



Final Project Report

Document information

Project Title	V&V Platform architecture and specifications
Project Number	03.03.01
Project Manager	ENAV
Deliverable Name	Final Project Report
Deliverable ID	D01
Edition	01.00.00
Template Version	03.00.04

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Abstract

P03.03.01 Validation and Verification (V&V) Platform architecture and specifications supported the definition and evolution of the architecture of V&V Infrastructure, the definition of relevant technical specifications and the V&V Platforms interfaces to support V&V platform interoperability standardisation. P03.03.01 also helped preparing the integration test planning.

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Rational for rejection
None.

Document History

Edition	Date	Status	Author	Justification
00.00.01	14/12/2015	Draft	[REDACTED]	First version
00.00.02	12/02/2016	Draft	[REDACTED]	Feedback Consolidation
00.01.00	22/02/2016	Final	[REDACTED]	Final version
01.00.00	16/03/2016	Final	[REDACTED]	Revised

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Acronyms

Acronym	Definition
ADD	Architecture Description Document
ATM	Air Traffic Management
FB	Functional Block
IBP	Industry Based Platform
IPR	Intellectual Property Rights
IOP	Interoperability
SUT	System Under Test
V&VI	Validation and Verification Infrastructure
V&VP	Validation and Verification Platform
V&V	Validation and Verification

1 Project Overview

This project was concerned with the definition & description of the Validation and Verification Platform (V&VP) architecture both for inter-Industrial Based Platform (IBP) and intra-IBP interfaces, mostly focusing on the Validation and Verification Infrastructure (V&VI) but also considering the different system prototypes integration. It was also concerned with the definition of relevant technical specifications and the preparation of the integration test planning.

These activities have only been covered for the exercises that requested support.

The activities regarding V&VI interoperability supported the V&VP platform interoperability standardization performed in EUROCAE WG-81.

1.1 Project progress and contribution to the Master Plan

The project has established a harmonised methodology to ensure that the V&VP architectures were aligned with the reference system architectures produced by WPB and the Federating System Projects. This way guaranteeing that the V&VPs were fit for purpose for the different validation exercises

The following diagram shows the Overall work package 3 (WP3) process from the reception of the V&V needs and requirements, to the V&V platform developed and integrated.

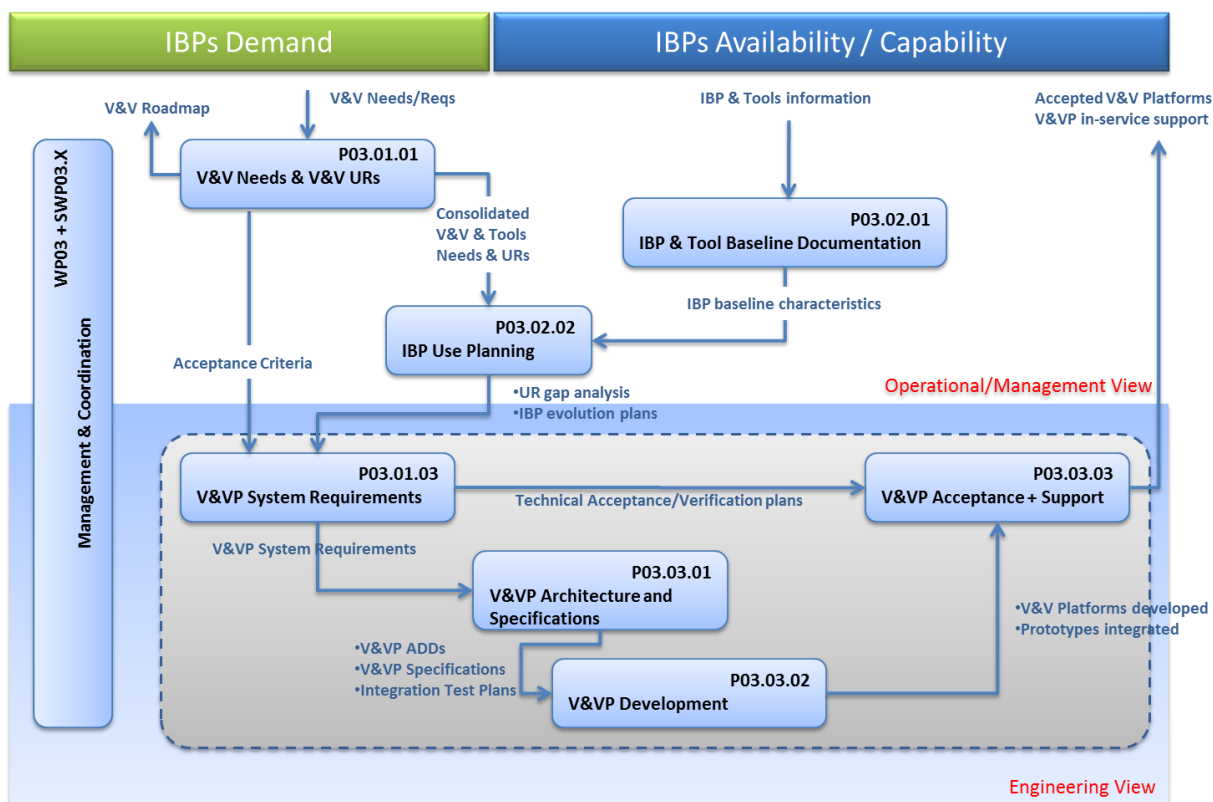


Figure 1: SESAR Overall WP3 process

1.2 Project achievements

The Project represented an essential step in the Engineering Process as it ensured that V&VP architecture and specifications definition were correctly addressed and taken into account throughout the V&VP development activity, contributing to the Industry Based/Pre-Operational V&V Platforms evolution process by defining and maintaining their architecture description and providing the V&VI/Tools specifications, as well as developing the V&VP integration plans and V&VP Integration test plans.

It has contributed significantly to this proposed V&V cooperation framework by supporting the SESAR Partners and the Operational and Technical Threads to properly define and coordinate the timely evolution and setting up of V&V Platforms along with the required support to adaptation and integration of the relevant tools and prototypes focusing on V2 and V3 maturity phases.

The overall engineering process required a definition of the V&VPs architecture and V&VI/Tools Specifications, to be used as main input for the development of the V&VPs.

Without this project which ensured the coherence of the V&VPs architecture and specifications, the overall process would have suffered the risks of duplications, the lack of interoperability, the lack of reusability, the integration difficulties and a consequent increase in costs.

The project has established a harmonised methodology to ensure that the V&VP architectures were aligned with the reference system architectures produced by WPB and the Federating System Projects. This way guaranteeing that the V&VPs were fit for purpose for the different validation exercises.

This transversal project has contributed to the preparation and documentation of several validation exercises, by applying the Overall Engineering Process, assuring that the platforms were developed satisfying the needs required to validate the exercise objectives through a better comprehension of the architecture, and minimizing the risk to delay their implementation through clear interfaces between platforms.

In particular, the yearly support consisted of :

- 29 exercises in 2012 (20 classified as higher priority and then considered in Release)
- 20 exercises in 2013 (10 of them in Release)
- 19 exercises in 2014 (15 of them in Release)
- 6 exercises in 2015 (3 of them in Release)

Part of the exercises planned for 2015 have been delayed and thus moved to 2016, as shown in WP3 EIMS Reports)

1.3 Project Deliverables

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

Reference	Title	Description
D20-004	V&VP Integration Plan - 2015 Q4	This document provides the overview of the V&VP integration plans produced during the last quarter of year 2015 by the task Integration Support of P03.03.01
D18-004	V&VP Architecture Description & Tool Specification - 2015 Q4	This document provides the overview of the V&VP ADDs (Architecture Definition Documents) produced in 2015/Q4
D26	V&V IOP Report 2014	This document addresses some IOP aspects which have been faced in 2014 SESAR exercises performed or prepared up to the date of publication,

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		and which are not taken into account by the ED-147.
D24	Support to Project 03.01.03 Report 2015	This document describes the support that P03.03.01 has provided to project P03.01.03 during 2015 for the purpose of writing System Requirements and Technical Acceptance Test Plans.

Most of the deliverables were internal for WP3 purposes and can be found in Reference section

1.4 Contribution to Standardisation

This project has addressed some ATM validation platform interoperability (IOP) aspects which have been faced in SESAR exercises performed or prepared up to the 2014. These aspects have been taken into account by the document, ED-147 (ATM Validation Platforms Interoperability Specification), produced by the EUROCAE working group WG-81. The WG-81 is a task force that focusses on analysing the Interoperability of ATM Validation Platforms.

In addition, this project has reported the assessment & actions taken in WG-81 to improve the standard following the open IOP aspects pointed out in V&VP IOP Report 2014. More details can be found in D26 deliverable.

1.5 Project Conclusion and Recommendations

The Project has guaranteed the traceability within the programme, through linking the platforms components to Functional Blocks (FB), not adding much value to the Evolution Plans generated by P03.02.02 (already describing the functionalities of each IBP, classified per FB).

The description of Architecture was articulated in two different levels:

- The (exercise-specific) inter-IBP interfaces, that was deemed of significant added value since:
 - It effectively helped some partners to coordinate among them
 - It supported WG-81 standardization activities
 - It facilitates SWIM compliance framework activities
 - It was deemed useful for what concerns the inter-IBP V&VI interfaces.
- The intra-IBP ADDs, that:
 - due to sensitive information contained in some system architecture documents (IPR), it was deemed too effort spending to provide this information in another ad-hoc ADD document;
 - in case of single platform validations, can provide a picture of architecture description to document activities performed on the platform, at least to describe (high level) the internal components and their mutual interactions, still remaining outside of the boundary of the IPRs.

Nevertheless, this project helped all partners to evolve the architecture of their different IBPs to cover the needs expressed by the URs.

From the experience documenting the architectures from the Validation and Verification Platforms (V&VP) supporting SESAR exercises, the following recommendations are proposed:

- To continue in SESAR2020 to describe the architecture of (exercise-specific) inter-IBP platforms (supporting SWIM compliance framework)

- To consider as optional in SESAR 2020 the description of the (exercise-specific) physical architectures of the IBPs, especially for the domain system, as long as there is not a formal programme reference for it.
- To continue in SESAR2020 to have high level functional description of the Domain Systems included in the IBPs, properly traced to the reference functional architecture, and potentially also including the availability notes of the integrated prototypes
- To continue in SESAR2020 to have a common reference architecture example to use as a reference and guide for all the partners
- To set a rule to specify the minimum level of details needed for the documentation of the architecture;
- To continue in SESAR2020 to have a common exercise repository accessible to all the project members;

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] EUROCAE document ED-147 from WG81
- [5] D20-004- V&VP Integration Plan - 2015 Q4
- [6] D17-004- V&VP Integration Plan - 2014 Q4
- [7] D14-004- V&VP Integration Plan - 2013 Q4
- [8] D09-004 - V&VP Integration Plan - 2012 Q4
- [9] D06 - Step 1 V&VP Integration Plan
- [10] D18-004 -V&VP Architecture Description & Tool Specification - 2015 Q4
- [11] D15-004 -V&VP Architecture Description & Tool Specification - 2014 Q4
- [12] D12-004 -V&VP Architecture Description & Tool Specification - 2013 Q4
- [13] D11-004 -V&VI Tools Specification - 2012 Q4
- [14] D10-002 - V&VP Architecture
- [15] D05 - Step 1 V&VI Tools Specifications
- [16] D04 - Step 1 V&VP ADDs
- [17] D26 -V&V IOP Report 2014
- [18] D21 -V&V IOP Report 2013
- [19] D03 - V&VP IOP Report
- [20] D24 - Support to Project 03.01.03 Report 2015
- [21] D23 - Support to Project 03.01.03 Report 2014
- [22] D22 -Support to Project 03.01.03 Report 2013
- [23] WP3 EIMS Reports - RIT v86 Updates
- [24] D01 DEL03.03.01_D01_Final_Project_Report

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