Final Project Report

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THALES, NATS, INDRA & EUROCONTROL	

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Abstract

The document is the final deliverable for 13.1.4 project.
It contains the description of project contribution to SESAR and provides some feedback from all project contributors.
The document lists the status of each deliverable as described in the PIR and the following CR.
It also includes a recapitulation of things to be improved and things that worked well during the project, together with a thorough analysis of the project deliverables, focused on identifying and justifying deviations from the original project plan, and how they were assessed by the SJU.
The report gives clues on how to use D02 and D17 deliverables inside the new federating project of WP7 & 13.

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Rational for rejection
None.

Document History

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This deliverable consists of SJU foreground.

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Publishable summary

13.01.04 is a technical project inside the Sub Work package 13.01 dedicated to architecture for NIMS (Network Information Management System).

The first task of 13.1.4 is defined during the initiation period, and is based on a strong development of sub regional level in Network Operation according to the implication of the FABS (Functional Airspace Blocks) in Airspace Management (ASM), Demand Management, Aeronautical Information Management (AIMS) and Demand and Capacity Balancing.

Starting from operational concepts, described by 7.2 project and others work package 7 level 3 projects, the project analyses the new operational scenario, and based of the decomposition of the role and responsibilities, proposes distributed and service based architecture for the Network Sub Systems.

Industries represent most of the effort for 13.1.4 project, and the plan is to build and refines representation of NIMS architecture according to INDRA and THALES understanding of network operation.

Eurocontrol, as project contributors, analyses both proposals based on current system architecture at network manager level, and evolution of the role of network manager at regional level according to the implementing rules, and operational requirements.

NATS as ANSP provides the operational expertise of local network management activities, and is in charge of operational survey inside SESAR, but also in the development of FABS projects and others ATM programs.

Starting in step 2 to cope with trajectory management operation concept, and to move from centralized to distributed architecture, the project has a slow start due to the lack of inputs from FABS and more generally to the lack sub regional level operational and technical requirements.

We decide with SJU and WP13 management, to change the main goal of the project to compensate from this delay of step 2 activities, and from sub regional requirements absence.

A CR made in 2012 gives the opportunity to focus on two majors subjects that must be used by 13.1.1 system federating project in WP-13, and provides inputs for both TAD step 1 [6] (based on local tools study) and step 2 (based on the first architecture definition):

- existing local tools to handle current network management operation in Europe, but also in other part of the world:
    - THALES Australia gives a complete description of TopSky ATFM product deployed in South Africa for the 2010 soccer world cup,
    - THALES ATM describes the French FMP tool set based on PRESAGE,
    - INDRA describes TMS in use in MUAC, and PERSEO developed with AENA
    - NATS gives a description of TLPD as local but also sub regional flow management tool
    - EUROCONTROL provides CHMI description.
- A first description of distributed architecture for NIMS in step 2 for each sub systems:
    - Airspace management in close relation with A-FUA concept and ADR systems improvement

- Demand management in close relation with trajectory management in planning phases, Flight Object and ground – ground interoperability
- Demand and Capacity Management and STAM concept evolution
- NOP management and CDM process in demand and capacity balancing

The project manages to deliver the D02 and D17 deliverables. Nevertheless, the difference between 13.1.1 and 13.1.4 is not so clear, and the definition of a future architecture for NIMS involving all stakeholders (ATC, FOC, local and regional flow management unit, MET services, AIM, military entities) requires a more global approach that 13.1.4 is not able to support.

1 Introduction

1.1 Purpose of the document

The purpose of this document is, as stated in the Multilateral Framework [1], to

- Summarises the results and conclusions relating to the concerned Members' participation in the Project (publishable summary);
- Describe the contribution of the Member to the development of new Standards and Norms Proposals in the Project;
- Describe the contributions made, through the Project, to the roadmap for deployment activities;
- Explain the progress made, through the Project, towards the execution of the ATM Master Plan;
- Provide an overview of the final achievement of the Deliverables and an explanation of the discrepancies between the planned and the actual work carried out in the Project;
- Provide for each Member involved in the Project, a Project Costs Breakdown Form of the total Eligible Costs incurred by the Member during the Project, including interest accrued on the Pre-Financing payments and any other Revenue related to the Project.
- Analyse the lessons learnt at project level.

1.2 Intended readership

As a closure report for 13.1.4 project, this document can be of interest to any stakeholder involved in this project and any of the associated ones in SESAR, mainly 13.1.1 as federating system project.

Besides of its project specific purpose, this document might be relevant for any stakeholder interested in architecture and local DCB tools.

- 13.01.04 Project Members
- 13.1.1 Project Members
- SESAR JU as the final client

1.3 Inputs from other projects

13.1.4 project worked almost alone as focusing on step 2 architecture topics by anticipation; and industry point of view.

Some inputs come directly from project contributors' documentation made available for SESAR purposes.

Of course the link with 13.1.1 federating system project for NIMS was important, the project uses TAD step 1 [6] at least for the functional block description and definition.

Nevertheless, DOD and OSED from WP-7 were used as input to better understand operational improvement description even if step 2 was delayed.

1.4 Glossary of terms

Term	Definition
ACC	Area Control Centre
ADR	Airspace Data Repository
AIMS	Aeronautical Information Management System
ANSP	Air Navigation Service Provider
ASM	Airspace Management
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CDM	Collaborative Decision Making
CFMU	Central Flow Management Unit
CHMI	CFMU Human Machine Interface
DCB	Demand and Capacity Balancing
E-ATMS	European Air Traffic Management System
FAB	Functional Airspace Block
FMP	Flow Management Position
NIMS	Network Information Management System
NOP	Network Operations Plan
SESAR	Single European Sky ATM Research Programme
SESAR Programme	The programme which defines the Research and Development activities and Projects for the SJU.
SJU	SESAR Joint Undertaking (Agency of the European Commission)
SJU Work Programme	The programme which addresses all activities of the SESAR Joint Undertaking Agency.
SOA	Service Oriented Architecture
SWIM	System Wide Information Management
TAD	Technical Architecture Description

2 Project contributions

The 13.1.4 project works directly with NIMS federating project. The deliverables and studies made by 13.1.4 are incorporated into 13.1.1 TAD step 1 and step 2.

The contribution of the project to SESAR objective is visible in NIMS technical architecture description document, and also in prototypes developed by level 3 projects in WP-13.2.

2.1 Progress made toward the ATM Master Plan

This section is not applicable for this project.

13.1.4 project deliverables are useful directly for 13.1.1 architecture tasks, and the link with the master plan is not made at 13.1.4 level.

2.2 Contributions to the roadmap for deployment activities

This section is not applicable for the project.

13.1.4 project is the pioneer project in terms of architecture definition for step 2 only and trajectory based operation. It has produced a list a topics that must be addressed during step 2 activities.

The project is not linked to the roadmap directly, even if it contributes to the definition of NIMS architecture through 13.1.1 step 2 TAD.

2.3 Contribution to standardization

This section is not applicable for the project.

13.1.4 project did not contribute directly to standardisation due to his role in WP13 architecture sub work package.

3 Project lessons learnt

What worked well?
Small team means more flexibility to address complex topics. But network management is a networked activity that links many stakeholders, and 13.1.4 team was sometimes too small to encompass the whole network management operational and technical problematic.
Interaction between 13.1.1 and 13.1.4 and B4.3 ADD – same persons from Eurocontrol and THALES work on all aspects + workshops for both projects. D17 – Local tools architecture study gives direct input to 13.1.1 step 1 TAD on local NM part, but also on exchanges (data and communication means) between Configuration Capabilities as described in B4.3 ADD Step 1. D02 – Step 2 V1 – Architecture Specification must be used as input for step 2 architecture definition in 13.1.1 project. The document proposes several questions or topics that require a deep analysis of system impacts and system adaptation to go further in the distributed architecture and SOA for the NIMS.
Gate and project management to adapt project scope to the new constraints: • Lack of operational requirements • Architecture work in advance for step 2
Support from WP13 management team in CR management and project management
THALES Australia gives us an opportunity to describe network management system in different place than ECAC area.
What should be improved?
The original project scope was based on operational needs at sub regional level and possible development of new tools at this level. The sub regional level was difficult to address in SESAR operational work packages and reduces the de facto the project scope
The bottom up approach of step 1 was required by the SESAR program, it was difficult to start the top down approach in 13.1.4 for step 2 due to delay in technical enablers definition
The feedback on architecture topics is quite a complex one, and most of the subjects we had to deal with are now combined in high level architecture studies (trajectory management, AIM data etc…) under B4.3 umbrella. May be we could have seen this sooner during the project.

Table 1 - Project lessons learnt

4 Project achievements

4.1.1 Project deliverables

Del. code	Del.Name	Description	Assessment Decision	Explanations
D01	Project Management Close Out Report	End of the project documents		This document
D02	Step 2 - V1 - Architecture Specification	System function distribution description based upon THALES & INDRA ATM experience and knowledge	Reservation/s requiring clarification/s	A new version has been delivered – to be assessed
D03	Step 2 - V1 - Solution Evaluation - Criteria	Definition of the criteria for the solution evaluation of architecture solution and criteria analysis	No Reservation	
D04	Step 2 - V2 - Architecture Specification	System function mapping for NIMS at the 3 levels Analysis of the CDM process with other system SESAR work package		Deliverable removed by CR 1628
D05	Step 2 - V2 - Solution Evaluation	Evaluation of the unique V2 solution Recommendation for step 3 tasks and system function mapping		Deliverable removed by CR 1628
D06	Step 2 - V3 - Architecture specification	System function mapping for NIMS at the 3 levels Analysis of the CDM process with other system SESAR work package		Deliverable removed by CR 1628
D07	Step 2 - V3 Solution Evaluation	Evaluation of the unique V3 solution Recommendation for step 3 tasks and system function mapping		Deliverable removed by CR 1628
D08	Step 2 - Operational coordination - FAB's Requirements	Recommendation for system requirements for 13.1.1 based on FAB's operational concepts analysis		Deliverable removed by CR 1628
D17	Step 2 - V1 - Baseline Study for local / regional interaction (deliverable)	System function distribution description based upon THALES & INDRA ATM experience and knowledge	Reservation/s requiring clarification/s	

Table 2 - List of Project Deliverables

5 Total Eligible Costs

Each member should have sent a project cost breakdown forms according to the instructions.

6 References

[1] SESAR, MFA, SJU/LC/608-CTR

[2] SESAR, Programme Management Plan, N/A, 03.00.00, April 2013

[3] 13.1.4 D03 – Step 2 - V1 - Solution Evaluation – Criteria – 00.00.03 – 31/01/2012

[4] 13.1.4 D02 – Step 2 - V1 - Architecture Specification – 01.01 – 12/09/2013

[5] 13.1.4 D17 – Step 2 - V1 - Baseline Study for local / regional interaction (deliverable) – 02.01 – 12/09/2013

[6] 13.1.1 D04 – Step 1 – TAD – 0.8 – 11/06/2013

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