Final Project Report

Document information	
Project Title	Weather Infrastructure Requirements Study
Project Number	15.04.09b
Project Manager	[redacted]
Deliverable Name	Final Project Report
Deliverable ID	Del 03
Edition	00.01.00
Template Version	03.00.00

Task contributors

List all the SESAR members involved in the task, either as main contributor or as partner contributor:

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Abstract

The target of this project is to provide a comprehensive weather sensor infrastructure concept for airports' different categories and runway configurations.
This concept evinces how to deploy meteorological sensors, complementary sensor/systems on European airports to obtain an optimum on performance with respect to aerodrome restrictions and WMO/ICAO guidance. Recommendations of required additional new weather sensors as well as infrastructure optimization strategies for special and ordinary located airports will be included in terms of achievable performance and prevailing weather phenomena.

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Rational for rejection
None.

Document History

Edition	Date	Status	Author	Justification
00.00.01	10/01/2013	New Template	[redacted]	New Document
00.01.00	16/01/2013	Final		Delieverable

Intellectual Property Rights (foreground)

This deliverable consists of) SJU foreground.

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Publishable summary

Airports across Europe and beyond are all different in number of runways, size and configuration as well as geographic location, environment and capacity. Thus airport constraints and weather phenomena/weather sensors vary from case to case. For instance, strong winds appear more often on coastal airports, low visibility rather in mountain rich areas. As a result, the deployed sensor suite and the installation conditions are manifold. However, differences in amounts and types of implemented weather sensor at similar airports can also be found. Hence, the need for a detailed and standardised sensor infrastructure concept will become increasingly important.

The project will deliver a comprehensive infrastructure concept, divided into 2 Deliverables, which provides firstly the best possible solution for the implementation of meteorological sensors on airports with respect to the ILS-category and conventional group of runway configurations (single, parallel, cross-type and V-type stripes) without considering any airport constraints [1]. In this ideal case the project will establish the best possible infrastructure to reach an optimum on sensor performances. On one hand, these infrastructure concepts consider the Instrumentation Landing System categories (ILS CAT I, II and III) and the associated infrastructure constraints as well as the size of the runway. The different categories determine specific runway instrumentations for instance runway lightings or the ILS antenna system and safety areas around the runway. Thereby, the categories affect the number, type and thus infrastructure details of the deployed weather sensors. On the other hand the runway configuration and the associated number of runways reflect the amount of aircraft movement. For instance, single stripe airports owe just one, mostly small runway whereas parallel-, cross-type or V-type stripe airports with larger runways shall be capable to handle denser traffic as well as to enable larger aircraft to land or to take-off. Thus, the difference in runway size and configuration requires different numbers of sensors. Furthermore the needed sensor suite can, optionally, be linked to the airport environment and thus to the prevailing MET hazards. Therefore the major MET hazards for aviation are also considered. This document is mainly the result of investigating ICAO and WMO (and FAA) guidelines for the deployment of instruments on an aerodrome area. Performance analysis and recommendations are mostly based on results of test campaigns at airports as well as scientific papers or study groups.

The second part of the comprehensive weather sensor infrastructure concept will focus on the actual situation of deployed weather sensors/ systems on airports [2]. Currently, the utilization of meteorological sensors on airports is quite different due to various prevailing MET hazards depending on airport location and size. For instance airports located close to oceans are mainly affected by sea breeze, airports close to mountain rich terrains experience more often fog situations. Thus different meteorological sensor suites are necessary. Investigations were done under different viewpoints; geographical location and then related weather phenomena for a specific set of airports. Afterwards, the study examines bigger and smaller airports which are not suffering from specific weather conditions. To identify the need of additional helpful weather equipment(s), gaps in weather hazard detection are roughly identified. Performance analyses are finally given by applying the methodology defined in 15.04.09b Deliverable 1 [3] on the considered airports.

Parts of the infrastructure concepts are:

- Suggestions for additional “novel” weather sensors
- Infrastructure descriptions of weather sensors which are not described in detailed by ICAO/WMO
- Performance analysis in terms of comparison between different RVR sensors are given
- State of the art sensor systems deployment are described for different runway configurations
- Deployment improvements for “complex” runway layouts of real life airports are proposed and further helpful sensors are suggested

The comprehensive infrastructure concept is based of the sensor concept provided by 15.04.09a devised in task 7. This task delivers a deliverable that provides a sensor concept defining types and numbers of weather sensors/ sensor systems, which have to be used for monitoring and detection of all kind of weather hazards.

1 Introduction

1.1 Purpose of the document

The purpose of this document is, as stated in the Multilateral Framework **Error! Reference source not found.**, 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

The indented readership is

- Airport Operator
- MET Office
- 150409a
- 15.04.09c
- ICAO/WMO

1.3 Inputs from other projects

As indicated in the executive summery, due to the 15.04.09 logic, this sensor concept is based on 15.04.09a.

1.4 Glossary of terms

2 Project contributions

2.1 Progress made toward the ATM Master Plan

Weather is the major delay factor at airports. There is room for improving the weather information itself and the provision of it to enhance situational awareness with respect to efficiency, safety and environmental impact. The project contributed with its work to situational awareness, better information, and operational improvements based on improved weather information.

2.2 Contributions to the roadmap for deployment activities

By installing weather sensors on airports, during the deployment phase, this concept could provide helpful input. It shows how each airport sensor will be deployed and therefore depicts sensor solution deployments for each weather phenomena.
Furthermore every airport design is applicable to this concept whether different ILS category or the numbers and orientation of runways.

2.3 Contribution to standardization

The outcomes of this project could be used as a technical contribution within the framework of the authorities. The deliverables may provide helpful guidelines for improvements of new or modifications of current recommendations and standards regarding deployment of novel weather sensors.

3 Project lessons learnt

What worked well?
A small number of project members have many advantages like easy coordination and quick informations communications and therefore decision making.
Different expertise of people, sharing different views and therefore broader understanding of processes
Extranet as a communication platform
What should be improved?
Lack of the big picture e.g. OFA approach, Releases, Steps, Enablers, OI's etc.
Coordination with other Sesar members (outside the project) is sometimes difficult (Members do not response to emails inquiry.
Extranet dependency register

Table 1 - Project lessons learnt

4 Project achievements

4.1.1 Project deliverables

Del. code	Del.Name	Description	Assessment Decision	Explanations
15.04.09b D01	Weather sensor infrastructure concept for different airport configurations and categories	This deliverable provides an infrastructure concept for ground based weather sensors for airport sitings. This concept considers deployment details for state of the art sensor identified in 15.04.09a. Ground-based weather sensors Infrastructure details are given with respect to airports ILS Category (CAT I, II and III), runway size and configurations (Single-, Parallel-, Cross-, V-Type-Stripes).	No Reservation	No deviation from the description
15.04.09b D02	Case study of deployed meteorological weather sensor configurations on today's	This deliverable studies the actual situation of weather sensor installations on different kind of European airports. The aim of the study is to identify the current situation of deployed weather sensors/systems and thereby identify needs of additional required sensors for a comprehensive sensor suite with respect to the prevailing MET hazards.	No Reservation	No deviation from the description

Table 2 - List of Project Deliverables

5 Total Eligible Costs

This section is based on the Project Costs Breakdown Forms of the eligible costs incurred by project Members during the project and these will be sent to the SJU separately by each member. The Project Manager should not complete this section.

6 References

[1] DEL 15.04.09.b D01 Weather Sensor Infrastructure concept.doc

[2] DEL 15.04.09.b D02 Case study of deployed meteorological weather sensor configuration on today's airports

[3] DEL 15.04.09.a D07 Airport System Concepts.doc

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