04/10
UEVOL Param Tools – System Parameters Calculation Tool Requirements Test (Report)	UEVOL-0675	Release T, 20/04/10
UEVOL Param Tools – System Parameters Launcher Tool Requirements Test (Report)	UEVOL-1569	Release E, 20/04/10
System Tools Validation Report	UEVOL-1725	Release B, 28/05/10
System, System Parameter Tool Software Test Report	UEVOL-1020	Release IC, 28/04/10
System Data Preparation Tool Delivery Sheet No. 25	UEVOL-1153-25	28/05/10
RTI: Real Time Issues Variant Reg	UEVOL-0212	14/04/10
Urbalis System – Infrastructure Interface Description	UEVOL-1558	Release B, 27/05/09
System Parameters Configuration Rules	UEVOL-0286	Release R+I, 26/04/10
System Parameters Description	UEVOL-0248	Release W+8, 09/06/10
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release E, 05/11/10
System Database User Manual	UEVOL-0956	Release L+, 08/01/10
Guidelines for Project Deployment	UEVOL-0962	Release P+I, 25/03/10
System Parameters Deployment Process	UEVOL-0350	Release O+, 08/01/10
System Data Activities Recorder	UEVOL-1377	Release A, 05/05/10
System Parameters Process Hazard Analysis	UEVOL-0422	Release E+, 21/04/10
Parameter Description – Train Characteristics	UEVOL-1625	Release A, 30/09/09
Train Movement Specification Verification Guideline	UEVOL-1637	Release B, 29/01/10
System Requirements Specification	UEVOL-0224	Release K, 23/03/2010
System Architecture Description	UEVOL-0225	Release K, 23/03/2010
System Exported Operational Constraints regular variant	UEVOL-1436	Release D+, 23/03/2010



Title of Document	Alstom Reference	Release/Date
Preliminary Hazard Analysis	UEVOL-0263	Release G, 15/12/2009
System Requirements Specification Verification Report	UEVOL-1294	Release H, 1/4/2010
System Requirements Test Plan	UEVOL-1415	Release E, 07/06/2010
System Requirements Test Description Verification Report	UEVOL-1366	Release F, 03/06/2010
System Architecture Description Verification Report	UEVOL-1295	Release H, 06/4/2010
System Integration Tests Description Verification Report	UEVOL-1365	Release E, 09/06/2010
System Verification & Validation Report	UEVOL-1369	Release IE, 11/06/2010
System Exported Constraints Verification Report	UEVOL-1446	Release G, 07/04/2010
System Data Preparation Tool - Traceability Matrix Between Rules and Tests	UEVOL-1758	Release B, 24/05/10
Gen RTS S&D – Gen Par – DGC – 4.1.5c.xls		
UEVOL Param Tools – System Parameters Data Entry Tool Requirements Test (Report)	UEVOL-0669	Release S, 21/04/10
UEVOL Param Tools – System Parameters Calculation Tool Requirements Test (Report)	UEVOL-0675	Release T, 20/04/10
UEVOL Param Tools – System Parameters Launcher Tool Requirements Test (Report)	UEVOL-1569	Release E, 20/04/10
System Tools Validation Report	UEVOL-1725	Release B, 28/05/10
System, System Parameter Tool Software Test Report	UEVOL-1020	Release IC, 28/04/10
System Data Preparation Tool Delivery Sheet No. 25	UEVOL-1153-25	28/05/10
Gen PZ Requirements Test Report	V10A	31/07/09
SGD CSV to XML Translator Requirement Test Report	APIL-CSVtoXML-SWRTR-V15A	03/04/10
RTI: Real Time Issues Variant Reg	UEVOL-0212	14/04/10
Urbalis System – Infrastructure Interface Description	UEVOL-1558	Release B, 27/05/09
System Parameters Configuration Rules	UEVOL-0286-	Release R+I, 26/04/10
System Parameters Description	UEVOL-0248	Release W+8, 09/06/10
System Parameter Configuration Rules Safety Study	UEVOL-1038	Release E, 05/11/10
System Data Activities Recorder	UEVOL-1377	Release A, 05/05/10
System Parameters Process Hazard Analysis	UEVOL-0422	Release E+ , 21/04/10
Parameter Description – Train Characteristics	UEVOL-1625	Release A, 30/09/09
Train Movement Specification Verification Guideline	UEVOL-1637	Release B, 29/01/10
System Regular Baseline 1.6.6.2: Restrictions on use Due to Safety Analysis (IHA iH, SHA iH, PHA iG) not taken into account in System Specification	UEVOL-2059	Release A
UEVOL System Regular 1.6.6.2b Delivery Sheet No. 0016	UEVOL-R-1159	14/06/10
RTI: Real Time Issues Variant Reg. Verification Report	UEVOL-1504	Release H, 22/04/10
Train Movement Specification Verification Guideline	UEVOL-1637	Release B, 29/01/10
System Validation Allocation Table Variant Regular	UEVOL-1367	Release G, 31/05/10
Gen PZ Requirements Test Report v11A		10/03/10
Gen RTS SGD-GenPar-DGC-4.1.5d		
System Tools Validation Report	UEVOL-1725	Release C, 13/08/10
System Data Preparation Tool Delivery Sheet No. 026	UEVOL-1153-026	16/08/10



Title of Document	Alstom Reference	Release/Date
System Parameter Configuration Rules Safety Study	UEVOL-I038	Release E+, 17/05/10
Train Movement Specification Verification Guidelines	UEVOL-I637	Release BI, 16/08/10
Phase-I0.7.9.3-RTR.xls		
Procedure to Calculate the Three Deadlocking Distances for the System Data Preparation	UEVOL-2083	Release B
System Data Preparation Tool Delivery Sheet No. 027	UEVOL-I153-027	
System Data Preparation Tool Delivery Sheet No. 28	UEVOL-I153-028	27/08/10
Scheme Plan Verification Guideline	UEVOL-I628	Release BI, 19/08/10
Project System Configuration Rules (SyCR) Verification Guidelines	UEVOL-I627	Release AI, 18/08/10
CR Safety Review	I988	Release P
System, System Parameter Tool Software Test Report	UEVOL-I020	Release 2C, 06/08/10
UEVOL System Regular I.6.6.4 Delivery Sheet No. 0021	UEVOL-R-I201	03/08/10
UEVOL System Regular I.6.6.5 Delivery Sheet No. 0024	UEVOL-R-I228	10/09/10

1.6.6–8 Review (January 2011)

Table 23: Documents reviewed for System Baseline 1.6.6–8

Title of Document	Alstom Reference	Release/Date
System Requirements Test Plan	UEVOL-I415	Release F, 22/09/2010
System V&V Report	UEVOL-I369	Release J, 13/12/2010
System Test Report (Variant Regular)	UEVOL-I516	Release I, 23/09/2010
Procedure Deadlocking Distances Calculation	UEVOL-2083	Release B
System Parameter Description	UEVOL-0248	Release W+12
System Generic Application Safety Case variant Regular	UEVOL-I632	Release P
Hazard Log Report variant Regular	UEVOL-I643	Release E
System Safety Exported Constraints	UEVOL-I727	Release E
CR Safety Review	UEVOL-I988	Release AD

1.6.6–6b Review (January 2011)

Table 24: Documents reviewed for System Baseline 1.6.6–6b

Title of Document	Alstom Reference	Release/Date
System Safety Case	UEVOL-1632	Release S, 20/12/2010
System Hazard Log	UEVOL-1643	Release F, 22/12/2010
System Safety Exported Constraints	UEVOL-1727	Release F, 22/12/2010
System Test Report Variant Regular	UEVOL-1516	Release J, 16/12/2010
System Requirements Test Plan	UEVOL-1415	Release F, 22/09/2010
System Verification & Validation Report (includes SyVAT coverage)	UEVOL-1369	Release K, 22/09/2010
System delivery sheet	UEVOL-R-1305	1.6.6–6b, 22/12/2010



1.6.6–9 Review (February 2011)

Table 25: Documents reviewed for System Baseline 1.6.6–9

Title of Document	Alstom Reference	Release/Date
System V&V Report	UEVOL-1369	Release L, 25/1/2011
System Generic Application Safety Case variant Regular	UEVOL-1632	Release T, 26/1/11
CR Safety Review	UEVOL-1988	Release AJ, 20/1/11
Hazard Log Report variant Regular	UEVOL-1643	Release G, 25/1/11
UEVOL System Regular 1.6.6.9 Delivery Sheet No. 0032	UEVOL-R-1328	Release 32, 26/1/11
ICONIS ATS URBAN Generic Application Safety Case	A428719	Release J, 28/1/11
ICONIS ATS URBALIS Safety Assessment Report	A429295	Release C, 28/1/11

1.6.6–6c Review (March 2011)

Table 26: Documents reviewed for System Baseline 1.6.6–6c

Title of Document	Alstom Reference	Release/Date
System 1.6.6–6c, V&V Report	UEVOL- 369	Release N, 22/3/11
UEVOL Safety Exported Constraints	UEVOL-1727	Release G, 22/03/11
Hazard Log Report	UEVOL-1643	Release H, 22/03/11
Requirements Management Plan	UEVOL-0273	Release C, 21/07/10
Platform and Subsystem Configuration Management Plan	UEVOL-0418	Release C, 07/04/10
System Generic Application Safety Case Variant Regular	UEVOL-1632	Release V, 22/03/11
UEVOL System Regular 1.6.6.6c Delivery Sheet No. 0035	UEVOL-R-1389	22/03/11

1.6.6-15 Review (July 2011)

Table 27: Documents reviewed for System Baseline 1.6.6–15

Title of Document	Alstom Reference	Release/Date
ATC Subsystem Requirement Specification Verification Report	UEVOL-0816	X, 18/5/11
UEVOL variant Regular Safety Exported Constraints	UEVOL-1727	H, 8/4/11
Hazard Log Report	UEVOL-1643	J, 16/5/11
System Verification and Validation Report – variant Regular – System Baseline 1.6.6.15	UEVOL-1369	U, 25/7/11
System Impact Analysis Report	UEVOL-2397	C, 22/7/11
ICONIS ATS Urban Safety Assessment Report	A429295	D, 28/7/11
	UEVOL-1988	BF
System Generic Application Safety Case Variant Regular	UEVOL-1632	AC, 22/7/11
UEVOL System Regular 1.6.6.15 Delivery Sheet No 0045	UEVOL-R-1557	22/7/11
System Parameter Configuration Rules Safety Study	UEVOL-1038	E_Plus_2, 13/5/11
System Parameters Description	UEVOL-0248	WV_Plus_18, 24/5/11
Project System Configuration Rules (SyCR) Verification Guidelines	UEVOL-1627	E, 11/3/11



Title of Document	Alstom Reference	Release/Date
Validation Summary for Reg 166-9 to Reg 166-15	Memo_Safety_UEVOL_039	30/7/11
Train Movement Specification Verification Guideline	UEVOL-1637	D2, 16/8/10
Scheme Plan Verification Guideline	UEVOL-1638	E, 10/3/11
Iconis ATS Urban, Generic Application Safety Case	A428719	Q
UEVOL System Regular 1.6.6.10 Delivery Sheet No 0034	UEVOL-R-1387	21/3/11
UEVOL System Regular 1.6.6.12 Delivery Sheet No 0039	UEVOL-R-1459	16/5/11
UEVOL System Regular 1.6.6.14 Delivery Sheet No 0043	UEVOL-R-1540	29/6/11
Train Movement Specification Verification Guideline	UEVOL-1637	F, 10/3/11
System Regular I&V Test Report	UEVOL-1516	K, 21/3/11
System Regular I&V Test Report	UEVOL-1516	L, 9/5/11
System Regular I&V Test Report	UEVOL-1516	N, 29/6/11
System Regular I&V Test Report	UEVOL-1516	O, 10/7/11
System Verification and Validation Report – variant Regular – System Baseline 1.6.6.9	UEVOL-1369	L, 25/1/11
System Verification and Validation Report – variant Regular – System Baseline 1.6.6.12	UEVOL-1369	Q, 19/5/11
System Verification and Validation Report – variant Regular – System Baseline 1.6.6.14	UEVOL-1369	S, 29/6/11
Reg 1.6.6.14, System Impact Analysis	UEVOL-2397	A, 29/6/11
ICONIS ATS Urban Safety Assessment Report	A429295	E, 3/8/11

1.6.6-21 Review (November 2011)

Table 28: Documents reviewed for System Baseline 1.6.6–21

Title of Document	Alstom Reference	Release/Date
System Regular I&V Test Report	UEVOL-1516	Release 1.6.6.21, 25/11/11
System Impact Analysis	UEVOL- 2397	Release F, 25/11/11
Hazard Log Report Variant Regular	UEVOL-1643	Release L, 15/11/11
System Verification and Validation Report - Variant Regular – System Baseline 1.6.6.21	UEVOL-1369	Release X, 14/11/11
UEVOL System Regular 1.6.6.21 Delivery Sheet No. 0052	UEVOL-R-1662	15/11/11
System Generic Application Safety Case Variant Regular	UEVOL-1632	vAF, 15/11/11
System Parameters Description	UEVOL-0248	vVPlus_19, 5/10/11
Specific Safety Study on UEVOL CC-V Parameters	A402903	vK, 25/10/11
CR Safety Review	UEVOL-1988	vBR



1.6.6-22 Review (March 2012)

Table 29: Documents reviewed for System Baseline 1.6.6–22

Title of Document	Alstom Reference	Release/Date
System Regular I&V Test Report	UEVOL-1516	Version 1.6.6.22
CR Safety Review	UEVOL-1988	CA
UEVOL System Regular 1.6.6.22 Delivery Sheet No 0059	UEVOL-R-1813	24 February 2012
System Generic Application Safety Case Variant Regular	UEVOL-1632	AI, 24 February 2012
System Verification and Validation Report – Variant Regular - System Baseline 1.6.6.22	UEVOL-1369	Release AA, 24/02/12
Hazard Log Report Variant Regular	UEVOL-1643	Release O, 24/02/12
Smart I/O-24v DC Safety Case	A402671	Release D, 20/12/11
Lettre Maintien Certificats SMIO v2.8.1	DT/SF/LL/22-A29	24/01/12

1.6.6-25 Review (July 2012)

Table 30: Documents reviewed for System Baseline 1.6.6–25

Title of Document	Alstom Reference	Release/Date
System Regular I&V Test Report	UEVOL-1516	Version 1.6.6.25, 09/04/12
CR Safety Review	UEVOL-1988	Release CU, 03/07/12
UEVOL System Regular 1.6.6.25 Delivery Sheet No 0070	UEVOL-R-1813	02 July 2012
System Generic Application Safety Case Variant Regular	UEVOL-1632	Release AL, 02 July 2012
System Verification and Validation Report – Variant Regular - System Baseline 1.6.6.22	UEVOL-1369	Release AC, 29/06/12
Hazard Log Report Variant Regular	UEVOL-1643	Release R, 02/07/12
System Impact analysis	UEVOL-2397	Release K, 28/06/12
System Impact analysis	UEVOL-2397	Release I, 24/02/12
ATS Generic Safety Case	A429842	Release F, 28/06/12
ATS Safety Assessment Report	A429295	Release G, 29/06/12

1.6.6-25 Review (July 2012)

Table 31: Documents reviewed for System Baseline 1.6.6–25 and CR 290720

Title of Document	Alstom Reference	Release/Date
Safety Issue Memo	UEVOL-R-2114, Release A	23 July 2012



1.6.6-25 Review (August 2012)

Table 32: Documents reviewed for System Baseline 1.6.6–25 and Further TORR Analysis

Title of Document	Alstom Reference	Release/Date
System Safety Response Time & TORR Issue	UEVOL-R-2171	Version E, 22/8/12

CLA 1.2.1.7 Review (September – October 2012)

Table 33: Documents reviewed for System Clasico Baseline 1.2.1.7

Title of Document	Alstom Reference	Release/Date
Options Management	UEVOL-0987	Version R, 29/4/2011
Program Management Plan	UEVOL-0068	Version E, 29/11/2011
Requirements Management Plan	UEVOL-0273	Version 2D, 03/08/2011
Configuration Management	UEVOL-0418	Version C, 07/04/2010
System Interface Description	UEVOL-0226	Version V, 09/03/2011
ATS-LC System Interface	UEVOL-0231	Version T, 26/04/2011
Interface Hazard Analysis	UEVOL-0367	Version Q, 20/02/2011
FIVP strategy	UEVOL-0547	Version B, 02/09/2010
Master List	UEVOL-0382	Version B, 29/11/2011
SRSADVR- Clasico	UEVOL-1971	Version E, 20/03/2012
DVP for Clasico	UEVOL-2134	Version B, 20/03/2012
Adapt Design and Design application for the URBALIS platform	UEVOL-2311	Version A
System Integration Test Description Verification Report-Clasico	UEVOL-2132	Version B, 20/03/2012
System Requirement Tests description Verification Report	UEVOL-2131	Version B, 21/03/2012
System Variant CLA Integration and Validation Test Report	UEVOL-2495	Version 1.2.0.2~1.2.0.4, 1.2.1.1~1.2.1.4 and 1.2.1.6
CLA 1.2.1.6 Verification & validation Report	UEVOL-2502	Version H, 25/09/2012
CBI –ATS SyID	UEVOL-0888	Version Dplus2, 05/09/2011
Infrastructure Interface Description	UEVOL-1558	Version C, 07/07/2011
Validation Allocation Table	UEVOL-2133	Version C,
Safety Critical Items List	UEVOL-2441	Version A, 25/11/2011
Safety Case	UEVOL-2436	Version J, 04/10/2012
System Impact Analysis	UEVOL-2532	Version A~E
ATC Generic Application Safety Case	UEVOL-0887	BE, 09/07/12
System Parameters Configuration Rules	UEVOL-0286	AI-Plus-2, 21/09/12
System Parameters Configuration Rules Safety Study	UEVOL-1038	L-Bis, 27/09/12
System Data Preparation Tool Traceability Matrix Between Rules and Tests	UEVOL-1758	AH-Plus-1, 18/06/12
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Plan	UEVOL-0669	VAH, 15/05/12
UEVOL PARAM Tools – System Parameters Calculation Tool Requirements Test Plan	UEVOL-0675	AH, 15/05/12



Title of Document	Alstom Reference	Release/Date
UEVOL PARAM Tools – System Parameters Launcher Tool Requirements Test Plan	UEVOL-1569	AH, 17/02/12
Software Requirements Test Report	UEVOL-1020	13.3.0.0
Validation Report Data Preparation Evol 13	UEVOL-2485	vD Plus – 1_13.0.4 – 13.3.0.0.xls
System Safety Delivery Sheet, Evolution 13	UEVOL-2381	K-Plus-2, 04/10/12
Procedure to Generate System Data from V12 – Plus to V13 Tool	UEVOL-2376	02/08/12
System Parameters Configuration Rules	UEVOL-0286	AI, 21/03/11
System Parameters Configuration Rule Safety Study	UEVOL-1038	L, 25/10/11
System Safety Delivery Sheet Evolution 13	UEVOL-2381	H, 16/02/12
ATC Software Safety Assurance Report	A402620	Release CY, 08/08/12
SIG-RS Interface Description	UEVOL-0101	Release AA, 28/04/11
Urbalis Evolution Safety, Verification and Validation Plan	UEVOL-0219	Release M, 15/11/11
Preliminary Hazard Analysis	UEVOL-0263	Version O-Plus, 20/12/11
CLA 1.2.1.6 System Impact Analysis	UEVOL-2532	Release E, 25/09/12
UEVOL System Clasico 1.2.1.7 Delivery Sheet No. 0017	UEVOL-R-1977	04/10/12
System Requirement Specification and Architecture Design, CLA Variant	UEVOL-1921	Release F, 05/09/11
System and Subsystem Change Control Plan, U400 Generic System	UEVOL-1266	Release B, 02/12/11
Specific Safety Study UEVOL Evacuation Process	Urbalis - 0960	Release L-Plus, 20/12/11
Exported Operational Constraints – CLA Variant	UEVOL - 1931	Release E, 26/08/11
System Hazard Analysis	UEVOL-0421	Release Q, 20/12/11
UEVOL Variant Clasico, Safety Exported Constraints	UEVOL-2435	Release B, 28/03/12
Hazard Log Report Variant Clasico	UEVOL-2434	Release F, 27/09/12
System Variant Clasico: Exported Constraint Verification Report	UEVOL-1970	Release E, 05/01/12
Urbalis Evolution System Generic Application Safety Case, Variant Clasico	UEVOL-2436	Release J, 04/10/12
Iconis ATS Urban Safety Assessment Report	A430134	Release A, 17/10/12
Iconis ATS Urban Generic Application Safety Case	A429842	Release K, 17/09/12
System Parameters Deployment Process	UEVOL-0350	Release AI, 29/04/11
System Parameters Process Hazard Analysis	UEVOL-0422	Release H, 03/10/11
System Data Activities Recorder	UEVOL-1377	Release AG, 08/12/10
Guidelines for Project Deployment	UEVOL-0962	Release AI Plus, 13/03/11
Project Name <System Project Configuration Rules>	UEVOL-1549	Release B, 16/06/09
Train Movement Specification Verification Guidelines	UEVOL-1637	Release P-Plus 1, 16/03/12
Scheme Plan Verification Guidelines	UEVOL-1628	O-Plus 1, Release 16/03/12
Project System Configuration Rules (Sy CR) Verification Guidelines	UEVOL-1627	O-Plus 1, Release 16/03/12
CR Safety Review	UEVOL-1988-DG	Release 05/10/12



Title of Document	Alstom Reference	Release/Date
System Parameters Description	UEVOL-0248	Release vAI-Plus-15, 24/07/12
U400 ATC Subsystem 9.3.2.2 for Clasico Projects Safety Assessment Report	A430089-B	Release 27/08/12
System Database User Manual	UEVOL-0956	Release AI-Plus-1, 29/04/12
RTI: Real Time Issues CLA Variant	UEVOL-0212-V	Release 04/05/11
RTI: Real Time Issues Verification Report Variant Regular and Clasico	UEVOL-1504-O	Release 27/09/11
Laser Measurement Module: Application Condition		

1.10.1.6 Review (December 2012 and January 2013)

Table 34: Documents reviewed for System Baseline 1.10.1.5 and 6

Title of Document	Alstom Reference	Release/Date
Validation Allocation Table	UEVOL-1367	M2, 16/11/12
Exported Operation Constraints	UEVOL-1436	J, 30/01/12
SyDVP REG	UEVOL-1368	I2, 16/11/12
SyRSVR	UEVOL-1294	L1, 29/08/12
SyID Urbalis System-Infrastructure	UEVOL-1558	M,
System Test Report Variant Regular, 1.10.1.6	UEVOL-1516	03/01/13
Specific Safety Study Evacuation Process	UEVOL-0960	O, 02/05/12
Option Management	UEVOL-0987	T, 14/11/12
Generic SyID	UEVOL-0201	Y, 24/10/11
ZC_CBI System Interface Description	UEVOL-0220	O, 24/01/12
ZC_ATS System Interface Description	UEVOL-0226	X, 24/01/12
CC_ATS System Interface Description	UEVOL-0227	AF, 05/12/12
LC_ATS System Interface Description	UEVOL-0231	V, 25/01/12
Interface Hazard Analysis	UEVOL-0367	S, 04/05/12
System Requirement Specification Architecture Description verification Report	UEVOL-1294	L, 29/08/12
System Requirement Test Description Verification Report	UEVOL-1366	I, 03/09/12
System Test Plan	UEVOL-1415	L, 07/06/10
System Delivery Sheet	UEVOL-2258	11/12/2012
System Impact Analysis	UEVOL-2397	S, 25/12/12
1.10.1.6 delivery sheet	UEVOL-2287	07/01/13
Safety Critical Items List	UEVOL-2304	C, 03/07/12
CR Safety Review	UEVOL-1988	vDU, 10/1/13
UEVOL System Regular 1.10.1.6 Delivery Sheet	UEVOL-R-2287	7/1/13
System Generic Application Safety Case Variant REGULAR	UEVOL-1632	vAU, 10/1/13
Procedure to Generate System Data from v13 to v14 Tool	UEVOL-2503	vD_Plus_1, 7/1/13
System Safety Delivery Sheet Evolution 14	UEVOL-2511	vF_Plus_2, 7/1/13
Urbalis Evolution, System Parameters Deployment Process	UEVOL-0350-AM	31/05/12



Title of Document	Alstom Reference	Release/Date
System Activities Data Recorder	UEVOL-1377-AL	29/10/11
System Parameters Process Hazard Analysis	UEVOL-0422-J	16/11/12
System Parameters Description	UEVOL-0248-AM-Plus-I	07/09/12
Guideline for Project Deployment	UEVOL-0962-AL-Plus-I0	27/01/12
System Database User Manual	UEVOL-0956-AL-Plus-I0	18/01/12
System Parameters Configuration Rules	UEVOL-0286-AM	31/05/12
System Parameters Configuration Rules Safety Study	UEVOL-1038-O-Plus I	16/11/12
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669-AH-Plus-3	14/11/12
UEVOL PARAM Tools – System Parameters Calculation Tool Requirements Test Report	UEVOL-0675-AH-Plus-4	14/11/12
UEVOL PARAM Tools – System Parameters Launcher Tool Requirements Test Report	UEVOL-1569-AH-Plus-I	14/11/12
System Data Preparation Tool/Traceability Matrix Between Rules and Tests	UEVOL-1758-AH-Plus 4	14/11/12
UEVOL-System Parameters Requirements Test Results	UEVOL-1020-SwRTR-13.5.1.0.2.xlsx	
UEVOL-2486-RTR Data Prep – Evol14 – vA – 13.1.0 – 13.5.1.0.xls		
Procedure to Generate System Data from v13 to v14 Tool	UEVOL-2503-D	09/11/12
System Requirement Specification Architecture Description, Variant Regular	UEVOL-0224, release Q-Plus I	12/7/12
Reg. 1.10.1.4 System Impact Analysis	UEVOL-2397, release P	26/11/12
Reg. 1.10.1.5 System Impact Analysis	UEVOL-2397, release Q	11/12/12
SIG-RS Interface Description	UEVOL-0101, release AE	24/1/12
Preliminary Hazard Analysis	UEVOL-0263, release R	2/5/12
System Hazard Analysis	UEVOL-0421, release S-Plus I	October 2012 [SIC]
System Verification and Validation Report, Variant Regular, System Baseline 1.10.1.5	UEVOL-1369	Release AJ, 11/12/12
Specific Safety Study on Safety Related Remote Controls (SRRC) Variant Regular and Clasico	UEVOL-2201	Release D, 18/1/12
Specific Safety Study on High Integrity Level Controls (HILC) Variant Regular and Clasico	UEVOL-2210	Release D, 18/1/12
UEVOL Variant Regular Safety Exported Constraints	UEVOL-1727	Release L, 22/11/12
Hazard Log Report Variant Regular	UEVOL-1643	Release V, 13/12/12
ICONIS ATS Urban generic Application Safety Case	A429842	Release R, 10/12/12
ICONIS ATS Urban generic Application Safety Case	A429842	Release S, 21/12/12
ICONIS ATS Urban Safety Assessment Report	A430201	Release A, 20/12/12
ICONIS ATS Urban Safety Assessment Report	A430201	Release B, 7/1/13
Excel spreadsheet 'justify_deleted_SyRSAD_REGI-10.xls' to accompany UEVOL-0816-AFI	No reference	No date
U400 Generic System, System and Subsystem Change Control Plan	UEVOL-1266	Release B, 2/12/11



Title of Document	Alstom Reference	Release/Date
System Verification and Validation Report – variant Regular – System Baseline 1.10.1.6	UEVOL-1369	Release AL, 26/12/12

1.10.1.8 Review (March 2013)

Table 35: Documents reviewed for System Baseline 1.10.1.8

Title of Document	Alstom Reference	Release/Date
System Impact Analysis Report	UEVOL-2397	U, 03/01/2013
System Test Report Variant Regular	UEVOL-1516	1.10.1.8, 25/02/2013
System safety case	UEVOL-1632	AW, 05/03/2013
System Verification and Validation Report	UEVOL-1369	AN, 04/03/2013
Hazard Log Report Variant Regular	UEVOL-1643,	Y, 04/03/2013
ICONIS ATS Urban Generic Application Safety Case	A429842	U, 1/3/2013
ICONIS ATS Urban Safety Assessment Report	A430283	C, 14/3/2013

1.6.6-27b Review (March 2013)

Table 36: Documents reviewed for System Baseline 1.6.6–27b

Title of Document	Alstom Reference	Release/Date
System Impact analysis	UEVOL-2397, R	20/12/2012
System Verification and Validation Report	UEVOL-1369, AK	20/12/2012
System Validation Allocation Table	UEVOL-1367, N	19/12/2012
Interface Hazard Analysis	UEVOL-0367, Hplus2	13/12/2012
System Requirements Test Plan	UEVOL-1415, F plus I	28/11/2012
System Requirement Test Description Verification Report	UEVOL-1366, K	19/12/2012
System Test Report	UEVOL-1516	29/01/2013
System Hazard Analysis	UEVOL-0421, F plus2	13/12/2012
System Safety Exported Constraints	UEVOL-1727, M	20/12/2012
System Generic Application Safety Case Variant Regular	UEVOL-1632, AT	31/01/2013
System Regular Delivery Sheet 1.6.6.27b	UEVOL-2338	12/02/2013
System Parameter Configuration Rules Safety Study	UEVOL-1038	vE_Plus_2, 13/5/11
Hazard Log Report Variant Regular	UEVOL-1643	VV, 20/12/12



1.2.2.1b Review (April 2013)

Table 37: Documents reviewed for Clasico System Baseline 1.2.2.1b

Title of Document	Alstom Reference	Release/Date
System Safety Delivery Sheet Evolution I3	UEVOL-238I vL_Plus_2	21/10/12
System Data Preparation Tool I Traceability Matrix Between Rules & tests	UEVOL-1758 vAH_Plus_5	18/12/12
UEVOL_2485_Validation_Report_Data Preparation_EvolI3_vD_Plus_I_I3.0.4_I3.3.0.0.xls		
UEVOL_System Parameters Requirement Test Results	UEVOL_1020_SwRT R_I3.3.3.0.2.xls	6/12/12
Urbalis Evolution <Procedure to generate System Data from VI2_Plus to vI3 Tool>	UEVOL-2376 vK_Plus_I	15/1/13
DVP for Clasico	UEVOL-2134, C	11/03/2013
VAT for Clasico	UEVOL-2133, D	11/03/2013
CLA SyRSVR	UEVOL-1971, F	19/10/2012
CLA SyRTDVR	UEVOL-2131, C	14/01/2013
System Integration and Verification Test Plan	UEVOL-2312, G	19/12/2012
System Integration and Verification Test Report	UEVOL-2395,	26/02/2013
System Verification and Validation report	UEVOL-2502, J and M	25/03/2013 19/04/2013
System Delivery sheet, 1.2.2.I	UEVOL-2361, M	18/03/2013
System Delivery sheet, 1.2.2.Ib	UEVOL-2410, N	18/04/2013
System hazard analysis	UEVOL-0421, Q plus I	05/11/2012
Hazard log report	UEVOL-2434, I	14/03/2013
Impact analysis	UEVOL-2532, L and N	18/03/2013 20/02/2013
UEVOL System Requirement Specification and Architecture Description	UEVOL-1921	G, 9/5/12
U400 System and Subsystem Change Control Plan	UEVOL-1266	C, 28/2/13
UEVOL variant Clasico Safety Exported Constraints	UEVOL-2435	C, 18/3/13
Exported Constraints Verification Report	UEVOL-1970	F, 18/12/12
System Generic Application Safety Case variant Clasico	UEVOL-2436	M, 19/3/13
System Generic Application Safety Case variant Clasico	UEVOL-2436	M Plus I, 19/4/13
ICONIS ATS Urban Generic Application Safety Case	A429842	T, 30/1/13
ICONIS ATS Urban Safety Assessment Report	A430283	A, 8/3/13
Software Delivery Review Report, ICONIS ATS Urban	A430251	A, 31/1/13
Exported Operational Constraints – All variants	UEVOL-1926	I plus I, 29/4/11



1.6.6.30b Review (July 2013)

Table 38: Documents reviewed for Regular System Baseline 1.6.6.30b

Title of Document	Alstom Reference	Release/Date
1.6.6.30 Delivery Sheet	UEVOL-R-2482	28/06/13
System Impact Analysis Report	UEVOL-2397	AD, 01/07/13
System Validation Allocation Table	UEVOL-1367	P, 02/07/13
System Requirements Test Description Verification Report	UEVOL-1366	L, 28/06/13
System Integration Tests Description Verification Report	UEVOL-1365	EI, 02/07/13
System Requirements Test Plan	UEVOL-1415	Fplus2, 02/07/13
System Verification & Validation Report	UEVOL-1369	AW and AWI 01/07/13
Interface Hazard Analysis	UEVOL-0367	Hplus3, 03/06/13
System Hazard Analysis	UEVOL-0421	Hplus3, 24/06/13
System Safety Exported Constraints	UEVOL-1727	Mplus1, 28/06/13
System Regular Hazard Log	UEVOL-1643	Wplus1, 02/07/13
ICONIS ATS URBAN Generic Application Safety Case	A429842	AA, 10/6/13
ICONIS ATS URBAN Safety Assessment Report	A429295	J, 15/7/13
Iconis ATS Urban 9.1.2P7 Subsystem Configuration Sheet	UEVOL-R-2406	10/6/13
Data preparation safety verification	UEVOL-R-2484	
CR Safety Review	UEVOL-1988	ET, 02/07/2013
System Generic Application Safety Case Variant Regular	UEVOL-1632	BF and BFplus1 19/07/2013
UEVOL System Regular 1.6.6.30b Delivery Sheet N°0092	UEVOL-R-2495	19/07/2013

1.2.2.3 Review (October 2013)

Table 39: Documents reviewed for Clasico System Baseline 1.2.2.3

Title of Document	Alstom Reference	Release/Date
Project System Configuration Rules (SyCR) Verification Guidelines	UEVOL-1627	A, 24/04/09
Train Movement Specification Verification Guideline	UEVOL-1637	W, 11/09/13
CLA 1.2.2.3 System impact analysis	UEVOL-2397	Q, 19/09/13
Hazard Log Report Variant Clasico	UEVOL-2434	J, 18/9/13
ICONIS ATS Urban Generic Application Safety Case	A429842	AB, 28/6/13
ICONIS ATS Urban Safety Assessment Report	A430283	F, 11/10/13
ICONIS ATS Urban 10.3.4 P5 (10.3.4.5002) Subsystem configuration sheet	UEVOL-R-2469	1/7/2013
[Formalised CR follow-up]	UEVOL-1988	FC
System I&V variant test reports - CLA variant	UEVOL-2395	1.2.2.3, 18/09/13
System Verification & Validation Report- CLA variant	UEVOL-2502	P, 19/09/13
System Generic Application Safety Case -CLA Variant	UEVOL-2436	Q,04/10/13
System Delivery Sheet	UEVOL-2547	19/09/13



1.10.1.14 Review (October 2013)

Table 40: Documents reviewed for Regular System Baseline 1.10.1.14

Title of Document	Alstom Reference	Release/Date
System Impact Analysis Report	UEVOL-2397	1.10.1.14, 25/09/13
System Test Report	UEVOL-1516	1.10.1.14, 18/09/13
CR Safety Review	UEVOL-1988	FC
System Safety Delivery Sheet Evolution 14	UEVOL-2511	Q plus3, 25/09/13
System Parameter Configuration Rules Safety Study	UEVOL-1038	Oplus2, 19/07/13
System Parameters Description	UEVOL-0248	AL plus 24, 09/08/13
System Parameters Configuration Rules	UEVOL-0286	AL plus 12, 17/07/13
System Data Preparation Tool Traceability Matrix Between Rules and Tests	UEVOL-1758	AN plus 10, 15/05/13
RTR DataPrep_Evol14_vj+1_14.4.0.1_14.4.1.1_Reg_011001.xls	UEVOL-2486	J plus1, 20/09/13
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669	AN plus 11, 04/07/13
UEVOL PARAM TOOLS – System Parameters Calculation tool, REQUIREMENTS TEST REPORT	UEVOL-0675	AN plus 11, 04/07/13
UEVOL Param Tools – System Parameters Launcher Tool Requirements Test (Report)	UEVOL-1569	AN plus 2, 06/05/13
Chain 2 tool system parameter RTR		14.4.1.1, 14/08/13
Analyse_CR_atvcm00460143		
Delivery Sheet 1.10.1.14	UEVOL-2554	25/09/2013

1.10.1.15 Review (January 2014)

Table 41: Documents reviewed for Regular System Baseline 1.10.1.15

Title of Document	Alstom Reference	Release/Date
System Impact Analysis Report	UEVOL-2397	AM, 17/01/2014
System Safety Delivery Sheet for 1.10.1.15-2	UEVOL-2721	17/01/2014
System Verification & Validation Report	UEVOL-1369	BE, 17/01/2014
System Generic Application Safety Case Variant Regular	UEVOL-1632	BN, 21/01/2014
CR Safety Review	UEVOL-1988	FL, 21/01/2014
ICONIS ATS Urban Generic Application Safety Case	A429842	AK, 13/1/14
ICONIS ATS Urban Safety Assessment Report	A430283	H, 27/12/13
ICONIS ATS Urban Safety Assessment Report	A430283	H, 20/1/14



1.10.1.17 Review (July 2014)

Table 42: Documents reviewed for Regular System Baseline 1.10.1.17

Title of Document	Alstom Reference	Release/Date
System REGULAR I&V test report	UEVOL-1516	28/04/2014
System Impact Analysis	UEVOL-2397	AQ, 23/04/2014
U400 System Regular 1.10.1.17 Delivery Sheet	UEVOL-R-2879	30/06/2014
System Verification & Validation Report	UEVOL-1369	BH, 30/06/2014
System Hazard Log	UEVOL-1643	AE, 12/05/2014
System Generic Application Safety Case Variant Regular	UEVOL-1632	BQ, 30/06/2014
CR Follow Up	UEVOL-1988	FY
SRAC	UEVOL-2560	C_Plus 2

1.10.1.18 Review (October 2014)

Table 43: Documents reviewed for Regular System Baseline 1.10.1.18

Title of Document	Alstom Reference	Release/Date
System Impact Analysis	UEVOL-2397	AT, 14/10/2014
U400 System Regular 1.10.1.18 Delivery Sheet	UEVOL-R-3052	15/10/14
System Verification & Validation Report	UEVOL-1369	BJ, 13/10/14
System Generic Application Safety Case Variant Regular	UEVOL-1632	BS, 16/10/2014
CR Follow Up	UEVOL-1988	GF

1.10.1.19 Review (August 2015)

Table 44: Documents reviewed for Regular System Baseline 1.10.1.19

Title of Document	Alstom Reference	Release/Date
System Impact Analysis	UEVOL-2397	AZ, 20/07/15
U400 System Regular 1.10.1.19 Delivery Sheet	UEVOL-R-3289	23/07/15
System Generic Application Safety Case Variant Regular	UEVOL-1632	BX, 25/07/15
CR Follow Up	UEVOL-1988	GZ

1.11.1.8 Review (April-September 2015)

Table 45: Documents reviewed for Regular System Baseline 1.11.1.8-2.4

Title of Document	Alstom Reference	Release/Date
System Parameters Configuration Rules	UEVOL-0286	AP_Plus_3, 05/08/14
System Parameters Description	UEVOL-0248	AP_Plus_8, 15/09/14
System Data Preparation Tool Traceability Matrix Between Rules and Tests	UEVOL-1758	AP_Plus_4, 12/09/14
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669	AP_Plus_4, 15/09/14



Title of Document	Alstom Reference	Release/Date
UEVOL PARAM TOOLS – System Parameters Calculation tool, REQUIREMENTS TEST REPORT	UEVOL-0675	AP_Plus_4, 15/09/14
System Parameter Tool, Requirements Test Description	UEVOL-1019	AP_Plus_4, 02/01/14
RTR DataPrep	UEVOL-2486	AP_Plus_4, 17/11/14
System Parameters Data Interface Tool, Reqs Test Report	UEVOL-2101	AP_Plus_4 15/09/14
System Parameter Tool Software Test Report	UEVOL-1020	15.5.2.0, 30/09/14
UEVOL—SySPAR Ch2 DGC_15.5.2.0		
DPT Delivery Sheet Evolution 15	UEVOL-2488	AP_Plus_5, 17/11/14
System Parameter Configuration Rules Safety Study	UEVOL-1038	R_Plus_2, 25/11/14
System Requirements Specification	UEVOL-0224	U, 21/11/13
System Parameters Description	UEVOL-0248	AP_Plus_9, 28/11/14
Safety, Verification & Validation Plan	UEVOL-0219	P, 14/10/14
Specific Safety Study UEVOL Evacuation Process	UEVOL-0960	S, 04/02/14
Generic SyID	UEVOL-0201	AB_Plus_2, 28/04/14
System Safety Exported Constraints	UEVOL-1727	O, 15/01/15
System Validation Allocation Table	UEVOL-1367	T1, 15/12/15
SyDVP REG	UEVOL-1368	L1, 15/01/15
System Requirement Specification Verification Report	UEVOL-1294	P, 14/01/15
System Requirement Test Description Verification Report	UEVOL-1366	Q, 06/08/14
System Integration Tests Description Verification Report	UEVOL-1365	L, 16/01/14
System Exported Constraints Verification Report	UEVOL-1446	P, 15/01/15
System Hazard Analysis	UEVOL-0421	W, 09/02/14
System Impact analysis	UEVOL-2397	AU, 15/01/15
System Impact analysis	UEVOL-2397	AY, 10/07/15
System Impact analysis	UEVOL-2397	BB, 03/08/15
System Delivery Sheet	UEVOL-R-3225	28/08/15
System Requirements Test Plan	UEVOL-1415	O, 08/09/14
System Test Report	UEVOL-1516	03/12/14
System Validation Allocation Table	UEVOL-1367	T2, 07/07/15
System Safety Exported Constraints	UEVOL-1727	S, 17/07/15
System Regular Hazard Log	UEVOL-1643	AM, 10/08/15
System V&V Report	UEVOL-1369	BR, 07/08/15
System Generic Application Safety Case Variant Regular	UEVOL-1632	CA, 26/08/15
System Requirement Specification Verification Report	UEVOL-1294	S, 20/07/15
PROGRAM QUALITY PLAN	UEVOL-0060	F, 15/10/2014
SYSTEM ENGINEERING MANAGEMENT PLAN	UEVOL-0066	E, 04/10/2014
PROGRAM MANAGEMENT PLAN	UEVOL-0068	H, 26/09/2014
SIG-RS Interface Description	UEVOL-0101	AJ, 21/11/2013
ZC-CBI System Interface Description variant Clasico and Regular	UEVOL-0220	R_plus1, 18/11/2013
ZC - ATS SYSTEM INTERFACE DESCRIPTION	UEVOL-0226	AA_plus3, 04/03/2014



Title of Document	Alstom Reference	Release/Date
CC-ATS Interface description	UEVOL-0227	AI_plus5, 17/03/2014
LC-ATS SYSTEM INTERFACE DESCRIPTION	UEVOL-0231	Y_plus2, 28/02/2014
System & Subsystem Requirement Management Plan	UEVOL-0273	F, 18/11/2014
INTERFACE HAZARD ANALYSIS	UEVOL-0367	Wplus1, 25/11/2014
Configuration Management Plan	UEVOL-0418	E, 19/11/2014
OPTION MANAGEMENT	UEVOL-0987	V, 22/11/2013
URBALIS system/External ESP-SPKS-PATOS System Interface Description	UEVOL-1375	M_plus_2, 26/04/2013
RTI: Real Time Issues Variant REG – CLA Verification Report Variant Regular & Clasico	UEVOL-1504	vW, 7/1/15
RTI: Real Time Issues REG Variant	UEVOL-0212	vAF, 5/1/15
System Parameters Deployment Process	UEVOL-0350	vAP_Plus2, 14/4/15
System Data Activities Recorder	UEVOL-1377	vAP_Plus1, 29/5/15
System Parameters Process Hazard Analysis	UEVOL-0422	vL_Plus_1, 16/4/15
Project System Configuration Rules (SyCR) Verification Guideline	UEVOL-1627	vY, 4/8/15
Scheme Plan Verification Guideline	UEVOL-1628	vY, 4/8/15
RTI: Real Time Issues Variant REG-CLA Verification Report Variant Regular & Clasico	UEVOL-1504	vW, 7/4/15
Train Movement Specification Verification Guideline	UEVOL-1637	vY, 4/8/15
Train Out of AP at Inter ZC	UEVOL-3202	vC, 6/8/15
U400 Solution Safety Related Application Conditions	UEVOL-2560	Release E_Plus4, 15/7/15
U400 Solution Safety Related Application Conditions	UEVOL-2560	Release E_Plus5, 15/9/15
Specific Safety Study on High Integrity Level Controls (HILC) variant Regular & Clasico	UEVOL-2210	Release G, 28/7/14
Specific Safety Study on Safety Related Remote Controls (SRRC) variant Regular & Clasico	UEVOL-2201	Release G, 8/7/14
U400 – HILC protocol with data interface. Analysis vs EN50159	UEVOL-R-2934	16/9/14
ATC Subsystem requirements specification and architecture description verification report	UEVOL-0816	Release AO, 2/4/15
System Generic Application Safety Case Variant Regular	UEVOL-1632	CB, 23/09/15
System REGULAR I&V test report 1.1.1.5-2_2	UEVOL-1516	23/09/2015
System Verification & Validation Report – variant Regular-System Baseline 1.1.1.8-2.4	UEVOL-1369	BS, 23/09/2015
UEVOL System Regular 1.1.1.8-2.4 Delivery Sheet N°0139	UEVOL-R-3399	22/09/15



1.10.3.3 Review (December 2015 – January 2016)

Table 46: Documents reviewed for Regular System Baseline 1.10.3.3

Title of Document	Alstom Reference	Release/Date
UEVOL System Requirements Specification and Architecture Design	UEVOL-I922	L_Plus51, 7/1/15
System Delivery Sheet	UEVOL-R-3299	03/08/15
System Delivery Sheet	UEVOL-R-3387	5/1/16
System Impact Analysis	UEVOL-2397	BA, 29/07/15
System Impact Analysis	UEVOL-2397	04/03/15
System Validation Allocation Table	UEVOL-I367	U2, 23/02/15
ZC_CBI System Interface Description	UEVOL-0220	O_plus_51, 29/09/14
ZC - ATS SYSTEM INTERFACE DESCRIPTION	UEVOL-0226	X_plus_51, 22/12/14
Urbalis System/External ESP-SPKS-PATOS System Interface Description	UEVOL-I375	J_plus_50, 22/12/14
SylD Urbalis System-Infrastructure	UEVOL-I558	M_plus_51, 07/01/15
Exported Operation Constraints	UEVOL-I436	J_plus_51, 07/01/15
System Exported Constraints Verification Report	UEVOL-I446	J_plus_51, 05/03/15
Specific Safety Study UEVOL Evacuation Process	UEVOL-0960	O_plus_51, 09/03/15
INTERFACE HAZARD ANALYSIS	UEVOL-0367	S_plus_51, 10/03/15
UEVOL Variant Regular Safety Exported Constraints	UEVOL-I727	T, 06/08/15
Hazard Log Report Variant Regular	UEVOL-I643	L, 05/08/15
System Requirements Test Plan	UEVOL-I415	P, 04/03/15
System Requirement Specification Verification Report	UEVOL-I294	Q1, 11/03/15
System Integration Tests Description Verification Report	UEVOL-I365	M, 04/03/15
System Verification and Validation Report – variant Regular – System Baseline	UEVOL-I369	BQ, 05/08/15
System Regular I&V Test Report	UEVOL-I516	05/05/15
System Tool Safety Delivery Sheet	UEVOL-2511	AL_plus_51, 10/10/14
System Parameters Description	UEVOL-0248	AL_plus_52, 19/12/14
Guidelines for Project Deployment	UEVOL-0962	AL_plus52, 05/10/15
Guidelines for Project Deployment	UEVOL-I038	O_plus_52, 20/02/15
System Generic Application Safety Case Variant Regular	UEVOL-I632	BY, 07/08/15
System Generic Application Safety Case Variant Regular	UEVOL-I632	BY_Plus1, 18/12/15
CR Analysis	UEVOL-I988	HB
System Hazard Analysis	UEVOL-0421	S_plus_51, 27/03/15
System Requirement Test Description Verification Report	UEVOL-I366	R, 04/03/15
Safety Critical Items List	UEVOL-2304	F_plus_1, 06/08/15
U400 System & Subsystem Change Control Plan	UEVOL-I266	Version E, 9/10/14
System Design Internal Review Report	UEVOL-3742	Release C, 9/1/15
Specific Safety Study on High Integrity Level Controls (HILC)	UEVOL-2210	Release D_Plus51, 12/3/15
Specific Safety Study on Safety Related Remote Controls (SRRC)	UEVOL-2201	Release D_Plus51, 12/3/15



Title of Document	Alstom Reference	Release/Date
Preliminary Hazard Analysis	UEVOL-0263	Release R_Plus5 I, 2/3/15
U400 Solution Safety Related Application Conditions	UEVOL-2560	Revision F_Plus I, 7/8/15

1.1.1.8-2.5 Review (October 2015)

Table 47: Documents reviewed for Regular System Baseline 1.1.1.8-2.5

Title of Document	Alstom Reference	Release/Date
System Parameters Process Hazard Analysis	UEVOL-0422	vL_Plus_2, 16/4/15
System delivery sheet for 1.1.1.8-2.5	UEVOL-R-3350	08/10/15
System Parameters Description,	UEVOL-0248	AP_plus_11, 22/09/15
System Impact Analysis Report	UEVOL-2397	BC, 07/10/15
System Safety Exported Constraints	UEVOL-1727	U, 08/10/15
System Hazard Log	UEVOL-1643	AN, 05/10/15
System V&V Report	UEVOL-1369	BT, 07/10/15
CR analysis	UEVOL-1988	HJ
System Generic Application Safety Case Variant Regular	UEVOL-1632	CC, 09/10/15

1.1.2.2-1 Review (April – May 2017)

Table 48: Documents reviewed for Regular System Baseline 1.1.2.2-1

Title of Document	Alstom Reference	Release/Date
System Validation Allocation Table	UEVOL-1367	Z 24/01/17
System Parameters Description	UEVOL-0248	AP PLUS 56 24/01/17
ATS-ZC System Interface Description	UEVOL-0226	AP PLUS 6 04/01/17
Interface Hazard Analysis	UEVOL-0367	Z PLUS 2 07/02/17
System Integration Tests Description Verification Report	UEVOL-1365	P 13/03/17
System Requirement Specification Verification Report	UEVOL-1294	X 24/01/17
System Requirement Test Description Verification Report	UEVOL-1366	U 10/02/17
System Impact Analysis	UEVOL-2397	BH 24/02/17
System Test Report	UEVOL-1516	10/03/17
System Verification & Validation Report (includes SyVAT coverage)	UEVOL-1369	CA 08/03/17
System Safety Exported Constraints	UEVOL-1727	U PLUS 2 15/03/17
Hazard Log Report	UEVOL-1643	AP PLUS 1 15/03/17
System Exported Constraints Verification Report	UEVOL-1446	SI 26/05/16
CR analysis	UEVOL-1988	IN 15/03/17
System Safety Case	UEVOL-1632	CN 14/03/17
System delivery sheet	UEVOL-R-3565	09/03/17
System Requirements Test Plan	UEVOL-1415	T 15/02/17
System Safety Case	UEVOL-1632	CO 15/06/17



Title of Document	Alstom Reference	Release/Date
System Delivery Sheet	UEVOL-R-3599	14/06/17

1.11.2.1-3 Review (November 2017)

Table 49: Documents reviewed for Regular System Baseline 1.11.2.1-3

Title of Document	Alstom Reference	Release/Date
System 1.11.2.1-3 System delivery sheet	UEVOL-R-3655	24/10/17
System Impact Analysis	UEVOL-2397	BL, 10/10/17
System Requirement Specification Verification Report	UEVOL-1294	T_Plus1, 26/10/17
System V&V Report	UEVOL-1369	CD, 20/10/17
System Safety Exported Constraints	UEVOL-1727	Z, 27/10/17
System Hazard Log	UEVOL-1643	AT, 27/10/17
CR Review	UEVOL-1988	IV
Safety Case	UEVOL-1632	CQ, 31/10/17

1.11.2.1-4 Review (June – July 2018)

Table 50: Documents reviewed for Regular System Baseline 1.11.2.1-4

Title of Document	Alstom Reference	Release/Date
System 1.11.2.1-4 System delivery sheet	UEVOL-R-3717	23/04/18
System Impact Analysis	UEVOL-2397	BP, 16/04/18
Adapt Design and design application for the Urbalis platform	UEVOL-2311	B, 15/01/14
Project Management Plan	UEVOL-0068	J, 15/03/16
PROGRAM QUALITY PLAN	UEVOL-0060	G, 05/06/15
UEVOL Configuration Management Plan	UEVOL-0418	G, 29/09/17
System & Subsystem Requirement Management Plan	UEVOL-0273	G, 18/01/17
System V&V Report	UEVOL-1369	CH, 16/04/18
CR Review	UEVOL-1988	JG
System Generic Application Safety Case Variant Regular	UEVOL-1632	CV, 26/04/18
System Hazard Log	UEVOL-1643	AX, 24/04/18
System Engineering Management Plan	UEVOL-0066	F, 17/11/17
U400 Solution Safety Related Application Conditions, UEVOL Variant Regular	UEVOL-2560	E_Plus12, 24/4/18
UEVOL REGULAR, Safety Critical Items List	UEVOL-2304	vG+1, 23/4/18



2.1.2.4.2 Review (August – September 2018)

Table 51: Documents reviewed for Regular System Baseline 2.12.4.2

Title of Document	Alstom Reference	Release/Date
U400 System Regular 2.12.4.2 Delivery Sheet	UEVOL-R-3769	27/07/2018
ZC_ATS System Interface Description	UEVOL-0226	AB_PLUS3, 14/02/2018
LC_ATS System Interface Description	UEVOL-0231	Z_PLUS_2, 06/02/2018
UEVOL Variant Regular – Safety Exported Constraints	UEVOL-1727	AD, 23/07/2018
SIG-RS Interface Description	UEVOL-0101	AO_PLUS1, 07/02/2018
U400 System Regular 2.12.4.2 Delivery Sheet	UEVOL-R-3769	27/07/2018
System Program Management Plan	UEVOL-0068	J, 15/03/2018
Safety, Verification and Validation Plan	UEVOL-0219	R, 30/08/2017
Urbalis Evolution Interface Hazard Analysis	UEVOL-0367	AE, 16/04/2018
Safety Requirements for Data Preparation Tools Development	UEVOL-1813	vD, 20/7/17
UEVOL REGULAR Safety Critical Items List	UEVOL-2304	vP, 6/7/18
RTI: Real Time Issues REG Variant	UEVOL-0212	vAF+5, 15/3/18
RTI: Real Time Issues Variant REG-CLA Verification Report Variant Regular & Clasico	UEVOL-1504	vAC, 26/6/18
System Parameters Configuration Rules Safety Study	UEVOL-1038	vZ, 16/5/18
UEVOL System Requirements Specification and Architecture Design	UEVOL-1922	V_plus_1, 19/02/2018
System Parameters Description	UEVOL-0248	AS_plus_6, 15/09/2017
System Parameters Configuration Rules	UEVOL-0286	AS_plus5, 12/06/2017
Delivery sheet	UEVOL-R-3769	, 09/07/2018
Guidelines for Project Deployment	UEVOL-0962	AR_plus_90, 09/03/2018
ATS_CBI System interface description	UEVOL-0262	S_plus_2, 08/02/2018
Specific Safety Study UEVOL Evacuation Process	UEVOL-0960	AB, 19/04/2018
System Hazard Analysis	UEVOL-0421	AE, 10/04/2018
System Validation Allocation Table	UEVOL-1367	AE, 22/02/2018
System Requirement Specification Verification Report	UEVOL-1294	Z, 26/03/2008
System Requirements Test Plan	UEVOL-1415	Y, 11/06/2018
System Impact analysis	UEVOL-2397	BO, 04/07/2018
System Requirement Test Description Verification Report	UEVOL-1366	Y, 20/06/2018
System Integration Tests Description Verification Report	UEVOL-1365	U, 22/06/2018
FIVP strategy	UEVOL-0547	C, 25/11/2014
System Test Report	UEVOL-1516	2.14.2.4, 19/07/2018
System Regular Hazard Log	UEVOL-1643	AZ, 20/07/2018
System V&V Report	UEVOL-1369	CJ, 06/07/2018
CR Analysis	UEVOL-1988	JK, 27/07/2018
System Generic Application Safety Case Variant Regular	UEVOL-1632	CX, 18/07/2018



1.11.2.4 Review (August – December 2018)

Table 52: Documents reviewed for Regular System Baseline 1.11.2.4

Title of Document	Alstom Reference	Release/Date
Urbalis Evolution System REGULAR I&V test report	UEVOL-1516	1.11.2.3, 30/01/2018
System impact analysis	UEVOL-2397	BO, 31/05/2018
Urbalis Evolution – Interface Hazard Analysis	UEVOL-0367	Z_Plus_4, 03/11/2017
Urbalis Evolution System Safety, Verification and Validation Plan	UEVOL-0219	P, 14/10/2014
Urbalis Evolution – UEVOL Variant Regular Safety Exported Constraints	UEVOL-1727	AB, 24/01/2018
Urbalis Evolution - LC-ATS System Interface Description	UEVOL-0231	Z_Plus_1, 20/09/2016
Urbalis Evolution - LC-ATS System Interface Description	UEVOL-0231	U_PLUS_2, 07/07/2017
Urbalis Evolution – ZC/CBI Interface Description	UEVOL-0220	S_Plus_1, 01/12/2016
UEVOL System REG 1.11.2.4 Delivery Sheet	UEVOL-R-3752	13/06/2018
UEVOL System Requirements Specification and Architecture Design	UEVOL-1922	12/01/17, Q_Plus_3
System Parameters Configuration Rules	UEVOL-0286	05/12/16, AR_Plus_70
System Hazard Analysis	UEVOL-0421	08/06/17, Z_Plus_2
Exported Operational Constraints – All variants	UEVOL-1926	11/01/17, P_plus_3
System Exported Constraints Verification Report	UEVOL-1446	02/03/17, V
System Validation Allocation Table	UEVOL-1367	01/12/17, AA
System Requirement Specification Verification Report	UEVOL-1294	03/02/17, W
System Requirement Test Description Verification Report	UEVOL-1366	16/06/17, W
System Integration Tests Description Verification Report	UEVOL-1365	31/07/17, R
System impact analysis	UEVOL-2397	31/05/18, BQ
System Requirements Test Plan	UEVOL-1415	20/02/18, V
System V&V Report	UEVOL-1369	03/06/18, CI
Guidelines for Project Deployment	UEVOL-0962	07/12/16, AP_plus_70
System Test Report	UEVOL-1516	
Hazard Log Report Variant Regular	UEVOL-1643	04/06/18, AY
System Generic Application Safety Case Variant Regular	UEVOL-1632	11/06/18, CW
CR Analysis	UEVOL-1988	18/06/18, JI
System 1.11.2.4 delivery sheet	UEVOL-R-3752	13/06/18
System Parameters Description	UEVOL-0248	01/03/17, AP_plus_74
UEVOL PARAM Tools – System Parameters Data Entry Tool Requirements Test Report	UEVOL-0669	08/06/15, AR
UEVOL PARAM TOOLS – System Parameters Calculation tool, REQUIREMENTS TEST REPORT	UEVOL-0675	07/12/16, AP_plus_55
System Parameters Data Interface Tool, Reqs Test Report	UEVOL-2101	28/02/17, AR_Plus_70
System Parameter Tool Software Test Report	UEVOL-1020	11/04/17, v16.2.0.0
System Parameter tool, Verification rules Requirements Test Description	UEVOL-1019	02/12/14, AP_Plus_5
System Parameter tool, Calculation rules Requirements Test Description	UEVOL-1019	26/10/16, AR_Plus_50
System Parameter tool, Data interface rules Requirements Test Description	UEVOL-1019	24/03/17, AR_Plus_70



Title of Document	Alstom Reference	Release/Date
DPT Delivery Sheet	UEVOL-2488	11/09/17, AP_plus_71
System Data Preparation Tool Traceability Matrix Between Rules and Tests	UEVOL-1758	09/11/16, AR_plus_50
Safety Requirements for Data Preparation Tools Development	UEVOL-1813	vD, 20/7/16
System Parameters Configuration Rules Safety Study	UEVOL-1038	vV+1, 6/7/17
Preliminary Hazard Analysis	UEVOL-0263	AA_Plus1, 2/3/17
U400 Solution Safety Related Application Conditions, UEVOL Variant Regular	UEVOL-2560	E_Plus13, 13/6/18
Specific Safety Study on Safety Related Remote Controls (SRRC) Variant Regular & Clasico	UEVOL_2201	J_Plus1, 7/10/17
Specific Safety Study on High Integrity Level Controls (HILC) Variant Regular & Clasico	UEVOL_2210	J_Plus1, 7/10/17

1.11.2.4-S2 Review (March 2019)

Table 53: Documents reviewed for Regular System Baseline 1.11.2.4-S2

Title of Document	Alstom Reference	Release/Date
System REG 1.11.2.4-S2 Delivery Sheet	UEVOL-R-3858	15/03/19

1.11.2.5 Review (August-September 2019)

Table 54: Document reviewed for Regular System Baseline 1.11.2.5

Title of Document	Alstom Reference	Release/Date
Potential Erroneous Train Localisation After Points Movement on Specific Configuration	UEVOL-4122	vA, 9/7/19
System Generic Application Safety Case Variant REGULAR BSI 1.11.2.5	UEVOL-1632	vDC, 19/7/19
UEVOL System Regular Delivery Sheet 1.11.2.5-1	UEVOL-R-4459	13/09/2019
System Generic Application Safety Case Variant REGULAR BSI 1.11.2.5	UEVOL-1632	vDC_PLUS1, 12/09/2019
ATC Data Preparation Rules Traceability Verification	UEVOL-0164	vL, 2/7/19
UEVOL System Regular Delivery Sheet 1.11.2.5	UEVOL-R-4429	19/7/18
UEVOL REGULAR, Safety Critical Items List	UEVOL-2304	vT, 15/7/19
REG 1.11.2.5, System Impact Analysis	UEVOL-2397	Rel. BV, 03/07/2019
Urbalis Evolution, System Integration Test Description Verification Report Variant Regular	UEVOL-1365	Rel. Z, 21/06/2019
Urbalis Evolution, System Requirement Specification and Architecture Description Verification Report – Variant Regular	UEVOL-1294	Rel. AG, 21/06/2019
Urbalis Evolution, CC-ATS Interface Description	UEVOL-0227	AI_PLUS8, 27/03/2019
Urbalis Evolutio, System VAT, Variant Regular	UEVOL-1367	AK, 02/07/2019
System Verification and Validation Report – Variant Regular System	UEVOL-1369	CO, 10/07/2019
Urbalis Evolution, Hazard Log Report Variant Regular	UEVOL-1643	BE, 15/07/2019
Urbalis Evolution, SyPD-System Parameters Description	UEVOL-0248	AP_PLUS76, 07/07/2019
U400 SOLUTION Safety Related Application Conditions	UEVOL-2560	E_Plus14, 16/7/19



2.12.5.2-1 Review (January-March 2020)

Table 55: Document reviewed for Regular System Baseline 2.12.5.2-1

Title of Document	Alstom Reference	Release/Date
GfPD – Guidelines for Project Deployment	UEVOL-0962	vAR+121, 6/12/19
RTI: Real Time Issues REG variant	UEVOL-0212	vAF+6, 30/4/19
RTI: Real Time Issue Variant REG Verification Report, Variant Regular & Clasico	UEVOL-1504	vAI, 15/10/19
System Database Validation Report	UEVOL-1556	vl, 12/10/16
SyPD – System Parameters Description	UEVOL-0248	vAS+22, 11/9/19
Safety Critical Items List	UEVOL-2304	vU, 6/12/19
System Parameters Configuration Rules Safety Study	UEVOL-1038	vAE, 22/10/19
System Generic Application Safety Case variant Regular, BSL 2.12.5.2	UEVOL-1632	vDD, 19/12/19
System Generic Application Safety Case variant Regular, BSL 2.12.5.2-1	UEVOL-1632	vDD_Plus1, 3/3/20
U400 System Configuration Management Plan	UEVOL-0418	H, 15/02/2019
U400 System Regular 2.12.5.2 Delivery Sheet	UEVOL-7503/B	20/12/2019
U400 System Regular 2.12.5.2-1 Delivery Sheet	UEVOL-7503	C, 20/12/2020
REG2.12.5.2, System Impact Analysis	UEVOL-2397	BY, 09/12/2019
SyRSAD All Variants	UEVOL-1922	V_PLUS2, 02/05/2919
Interface Hazard Analysis	UEVOL-0367	AK, 17/10/2019
System Hazard Analysis	UEVOL-0431	AK, 09/10/2019
Specific Safety Study on UEVOL Evacuation Process	UEVOL-0960	AJ, 19/08/2019
Hazard Log Report Variant Report	UEVOL-1643	BF, 05/12/2019
UEVOL Variants Regular – Safety Exported Constraints	UEVOL-1727	AI, 18/12/2019
2.12.5.2 - System Variant Regular Integration and Validation Test Report	UEVOL-1516	2.15.5.2, 13/12/2019
System Test Plan (REG2.12.5)	UEVOL-1415	2.12.5, 06/12/2019
System Requirements Test Description Verification Report	UEVOL-1366	AD, 15/11/2019
System Exported Constraints – All Variants	UEVOL-1926	R_PLUS1, 02/05/2019
System Integration Test Description Verification Report Variant Regular	UEVOL-1365	AD, 17/10/2019
System Validation Allocation Table	UEVOL-1367	AM, 11/12/2019
System Exported Constraints Verification Report	UEVOL-1446	AE+1, 04/07/2019
System V&V Report	UEVOL-1369	CP, 10/12/2019
System Data Prep Delivery Sheet Evolution 17.0.4	UEVOL-3977	AS_PLUS20, 29/10/2019
Data Prep – Test Description	UEVOL-3980	AS_PLUS20, 16/10/2019
System Parameters Data Entry Tool	UEVOL-0669	AS_PLUS5, 21/06/2019
System and Subsystem Change Control Plan	UEVOL-1266	Revision G, 22/10/19
ATC Subsystem Requirements Specification and Architecture Description Verification Report	UEVOL-0816	Release BU, 24/10/19
SIG-RS Interface Description	UEVOL-0101	Release AX, 25/04/19
System Engineering Management Plan	UEVOL-0066	Release G, 15/02/19
Preliminary Hazard Analysis	UEVOL-0263	Release AM, 05/07/19



Title of Document	Alstom Reference	Release/Date
Specific Safety Study on Safety Related Remote Controls (SRRC) Variant Regular and Clasico	UEVOL-2201	Release R, 22/07/19
Specific Safety Study on High Integrity Level Controls (HILC) Variant Regular and Clasico	UEVOL-2210	Release S, 19/07/19
U400 Solution Safety Related Application Conditions	UEVOL-2560	Release G-Plus 4, 17/12/19
U400 Solution Safety Related Application Conditions	UEVOL-2560	Release G-Plus 5, 26/02/20

1.11.2.6-2 Review (October-November 2020)

Table 56: Document reviewed for Regular System Baseline 1.11.2.6-2

Title of Document	Alstom Reference	Release/Date
UEVOL System Hazard Analysis	UEVOL-0421	AO, 10/08/2020
System Hazard Log	UEVOL-1643	BK, 09/10/2020
System Validation Allocation Table	UEVOL-1367	AP, 28/09/2020
CC-ATS Interface Description	UEVOL-0227	AI_PLUS10, 27/03/2020
System Requirements Specification and Architecture Description Verification Report – Variant Regular	UEVOL-1294	AM, 06/10/2020
System Integration Test Descriptions Verification Report	UEVOL-1365	AG, 20/08/2020
System Verification and Validation Report - Variant	UEVOL-1369	CV, 25/09/2020
REG 1.11.2.6-2 System Impact Analysis	UEVOL-2397	CC, 21/09/2020
System Parameters Description	UEVOL-0248	AP_PLUS_78, 30/10/2020
Urbalis Evolution – System Generic Application Safety Case Variant Regular BSL 1.11.2.6-2	UEVOL-1632	DJ, 22/10/2020
UEVOL System Regular 1.11.2.6-2	UEVOL-7521	E, 23/10/2020
Safety Verification and Validation Plan	UEVOL-0219	T, 04/02/2020
REG 1.11.2.5-3 – System Impact Analysis	UEVOL-2397	CA, 09/04/2020
System Requirements Specification and Architecture Description Verification Report	UEVOL-1294	AG_PLUS1, 11/09/2019
System Integration Test Description Verification Report – Variant Regular	UEVOL-1365	Z_PLUS1, 11/09/2019
Safety Critical Items List	UEVOL-2304	Y, 15/10/20
System Generic Application Safety Case Variant Regular, BSL 1.11.2.6-2	UEVOL-1632	DJ, 22/10/20
U400 Safety Related Application Conditions	UEVOL-2560	Release E-Plus16, 20/10/20
Verification and Validation Process Audit and Inspection Checklist	UEVOL-7927	B, 3/9/20
System Verification and Validation Report – Variant Regular	UEVOL-1369	CR, 20/04/2020

B. Issues Lists used in Assessment of System Baselines

The following issues lists have been used in association with the indicated baselines:

For baseline 1.6.2–5 the applicable documents at System, CBI and ATC levels are P09004088/035mem [23], P09004088/022mem [24] and 09004088/014mem [25] respectively.

For baseline 1.6.6–6 the applicable documents at System, ATC, Software and Middleware levels are PI0003124/023mem [26], PI0003124/024mem [27], PI0003124/017mem [28] and PI0003124/030mem [29].

For baseline 1.6.6–6b all issues at System, ATC and Software levels are contained in PI0003434/012mem [30].

For baseline 1.6.6–9 the applicable documents at System and ATC level are PI0002591/047mem [31] and PI0002591/045mem [32] respectively.

For baseline 1.6.6–6c all issues at System, ATC and Software levels were identified in PI1000766/012mem [33].

For baseline 1.6.6–15, the relevant System issues are contained in list PI1001820/016mem [34].

For baseline 1.6.6–21, the relevant System issues are contained in list PI1002414/019mem [35].

For baseline 1.6.6–22, the relevant System issues are contained in list PI2000202/014mem [36].

For baseline 1.6.6-25, the relevant System issues are contained in list PI2000998/011mem [37].

For baseline 1.2.1.7, the relevant Clasico System issues are contained in list PI1002414/031mem [38].

For baseline 1.10.1.6, the relevant system issues are contained in list PI2002094/032mem [39].

For the baseline 1.10.1.8, the relevant system issues are contained in list PI3000195/023mem [40].

For baseline 1.6.6-27b, the relevant Regular System issues are contained in list PI2002094/039mem [41].

For baseline Clasico System 1.2.2-1b, the relevant System issues are contained in list PI3000195/033mem [42].

For Regular System baseline 1.6.6.30b, the relevant Regular System issues are contained in list PI3001341/011mem [43].

For Clasico System 1.2.2.3, the relevant System issues are contained in list PI3001656/025mem [44].

For Regular System baseline 1.10.1.14, the relevant System issues are contained in list PI3001656/031mem [45].

For Regular System 1.10.1.15-2, the relevant System issues are contained in list PI3001656/036mem [46].

For Regular System 1.10.1.17, the relevant System issues are contained in list PI4003375/020mem [47].

For Regular System 1.10.1.18, the relevant System issues are contained in list PI4004370/015mem [48].

For Regular system 1.10.1.19, the relevant system issues are contained in list PI5001303/013mem [49].

For Regular system 1.11.1.8-2.4, the relevant system issues are contained in list PI4003047/014mem [50].

For Regular system 1.11.1.8-2.5, the relevant system issues are contained in list PI5001597/021mem [51].

For Regular system 1.10.3.3, the relevant system issues are contained in list PI5001597/039mem [52].

For Regular system 1.11.2.1-1, the relevant system issues are contained in list PI5001597/021mem [53].

For Regular system 1.11.2.2-1, the relevant system issues are contained in list PI7000256/014mem [54].

For Regular system 1.11.2.1-3, the relevant system issues are contained in list PI7010068/031mem [55].

For Regular system 1.11.2.1-4, the relevant system issues are contained in list PI8000318/021mem [56].

For Regular System 2.12.4.2, the relevant issues are contained in list PI8001130/020mem [57].

For Regular system 1.11.2.1-4, the relevant system issues are contained in list PI8001130/017 [58].

For Regular System tool v16.2.1, the relevant issues are contained in list PI8001130/028 [59].

For Regular system 1.11.2.5, the relevant system issues are contained in list PI9000730/021 [60].



For Regular system 2.12.5.2-1, the relevant system issues are contained in list P19001510/021 [61].

For Regular system 1.11.2.6-2, the relevant system issues are contained in list P20001408/013 [62].