Final Project Report

Document information	
Project Title	ASAS-ASEP Oceanic Applications
Project Number	04.07.04.b
Project Manager	NATS
Deliverable Name	Final Project Report
Deliverable ID	D01
Edition	01.00.00
Template Version	03.00.04
Task contributors	
NATS,	

Abstract

The objective of the project was to progress with the operational definition and validation of ASAS Separation (ASEP) applications of In-Trail Merge and the In-Trail Follow procedures in the environments of the North and South Atlantic.

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Rational for rejection
None.

Document History

Edition	Date	Status	Author	Justification
00.00.01	04/03/2016	Draft		New document
01.00.00	19/09/2016	Final		Final document.

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This deliverable consists of SJU foreground.

Acronyms

Acronym	Definition
ATM	Air Traffic Management
ASAS	Airborne Separation Assistance System
ASEP	ASAS Separation
CONOPS	Concept of Operation
DOD	Detailed Operating Description
E-OCVM	European - Operational Concept Validation Methodology
EUR	Europe
FIM	Flight Deck Interval Management
ITF	In-Trail Follow
ITM	In-Trail Merge
NAT	North Atlantic
OCA	Oceanic Control Area
OSED	Operational Service and Environment Definition
PIR	Project Initiation Report
PTM	Pairwise Trajectory Management
RLatSM	Reduced Latitudinal Separation Minima
RTCA	Radio Technical Commission for Aeronautics
RlongSM	Reduced Longitudinal Separation Minima
SAM	South America
VALS	Validation Strategy

1 Project Overview

The objective of the project was to progress with the operational definition and validation of ASAS Separation (ASEP) applications of In-Trail Merge (ITM) and the In-Trail Follow (ITF) procedures and the environment in the North and South Atlantic

1.1 Project progress and contribution to the Master Plan

The project only provided an initial Operational Service and Environment Definition (OSED) and V1 Benefits Analysis deliverable prior to project suspension. The benefits analysis used fast time simulations of Europe / South America (EUR/SAM corridor and NAT airspace) oceanic traffic to quantify to a rough order of magnitude the potential fuel benefit the ASEP applications could provide.

Code	Name	Project contribution	Maturity at project start	Maturity at project end
CM-0701	Ad Hoc Delegation of Separation to Flight Deck - In Trail Procedure (ASEP-ITP)	Progress operational definition and validation of ASEP-ITF and ASEP-ITM.)	V1	V1

1.2 Project achievements

Project 04.07.04b was suspended prior to the full V1 validation of the ITF and ITM concepts. A clear alignment with Top Down Step 3 definition was recognized by the project team and the SJU; consequently the Project was proposed for suspension until Top Down Step 3 definition became available (CONOPS and DOD/VALS).

1.3 Project Deliverables

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

Reference	Title	Description
D06	Validation Strategy	The Validation Strategy is intended to present the strategy for progressing the ASEP concept and procedures from V1 to V2 and into V3 maturity through validation activities.
D02	OSED for ASEP Functions v 0.1	The Operational Service and Environment Definition document is intended to describe the ASAS Separation (ASEP) applications of In-Trail Merge and the In-Trail Follow procedures and the environment in which these procedures will be operated.

D15	Benefits Analysis Document v0.1	This document contains the initial (v0.1) 4.7.4b benefit assessment for input into the ASEP Operational Focus Area Cost Benefit Assessment. The document contains the initial benefit mechanisms that show the positive and negative impacts that the project expects application of Oceanic ASEP to provide, in addition to benefit assessments conducted by ENAIRE and NATS for the EUR/SAM Corridor and NAT respectively.

1.4 Contribution to Standardisation

Project 04.07.04b was suspended before V2 and V3 validation results and subsequent contributions to standardisation bodies were made. Outside of SESAR, Flight Deck Interval Management (FIM) standardisation activities have taken place, with the 'Pairwise Trajectory Management (PTM) aspect of FIM (undertaken in RTCA SC-186) currently progressing similar concepts to those originally described in 04.07.04b.

1.5 Project Conclusion and Recommendations

Project 04.07.04b was suspended before it was planned to fully validate the concepts to E-OCVM V1 level and provide results to drive standardisation activities. The decision to suspend the project was based on the uncertainty of the SESAR Step 3 environment which was needed to identify and quantify the anticipated benefits that the concept would be expected to provide. Although in the Project Initiation Report (PIR) it was expected that initial operating capability on the ASEP functions would occur in 2018-2023, the industry partners noted that 2030 onwards was more likely.

The Benefits Analysis undertaken indicated that although the benefit per ITF step climb was reasonable; the overall benefit across a 100% equipped fleet was marginal, given a finite number of opportunities to obtain the benefit. Two pilot and controller workshops held on the concept also raised a number of questions on the viability and suitability of the proposed applications, namely availability of meteorological information at intended FL, availability of target aircraft Mach via ADS-B and the lack of defined ability of 'overtake' slower traffic via lateral manoeuvre. Furthermore, it was noted in February 2012 that a number of operational changes and enhancements that would reduce separation in the intended operating environment of the North Atlantic were likely to be introduced. The benefits provided by these changes and enhancements were expected to significantly erode the benefit provided by the ASEP concepts researched within the project, and without the cost of installing additional concept specific airborne equipment.

In the four years since the project has been suspended, within the Shanwick and Gander Oceanic Control Area's (OCA's), RLongSM has become a permanent fixture, reducing longitudinal procedural separation down to 5 minutes for ADS-C equipped airframes. Reduced Latitudinal Separation Minima (RLatSM) has been introduced as a trial on core Oceanic tracks, reducing the lateral separation to 30NM from 60NM. ADS-B surveillance along the 'Blue Spruce route' has been established in Gander and Reykjavik airspace. Spaced based ADS-B is scheduled to become operational in the North Atlantic in 2018, providing a surveillance based separation service, thereby reducing the separations between suitably ADS-B equipped aircraft beyond that provided RLongSM and RLatSM, currently envisioned 15NM. By 2025 the Oceanic Route structure will be removed, moving to Free Route Airspace.

Although ASEP may play a part in strategic de-confliction in oceanic free route airspace, the ASEP ITF and ITM concepts would need to be re-evaluated for this environment.

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] 04.07.04b Operational Services Environment Description, D02, V01.00.00, 2012

[5] 04.07.04b Benefits Analysis, D06, V01.00.00, 2012

[6] 04.07.04b Validation Strategy D15, V01.00.00, 2011

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