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EUROCONTROL Guidance Material for Minimum Safe Altitude Warning
Appendix C: Cost Framework for the Standardisation of MSAW

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Abstract		
This document provides guidelines for users of the MSAW Cost Framework. The Cost Framework assesses the cost for implementation for individual ANSPs of Minimum Safe Altitude Warning Level 2.		
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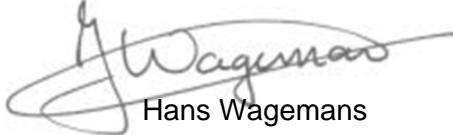| STATUS, AUDIENCE AND ACCESSIBILITY		
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DOCUMENT APPROVAL

The following table identifies all management authorities who have successively approved the present issue of this document.

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The following table records the complete history of the successive editions of the present document.

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CONTENTS

EXECUTIVE SUMMARY

This document provides guidelines for users of the Cost Framework. The Cost Framework calculates the potential financial implications for an Air Navigation Service Provider (ANSP) that is planning to implement MSAW, in accordance with The European Convergence and Implementation Plan objective ATC02.6 (Implement ground based safety nets – Minimum Safe Altitude Warning Level 2).

1. INTRODUCTION

This document provides guidelines for users of the MSAW Cost Framework. The Cost Framework calculates the potential financial implications for an Air Navigation Service Provider (ANSP) that is planning to implement MSAW, in accordance with The European Convergence and Implementation Plan objective ATC02.6 (Implement ground based safety nets – Minimum Safe Altitude Warning Level 2).

This document provides:

- Background information.

- Instructions for using the spreadsheet model.

- Interpretation of the results of the calculations.

The Cost Framework uses Microsoft Excel.

2. OBJECTIVE OF THE COST FRAMEWORK

The objective of the Cost Framework is to identify the potential costs that an ANSP may incur when implementing MSAW. It also puts a value on both the capital expenditure of implementation (such as purchasing new software and systems) and also the cost in terms of the man-days that are required to implement MSAW.

A further objective of the Cost Framework is to estimate potential savings that an ANSP could achieve when implementing MSAW by making the best use of the SPIN guidance material, as well as the knowledge that has been gained through active participation in SPIN related activities.

3. STRUCTURE OF THE COST FRAMEWORK

The Cost Framework has been developed to be consistent with the guidance material produced by EUROCONTROL[1] for the implementation of MSAW. The implementation and operation of MSAW has been broken down into four life-cycle steps:

- Requirements definition.

- Implementation or change.

- Tuning and validation.

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[1] EUROCONTROL Guidance Material for Minimum Safe Altitude Warning.

- Operation and monitoring.

The costs estimated for each of the elements within these steps is based on the validated figures of the STCA Economic Assessment[2], which was carried out in 2006. A detailed list of costs and assumptions are included in the Economic Assessment of MSAW standardisation[3].

The Cost Framework is structured into two worksheets within one Excel workbook. The worksheets are titled:

- **Basic data** – This defines the basic input parameters and the central value of the costs that have been estimated.

- **Ranges and sensitivity** – This provides a range for each of the input values and has the option to calculate a saving due to joint procurement of MSAW by a group of ANSPs.

4. OUTPUT

The range of costs for each element is represented by the following categories:

- **Low,** this represents an uncomplicated implementation of MSAW. This can either be due to the topography of the land, or an MSAW already being present in the ATM system.

- **Base,** this represents a moderately complex implementation of MSAW, where there may be added complexity due to the implementation of MSAW into the existing ATM system or additional complexity due to the topography of the land.

- **High,** this represents a more complex implementation, where the complexities of the current ATM system and the topography of the land combine to make implementation of MSAW a highly complex task.

The output on the 'Ranges and Sensitivity' worksheet presents the overall cost of the MSAW implementation, and compares the figures for an ANSP implementing MSAW independently (case A) and for one implementing MSAW utilising the knowledge and experience of the SPIN Sub Group, and the associated guidance material that has been developed (case B).

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[2] An economic assessment of standardised STCA, Helios Technology Limited, October 2006.
[3] Economic assessment of MSAW standardisation, Helios, July 2008.

5. HOW TO USE THE COST FRAMEWORK

5.1 Input values

The Cost Framework has been developed so that it is simple to use. There are only three input parameters that are required, and these cells are coloured yellow. A screenshot of the input parameters section is displayed in Figure 1, in which the value in the yellow cell can be replaced with a figure that is relevant for the user.

1	How many ATCOs require training in total?	300
2	Select a reduction in procurement costs due to collaboration	0%
3	Select a reduction in maintenance costs due to collaboration	0%

Figure 1: Example of input cell

The input parameters are located on the 'Basic Data' worksheet and the inputs required are:

- The number of ATCOs that require training.

- The percentage reduction in purchase costs achieved through joint procurement.

- The percentage reduction in maintenance costs achieved through joint procurement.

5.2 Results

Once the input values have been entered the results are immediately available, without any further calculations being required.

The 'Basic Data' sheet provides a central value of the cost of implementation, which does not account for any discounts that may be achieved through joint procurement. It also provides a percentage of the cost saved through using the knowledge of the SPIN Sub Group and the related guidance material compared with an ANSP implementing MSAW independently. An example screenshot of the basic results is presented in Figure 2.

	Case A	Case B
	Independent	Knowledge sharing
	Base	Base
Total costs		
Manpower	€ 330,000	€ 280,000
External costs	€ 290,000	€ 290,000
Total	**€ 620,000**	**€ 570,000**
SAVINGS		8.1%

Figure 2: Basic cost estimates

More detailed results are presented in the 'Ranges and Sensitivities' worksheet. This worksheet provides the ranges that have been placed on values and the resulting overall costs, including discounts achieved through joint procurement.

An example screenshot of the more detailed results is presented in Figure 3.

	Case A			Case B		
	Independent implementation			Knowledge sharing implementation		
	Low	Base	High	Low	Base	High
Cost per man day	550	600	650	550	600	650
Number of Man Days	461	556	550	392	466	456
Total costs						
Manpower	€ 250,000	€ 330,000	€ 360,000	€ 220,000	€ 279,840	€ 300,000
External costs	€ 130,000	€ 290,000	€ 545,000	€ 130,000	€ 290,000	€ 545,000
Total	**€ 380,000**	**€ 620,000**	**€ 905,000**	**€ 350,000**	**€ 570,000**	**€ 845,000**
Saving in Case B compared to Case A				7.9%	8.1%	6.6%

Figure 3: Ranges and sensitivities

6.   SUMMARY

The tables presented in the previous section provide an estimate of the cost that an ANSP will incur when implementing MSAW to meet the EUROCONTROL specification.

The Cost Framework has been developed to be extremely simple and easy to use and informative, whilst allowing the flexibility for ANSPs to adapt it to fit the scale of the operational unit into which MSAW will be implemented.

7.   REFERENCES

1. EUROCONTROL Guidance Material for Minimum Safe Altitude Warning

2. An economic assessment of standardised STCA, Helios Technology Limited, October 2006

3. Economic assessment of MSAW standardisation, Helios Technology Limited, July 2008.

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