Final Project Report

Document information	
Project Title	Aeronautical Databases
Project Number	09.31
Project Manager	Thales
Deliverable Name	Final Project Report
Deliverable ID	D00-003
Edition	00.04.04
Template Version	03.00.04
Task contributors	
Thales, Eurocontrol.	

Abstract

The 09.31 project dealt with Aeronautical Databases. It promoted open format DB that can be used by Avionics Systems. It dealt with the following areas:

- Aeronautical Data Bases data chain (applicable to all domains)
- Navigation Data Bases
- Airport Mapping Data Bases
- Terrain Data Bases
- Obstacle Data Bases

Authoring & Approval

Prepared By - *Authors of the document.*		
Name & Company	**Position & Title**	**Date**
██████ - Thales	████████████	01/07/2016

Reviewed By - *Reviewers internal to the project.*		
Name & Company	**Position & Title**	**Date**
██████ Airbus	████████████	31/03/2016
██████ Leonardo		29/06/2016
██████ Eurocontrol		30/06/2016

Reviewed By - *Other SESAR projects, Airspace Users, staff association, military, Industrial Support, other organisations.*		
Name & Company	**Position & Title**	**Date**
██████ DSNA	████████████	29/03/2016
██████ Thales		08/04/2016
██████ Airbus		28/06/2016

Approved for submission to the SJU By - *Representatives of the company involved in the project.*		
Name & Company	**Position & Title**	**Date**
██████ Thales	████████████	01/07/2016
██████ Airbus		01/07/2016
██████ Leonardo		01/07/2016
██████ Eurocontrol		30/06/2016

Rejected By - *Representatives of the company involved in the project.*		
Name & Company	**Position & Title**	**Date**
None		

Rational for rejection
None.

Document History

Edition	Date	Status	Author	Justification
00.01.01	16/06/2015	Draft	██████	New Document
00.01.02	22/07/2015	Final		Final version with approval
00.02.00	17/09/2015	Draft		Final Project Reports sections completed (Draft) Template updated to take into account latest version.
00.02.01	03/12/2015	Draft		Update for standardisation activities and empty sections filled (except 1.1)
00.02.02	23/12/2015	Final		Partners provided neither Comments nor Approval
00.03.01	15/03/2016	Draft		§1.1 filled.

				Minor update in the other sections
00.03.02	29/03/2016	Draft	██████	Update following ██████ review
00.03.03	08/04/2016	Final		New template (03.00.04) Approbation
00.04.01	07/06/2016	Draft		SJU assessment report taken into account
00.04.02	22/06/2016	Final		Final version
00.04.03	27/06/2016	Draft		Update following Closure gate review
00.04.04	01/07/2016	Final		Leonardo -> Review & Approval ██████ -> Review Eurocontrol -> Review & Approval

Intellectual Property Rights (foreground)

This deliverable consists of SJU foreground.

Acronyms

Acronym	Definition
ADB	Aeronautical Databases
AEEC	Airlines Electronic Engineering Committee
AMDB	Aerodrome / Airport Database (include ASDB and ASRN)
AMM	Airport Moving Map
ASDB	Airport Surface Database (graphical part of the AMDB)
ASRN	Airport Surface Routing Network (Functional graph of the AMDB)
ATN	Aeronautical Telecommunication Network
ATM	Air Traffic Management
BML	Binary XML
DB	Data Base
D-TAXI	Datalink TAXI
EN	Enabler
EUROCAE	European Organisation for Civil Aviation Equipment
ICAO	International Civil Aviation Organization
N/A	Not Applicable
NDB	Navigation Data Base
NDBX	Navigation Database XML
OI	Operational Improvement
RTCA	Radio Technical Commission for Aeronautics
SC-xxx	RTCA Steering Committee
TAC	Technical Advisory Committee
TOD	Terrain Obstacle Database
ToR	Term of Reference
TRL	Technical Readiness Level
WG-xxx	EUROCAE Working Group

XML	eXtensible Markup Language
XSD	XML Schema Definition

1 Project Overview

The 09.31 project deals with Aeronautical Databases. It promotes open format DB that can be used by Avionics Systems. It deals with the following areas:

- Aeronautical Data Bases data chain (applicable to all domains)
- Navigation Data Bases
- Airport Mapping Data Bases
- Terrain Data Bases
- Obstacle Data Bases

1.1 Project progress and contribution to the Master Plan

The project addressed several subjects:

- Aeronautical databases data Chain

- Navigation databases

- Airport Mapping databases

- Terrain and Obstacle databases.

The project was divided into 4 parts associated to each subject. For each subject standardisation, definition, prototype development and integration of database with application was performed as needed.

The project developed Databases' prototype, validated the prototype and integrated it with the application using this information. All implementation errors (eg: missing elements) were identified and were corrected and, when necessary, the solution was promoted in the working groups (EUROCAE WG-44 / AEEC ADB Committee). Thanks to this the P09.31 contributed to the maturity level of the standards defining open format databases and providing prototype allowing the validation of intended function based on DB (eg: D-TAXI, conformance monitoring for pilots). The maturity level is different for mainline and regional aircraft because the TRL5 level is associated to the functions uses the AMDB. The prototypes developed in 09.14 (Airport Surface Alerts) and 09.13 (Airport Surface Taxi Clearances) are not the same for regional and mainline aircraft.

The activities addressed by P 09.31 contributed to the following Operational Improvements Solution / Enablers (EN) as captured in the ATM Master Plan (eATM Master Plan Data Set 15):

Code	Name	Project contribution	Maturity at project start	Maturity at project end
#02	Airport Safety Nets for controllers: conformance monitoring alerts and detection of conflicting ATC clearances	Need reported in AMDB	N/A	N/A
#22	Automated Assistance to Controller for Surface Movement Planning and Routing	Need reported in AMDB	N/A	N/A
#23	D-TAXI service for CPDLC application	09.31 provided AMDB compatitble with ATN baseline 2 messages. 09.31 also promoted an interop approach between AMDB standards and ATN baseline 2. This activity is not fully completed.	TRL1	TRL5 for mainline aircraft TRL3 for regional aircraft
#26	Manual taxi routing function	09.31 provided AMDB allowing the display and computation of the taxi routes and clearances. 09.31 also promoted its feedback to the working group working on the standardisation of AMDB.	TRL1	TRL5 for mainline aircraft TRL3 for regional aircraft
A/C-24	Airport moving map and own aircraft position display in cockpit.	09.31 computed AMDB in an open format to fully support an AMM including the display of ownship position.	TRL1	TRL5 for mainline aircraft TRL3 for regional aircraft
A/C-31a	Data link communication exchange for ATN baseline 2 (FANS 3/C)	09.31 provided AMDB compatitble with ATN baseline 2 messages. 09.31 also promoted an interop approach between AMDB standards and ATN baseline 2. This activity is not fully completed.	TRL1	TRL5 for mainline aircraft TRL3 for regional aircraft
A/C-42a	Onboard graphical display of taxi clearance using common air/ground airport database	09.31 provided AMDB allowing the display and computation of the taxi routes and clearances. 09.31 also promoted its feedback to the working group working on the standardisation of AMDB.	TRL1	TRL5 for mainline aircraft TRL3 for regional aircraft

A/C-72	Use of FMS/MMS data base to support mission trajectory	Contribution to standardisation activities	N/A	N/A
AIMS-06	Ground-Ground AIS provision to ASM	Contribution to standardisation activities	N/A	N/A
AIMS-14	Set up a digital data chain to ensure the Aeronautical Information data provision into on-board avionic systems	Contribution to standardisation activities	N/A	N/A
AIMS-16	Electronic Terrain and Obstacle Data (TOD)	Contribution to standardisation activities	N/A	N/A

1.2 Project achievements

Project achievements for Aeronautical Data Bases data chain (applicable to all domains)

The project studied the necessary updates to be done in ED-76 (Standards for Processing Aeronautical Data), as detailed in **Error! Reference source not found.**. The project initial study was formalised in D44 and then promoted in EUROCAE WG-44. The ED-76 was updated accordingly.

Aeronautical Data are used in different systems today like TAWS or Electronic Charting for Terrain Data. RTCA and EUROCAE have defined the functional content of these databases in WG-44 but not the encoding format. A standardized format provides the airlines with freedom of choice in their selection of database provider. A standardized encoding is agreed between stakeholders in AEEC ADB committee. The goal of this AEEC ADB committee is to prepare a standard for an open interchange format for aeronautical data. The committee defines a single open encoding format for airport mapping, terrain and obstacles to be directly loaded in airborne systems. In addition, the database processing chain is free from any proprietary techniques and eases interoperability.

Project achievements for Navigation Data Bases

The state of the art of Navigation Data Bases is a proprietary format based on ARINC 424 (ASCII). The project contributed to the development of NDBx format which is an open format based on bml. The project developed an NDBx prototype, integrated it with an FMS and demonstrated that a FMS can use bml data. The project also identified the following issues to be tackled before moving forward:

- o Interoperability: Use of NDBx by several FMS vendors
- o Operational deployment: How to merge LoA type I & II processes? How to ensure FMS software / DB compatibility?
- o Load management Who can build the A665 load? It depends on the targeted hardware. Tailored data management? It is linked to an AIP pack
- o Global business case and transition to that business case

The status of this issue is still open. Consequently, there is no standard development for NDBx for the moment and the NDBx format is not ready for deployment.

Project achievements for Airport Mapping Data Bases (AMDB)

The project developed several sets of AMDB that where integrated with 09.13 / 09.14 prototypes (Initial Package and Advanced Package). 09.13 prototypes support D-TAXI / Manual Taxi routing onboard functions. 09.14 prototypes support Conformance Monitoring for pilots function.

The first set of AMDB complied with ARINC 816-0 format (state of the art)

The second set complied with ARINC 816-2 format required by D-TAXI / Manual TAXI functions of the 09.13. It was the first prototype compliant to this standard developed in the world. The feedback of this development and from 09.13 /09.14 projects was promoted to adequate standardisation groups (i.e. EUROCAE WG-44 and AEEC ADB).

A partial implementation of ARINC 816-3 draft (publication scheduled on Q2 2016) was taken into account in the third set of AMDB developed by 09.31 project. This implementation allowed to solve a limitation identified by 09.13 project (no taxi on apron) and to validate the design of ARINC 816-3 during its development. The ASRN specified in A816-2 only covers Runway and Taxiway, As a consequence, the routing on apron areas was not possible.

The three sets of AMDB include the following airports:

LFBO – Toulouse Blagnac – France

LFPG – Paris CDG – France

LIMC – Milano Malpensa - Italy

Project achievements for Terrain and Obstacle Data Bases

The project contributed to the first discussions about an open format for TOD in adequate standardisation groups (i.e. EUROCAE WG-44 and AEEC ADB). The project did not develop any prototype because no validation activities involving such a prototype were planned. As a consequence, the project contribution to this domain was limited to the project expertise on the domain in standardisation groups.

1.3 Project Deliverables

The following table presents the relevant deliverables that have been produced by the project.

| Reference	Title	Description
D44 (TS)	WA1 - Data Definitions and Requirements at airborne level - AIS and data chain / Navigation Database / Airport Database / Terrain & Obstacle Databases	This deliverable addresses the phase of requirements collection for the navigation database, the airport database, the terrain/obstacle databases, the AIS database and data chain.
D52 (VR)	WA2 - Report on database prototype technical validation - AIS and Data Chain	This deliverable addresses the prototype concerning AIS and Data chain. The document is a Validation Report connected to the Navigation Database standard (NDBX). The purpose of the report is to validate the data chain from AIXM to ARINC 424A models. The conversion to embedded format NDBX (part of the ARINC 424A) has been validated in the D51 validation report document.
D51 (VR)	WA2 - Report on database prototype technical validation - Navigation Databases	This deliverable addresses the prototypes concerning Navigation Database. The document is a Validation Report for a Navigation Database standard (NDBX). The purpose of the report is to validate the operation of NDBX standard on the

		Airlab simulation platform. Two complementary exercises are performed in order to validate the NDBX prototype standard. The tests are all operated with the NDBX Navigation Database. The conversion process results and then the FMS behaviour results to a set of procedures are presented in the report.
D54 (VR)	WA2 - Report on database prototype technical validation – Airport Databases	This report is the verification report that formalised the verification activities performed on the last version of the AMDB produced by P09.31 and delivered to P09.13 and P09.14 for validation activities in SESAR Release 5.

1.4 Contribution to Standardisation

Presentation of standardisation activities

Below figure presents the Aeronautical Data Chain Participants and Flow of Aeronautical Data:
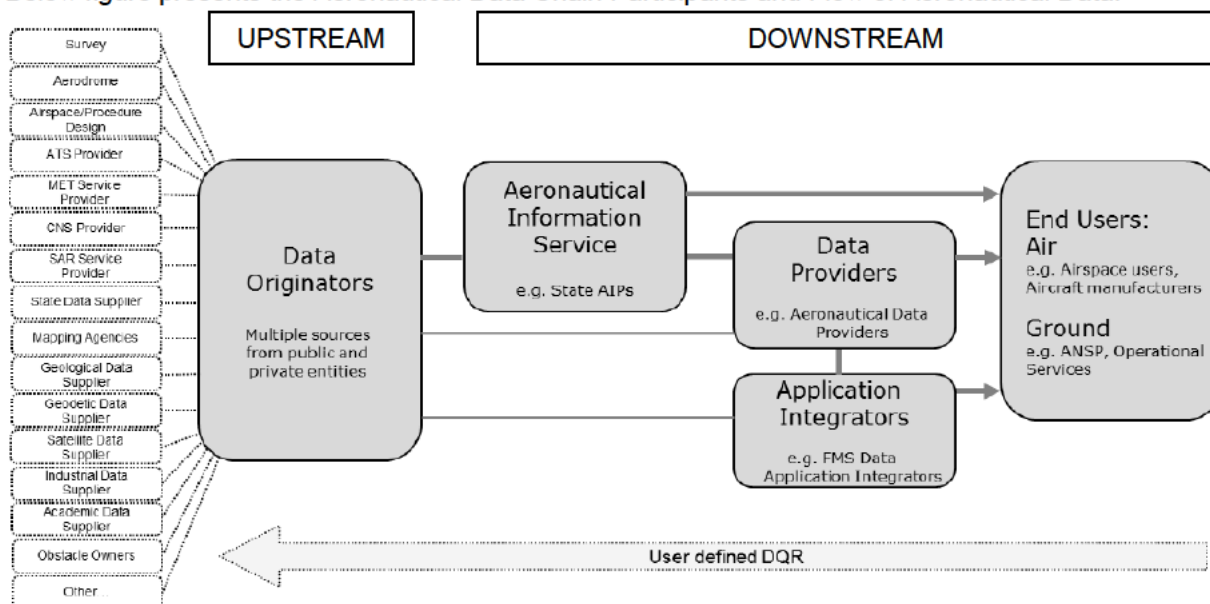
The figure below presents the portfolio of standards applicable to aeronautical databases:

Data Type	Upstream	Downstream		
	Data Requirements	Data Quality	Data Exchange	Database Standards
All Data	ICAO + AIXM, OGC & ISO Standards	ED-76 / DO-200		ARINC 814
Navigation	ICAO Annex 15	ED-77 / DO-201	ARINC 424	NDBX
Terrain	ICAO Annex 15	ED-98 / DO-276	ED-119 / DO-291	ARINC 813
Obstacle	ICAO Annex 15	ED-98 / DO-276	ED-119 / DO-291	ARINC 815
Aerodrome Mapping	ICAO Annex 15 (tentative)	ED-99 / DO-272	ED-119 / DO-291	ARINC 816

SESAR 9.31 dealt with the downstream. Upstream is not in the scope of the project.

The Database standards column is the standard that defines the format of the database that could be loaded into an embedded application (open format).

Below table presents the status of each downstream standard and contribution from 9.31 project:

Standard	Working Group	Last official version	Date	Status	Next revision	9.31 contribution
ED-76 DO-200	EUROCAE WG-44 RTCA SC-217	ED-76 rev A DO-200 rev B	2015	Update finalised on March 2015	None planned	Yes
ED-77 DO-201	EUROCAE WG-44 RTCA SC-217	ED-77 rev – DO-201 rev A	2000	Update in progress	2019	No
ED-98 DO-276	EUROCAE WG-44 RTCA SC-217	ED-98 rev C DO-276 rev C	2015	Update finalised on Sept 2015	None planned	Yes
ED-99 DO-272	EUROCAE WG-44 / RTCA SC-217	ED-99 rev D DO-272 rev D	2015	Update finalised on Sept 2015	None planned	Yes
ED-119 DO-291	EUROCAE WG-44 / RTCA SC-217	ED-119 rev C DO-291 rev C	2015	Update finalised on Sept 2015	None planned	Yes
ARINC 424A	AEEC – Navigation Data Base (NDB)	ARINC 424A	2013	Update in progress.	TBD	No
NDBX	None	None	None	Refer to NDX section	None	Yes

ARINC 814	AEEC – Aeronautical Data Base (ADB)	None	N/A	A814-0 Publication in progress	2016	Yes
ARINC 813	AEEC – Aeronautical Data Base (ADB)	None	N/A	First release in progress	2017	Yes
ARINC 815	AEEC – Aeronautical Data Base (ADB)	None	N/A	First release in progress	2017	Yes
ARINC 816	AEEC – Aeronautical Data Base (ADB)	A816-2	2012	A816-3 Publication in progress	2016	Yes

ED-76 / DO-200: Standards for Processing Aeronautical Data

An update of the ED-76 was done and finalised in March 2015. The main achievements include:

- Identify all types of Aeronautical Data that should be covered by the Standard.

- Modify Section 1 of the document to reflect that the Standard applies to the types of Aeronautical Data identified that need to be following the same or a similar data chain as already outlined in the current document.

- Modify the Standards with the aim of ensuring that it covers changes in technology that might be used to move data to an aircraft.

- Ensure that updates and modification are accomplished such that existing implementations of the document such as FAA AC 20-153A or European Aviation Safety (EASA) - Conditions for the Issuance of Letters of Acceptance for Navigation Database Suppliers by the Agency - are not impacted, i.e. forward compatibility is achieved and existing Letters of Agreement are not required to be updated.

- State-of-the-art method applied to process, tools and procedures (e.g. DO-330)

- Apply state-of-the-art DO-330 for tool qualification, defining tool qualification level requirement

- Improved robustness of data quality requirement management process with respect to application intended function

- Improved robustness of origination process for non-authoritative data, as requested by extending perimeter beyond navigation database

9.31 project ensured that the standard correctly takes into account industrial issues.

9.31 project considers this standard mature for deployment phase.

ED-98 / DO-276: User Requirements for Terrain & Obstacle Data

The ED-98 update takes into account rotorcraft operations.

9.31 project participated to the discussion and promoted its expertise on the domain.

9.31 could not further assess the need for and benefit of an open format for Terrain and Obstacle database as a replacement for the proprietary formats currently used by Avionics Systems.

ED-99 / DO-272: User Requirements for Aerodrome Mapping Information

The ED-99 update includes:

- Introduction of SWIM concept

- Enhancement of the features defined in previous version of the ED-99 (implementation feedback taken into account)

- Coverage of the deicing / apron / parking areas for the routing functions (ASRN).

9.31 project was deeply involved in this update. The feedback of SESAR 9.31 (AMDB development) and SESAR 9.13 / 9.14 (Applications that use AMDB) was taken into account. Thanks to this contribution, the maturity of SESAR concepts is enhanced.

9.31 project considers ED-99 mature for manual taxi routing function.

ED-119 / DO-291: Minimum Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data

ED-119 is the interchange format that supports the user requirements defined in ED-98 and ED-99. The update of ED-119 is consistent with ED-98 / ED-99 update.

9.31 project contribute to this standard to support modifications done in ED-98 and ED-99.

NDBX

It was decided that no NDBX standard will be developed. However, ARINC 424A will include xml encoding.

9.31 project considers that the following issues should be solved before the initiation of other activities on NDBX:

- Interoperability:
  - Use of NDBx by several FMS vendors
- Operational deployment:
  - How to merge LoA type I & II processes?
  - How to ensure FMS software / DB compatibility?
- Load management
  - Who can build the A665 load? => depends on the targeted hardware
  - Tailored data management? => linked to an AIP pack
- Global business case and transition to that business case

9.31 project considers NDBX standard not mature for deployment.

ARINC 814

ARINC 814 includes:

- XML based database formats
    - Embedded Interchange Format for Airport Mapping Database – ARINC 816
    - Embedded Interchange Format for Terrain and Obstacle Database – ARINC 815
    - Navigation Data Base Open Standard (NDBX)
- XML based Data Link Protocols
    - Aircraft/Ground Information Exchange (AGIE) – ARINC 830
    - Standards for Air Traffic Data Communication Services – RTCA SC-214
    - AIS & MET Datalink, RTCA SC-206
- Feedback from W3C EXI (Efficient XML Interchange) working group
- Feedback from OGC Binary XML working group

This is the first release of the standard.

9.31 project was involved in the redaction of this standard. The feedback of SESAR 9.31 (AMDB development, NDBX, TOD) was taken into account. Thanks to this contribution, the maturity of SESAR concepts is enhanced.

9.31 project considers A814-0 standard mature for deployment.

ARINC 813

ARINC 813 defines a single open encoding format for Terrain. This standard is similar to ARINC 816 for another domain (Terrain vs Aerodrome Mapping).

This is the first release of the standard.

9.31 project was involved in the redaction of this standard. The expertise of SESAR 9.31 on AMDB was promoted for Terrain domain. 9.31 did not develop any Terrain Database. As a consequence, no prototype feedback was promoted.

The prototype of the standard developed in 2016 may allow to validate the maturity of ARINC 813-0 At this stage, 9.31 project considers A813-0 standard not mature for deployment.

ARINC 815

ARINC 815 defines a single open encoding format for Obstacles. This standard is similar to ARINC 816 for another domain (Obstacle vs Aerodrome Mapping).

This is the first release of the standard.

9.31 project was involved in the redaction of this standard. The expertise of SESAR 9.31 on AMDB was promoted for Obstacle domain. 9.31 did not develop any Obstacle Database. As a consequence, no prototype feedback was promoted.

The prototype of the standard developed in 2016 may allow to validate the maturity of ARINC 815-0 At this stage, 9.31 project considers A815-0 standard not mature for deployment.

ARINC 816

RTCA SC-217 / EUROCAE WG-44 is updating documents ED-99 and ED-119 (versions ED-99D and ED-119C). Supplement 3 to ARINC 816 maintains alignment with the RTCA/EUROCAE standards. The following items are considered:

- Airport lighting (including runway status lighting)

- Taxiway holding position directions and pattern

- Extend Aerodrome Surface Routing Network (ASRN) definition to include apron, parking, and deicing areas

- Identify other taxiways associated with intersections that are not represented in the taxiway identifier

- Text notes

- Attributes to identify TaxiwayElement features as taxiway intersections

- Taxiway markings (e.g., apron entry points, position markings, SMGCS, gate direction markings)

- Container improvements

- Data packaging/file separation

9.31 project was involved in the update of this standard. The feedback of AMDB developed by SESAR 9.31 was promoted. 9.31 also developed partial prototype to include ASRN extension on apron areas.

9.31 project considers ARINC 816-3 mature for manual taxi routing function.

1.5 Project Conclusion and Recommendations

The project provided AMDB to 09.13 and 09.14 projects. Validation exercises performed by 09.13 and 09.14 project allow the validation of the AMDB and associated standards.

The project considers that the following level of maturity is reached for open format data bases:

- Aeronautical Data Bases data chain (applicable to all domains):
    - ED-76 Rev A is mature and ready for deployment

- Navigation Data Bases
    - NDBx format is neither mature nor ready for deployment

- Airport Mapping Data Bases
    - ED-99 Rev D / ARINC 816-3 are mature and ready for deployment

- Terrain and Obstacle Data Bases
    - ED-98 / ARINC 815-0 / A813-0 are neither mature nor ready for deployment

Project recommendations:

- Aeronautical Data Bases data chain (applicable to all domains):

No activity needed for the moment. The level of maturity of ED-76 Rev A is good enough for deployment

- Navigation Data Bases

Solve the following issues before moving forward:

- o Interoperability: Use of Navigation DB on NDBx format by several FMS vendors is needed to solve interoperability issues between them

- o Operational deployment: How to merge LoA type I & II processes? How to ensure FMS software / DB compatibility?

- o Load management Who can build the A665 load (eg DB Provider, Application Manufacturer, OEM, Airline)? It depends on the targeted hardware. Tailored data management? It is linked to an AIP pack

- o Global business case and transition to that business case

- Airport Mapping Data Bases

  - o Deployment ED-99 Rev D / ARINC 816-3 can be performed when Systems designers and AMDB providers will be ready.

  - o Interoperability of AMDB and DB used by ground segment should be evaluated.

  - o Interoperability requirements of AMDB and D-TAXI messages should be detailed

  - o Enhancement of AMDB standard should be studied to support LVO/SMGCS, D-NOTAM, New SESAR concepts.

- Terrain and Obstacle Data Bases

As appropriate, reassessment of the need for and benefit of an open format. Prototype phase needed before deployment, if justified by requirements.

2 References

[1]   SESAR Programme Management Plan, Edition 03.00.01

[2]   European ATM Master Plan

[3]   Multilateral Framework Agreement ("MFA") signed between the SJU, EUROCONTROL and its 15 selected members on August 11, 2009, amended on 14 June 2010, 19 October 2010 and 2 July 2012

[4]   WPB.01 Integrated Roadmap Dataset15 Release Note, D83, Edition 00.01.00, 21/12/2015

[5]   EUROCAE ED-76 Rev - / RTCA DO-200 Rev A, Standards for Processing Aeronautical Data, 1998

[6]   EUROCAE ED-77 Rev - / RTCA DO-201 Rev A, Standards for Aeronautical Information, 2000

[7]   EUROCAE ED-98 Rev A / RTCA DO-276 Rev A, User Requirements for Terrain & Obstacle Data, 2012

[8]   EUROCAE ED-99 Rev C / RTCA DO-272 Rev C, User Requirements for Aerodrome Mapping Information, 2011

[9]   EUROCAE ED-119 Rev B / RTCA DO-291 Rev B, Minimum Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data, 2011

[10] ARINC 424, Navigation Systems Data Base

[11] ARINC 816 Supplement 2, Embedded Interchange Format For Airport Mapping Databases, 25/06/2012

[12] P09.31, Standardisation Report V1, D00-001, 30/07/2015

[13] P09.31, Standardisation Report V2, D00-002, 23/12/2015

[14] P09.31, WA0 - Data Definitions and Requirements - Airport Database (interim issue), D02, 08/10/2010

[15] P09.31, WA0 - Data Definitions and Requirements - Airport Database (updated issue), D06, 04/07/2011

[16] P09.31, WA1 - Database definitions and requirements at airborne level - Airport Database (interim issue), D10, 08/12/2010

[17] P09.31, WA2 - Database standards and associated tools - AIS and data chain (first batch), D17, 31/08/2011

[18] P09.31, WA2 - Report on database prototype scenarios definition - Navigation and Airport Databases (second batch), D23, 18/07/2012

[19] P09.31, Delivery Notification Form: Airport database prototype for integration and verification activities in project STEP2, D32-002, 18/07/2014

[20] P09.31, WA0 - Data Definitions and Requirements (interim issue), D36, 02/11/2010

[21] P09.31, WA0 - Data Definitions and Requirements (updated issue), D37, 04/07/2011

[22] P09.31, WA1 - Database definitions and requirements at airborne level - Navigation Database (updated issue Y11), D43, 20/12/2011

[23] P09.31, WA1 - Database definitions and requirements at airborne level - Airport Database (updated issue Y11), D45, 20/12/2011

[24] P09.31, WA0 - Data Definitions and Requirements - Terrain & Obstacle Databases (interim issue), D03, 08/10/2010

[25] P09.31, WA0 - Data Definitions and Requirements - Navigation Database (updated issue), D05, 04/07/2011

[26] P09.31, WA1 - Database definitions and requirements at airborne level - AIS and data chain (interim issue), D12, 08/12/2010

[27] P09.31, WA1 - Database definitions and requirements at airborne level (updated issue Y13), D13, 14/10/2013

[28] P09.31, WA2 - Database standards and associated tools - Navigation and Airport Databases (first batch), D18, 31/08/2011

[29] P09.31, WA2 - Report on database prototype scenarios definition - Navigation and Airport Databases (first batch), D21, 11/10/2011

[30] P09.31, WA2 - Database standards and associated tools (first batch), D40, 31/08/2011

[31] P09.31, WA2 - Report on database prototype technical validation (first batch), D42, 18/07/2012

[32] P09.31, WA2 - Report on database prototype technical validation - Navigation and Airport Databases (first batch Y11), D51, 11/10/2011

[33] P09.31, WA2 - Report on database prototype technical validation - AIS and Data Chain (first batch Y11), D52, 26/01/2012

[34] P09.31, WA0 - Data Definitions and Requirements - AIS and data chain (updated issue), D08, 04/07/2011

[35] P09.31, WA1 - Database definitions and requirements at airborne level - Navigation Database (interim issue), D09, 08/12/2010

[36] P09.31, WA0 - Data Definitions and Requirements - Navigation Database (interim issue), D01, 08/10/2010

[37] P09.31, WA2 - Report on database prototype scenarios definition - AIS and Data Chain (first batch), D22, 17/08/2011

[38] P09.31, WA2 - Report on database prototypes technical validation (second batch), D25, 22/09/2014

[39] P09.31, Delivery Notification Form: Navigation database prototype for integration and verification activities in project STEP1, D28, 18/08/2011

[40] P09.31, Platform Readiness Note: Integration platform for verification activities in project STEP1, D34, 17/08/2011

[41] P09.31, Platform Readiness Note: Integration platform for verification activities in project STEP2, D35, 21/12/2012

[42] P09.31, WA1 - Database definitions and requirements at airborne level (interim issue), D38, 08/12/2010

[43] P09.31, WA1 - Database definitions and requirements at airborne level (updated issue Y12), D44, 21/12/2012

[44] P09.31, WA1 - Database definitions and requirements at airborne level - Terrain & Obstacle Database (updated issue Y11), D47, 20/12/2011

[45] P09.31, WA1 - Database definitions and requirements at airborne level - AIS Database (updated issue Y11), D49, 20/12/2011

[46] P09.31, WA0 - Data Definitions and Requirements - AIS and data chain (interim issue), D04, 08/10/2010

[47] P09.31, WA0 - Data Definitions and Requirements - Terrain & Obstacle Databases (updated issue), D07, 04/07/2011

[48] P09.31, WA1 - Database definitions and requirements at airborne level - Terrain & Obstacle Databases (interim issue), D11, 08/12/2010

[49] P09.31, WA2 - Database standards and associated tools - Navigation and Airport Databases (second batch), D19, 20/12/2012

[50] P09.31, Delivery Notification Form: Airport database prototype for integration and verification activities in project STEP1, D29, 10/10/2011

[51] P09.31, Delivery Notification Form: AIS database prototype for integration and verification activities in project STEP1, D30, 14/10/2011

[52] P09.31, Delivery Notification Form: Airport database prototype for integration and verification activities in project STEP2, D32-001, 21/12/2012

[53] P09.31, Delivery Notification Form, D32-003, 31/03/2016

[54] P09.31, WA2 - Report on database prototype technical validation - Navigation and Airport Databases (second batch Y12-13), D53, 14/10/2013

[55] P09.31, Report on AMDB prototypes technical validation, D54, 08/04/2016

-END OF DOCUMENT-