

# ES2 – WS02-10

30 June – 01 July 2010 – Bucharest

SMS COST Model Working Session



## SMS COST MODEL

The need for an SMS cost model

Decomposing SMS into “tasks”

Building a mathematical model

Model input

Model output

## The Need for SMS Cost Estimation

- An SMS is a mandatory and a critical component for every ANSP.
- The cost of implementing and maintaining a safety management system can be substantial.
- The expenses involved need to be planned for and budgeted.
- This is especially important in a financial crisis.

## Estimating the Cost

- Analyze the SMS and decompose it into simple procedures that can be easily described and modeled.
- Build a mathematical model that calculates the cost of each procedure.
- Implement the model.

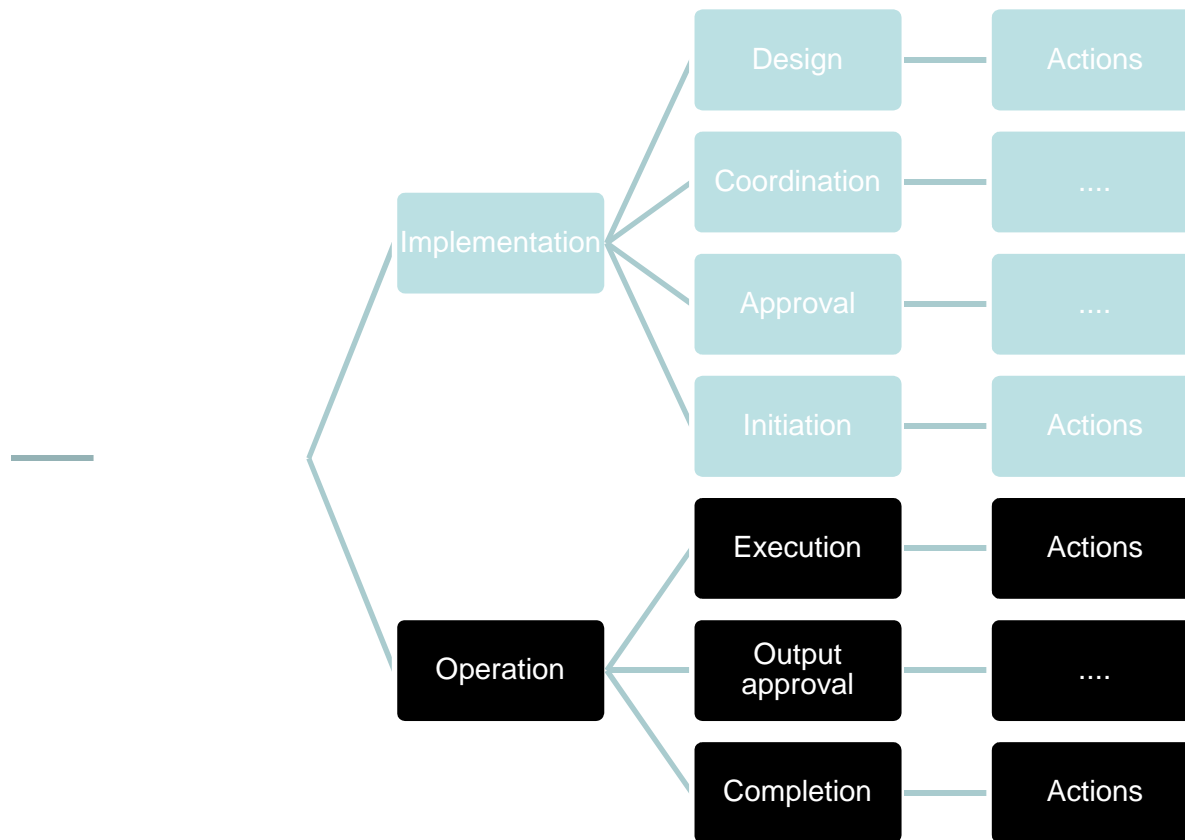
## Decomposing the problem

- Analyze the SMS and break it down into separate procedures.
- Separate each procedure into steps/tasks.
- Identify the activities required to perform each step/task.

## Decomposing the problem

- Two cost cards per procedure:
  - Implementation
  - Operation
- Four cost components in each task:
  - Human effort
  - Training
  - Infrastructure and equipment
  - Non-effort elements

# Overview of SMS break down



## The SMS cost model

- There are different cost models.
- They were compared in the context of SMS cost modelling.
- The most appropriate model was selected.
- Activity based cost accounting method
- Standard cost model



# Cost model input/output

- Model Input
  - Global variables
  - Implementation cost card
  - Operation cost card
- Model Output (results)
  - Human effort
  - Training
  - Infrastructure & equipment
  - Non-effort elements

## Global variables

- Global variables
  - Daily rates
    - SAF
    - OPS, ENG
    - MAN, ANC, ADM
    - INT & EXT Trainers or support
  - Inflation
  - Weighted average cost of capital
  - Annual effort cost increase



## Human effort - implementation

- Procedure Design
- Procedure Coordination
- Procedure Approval
- Procedure Initiation



## Human effort - operation

- Procedure Execution
- Procedure Output Approval
- Procedure Completion

# Training

- Input data
  - Training courses
  - Training infrastructure and equipment  
e.g. SOE, venue
  - Training missions
  - Training non-effort elements  
e.g. training materials
- Output
  - Total training cost

# Infrastructure and equipment

- Input data
  - Gross balance value
  - Expected operating life
  - % for SMS purposes
- Output data
  - Cost (depreciation and interest) for the whole operating life

## Non-effort elements

- Input data
  - Unit price
  - Quantity
  - Frequency per year
- Output data
  - Total cost

## Results of SMS cost modeling

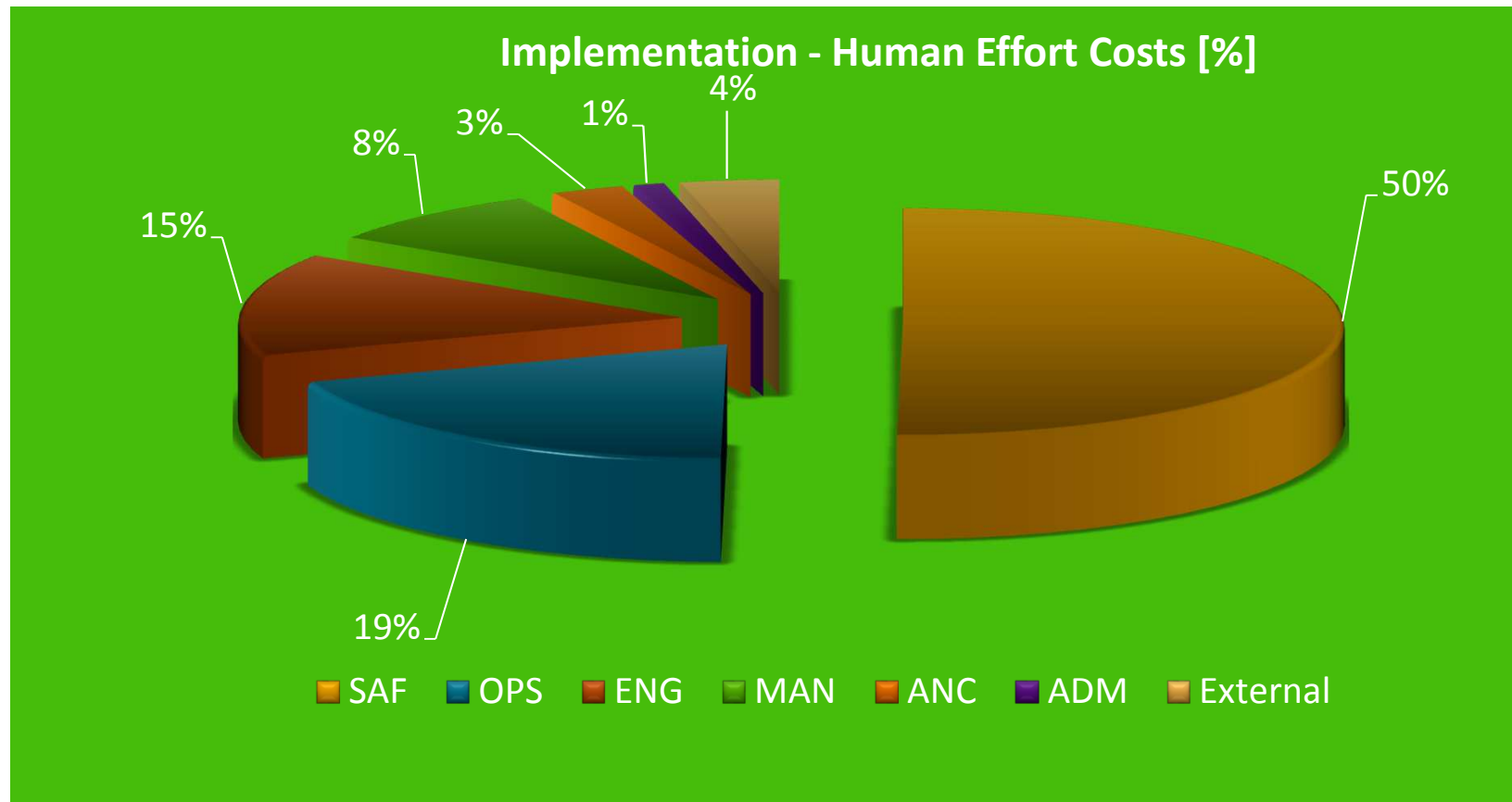
- Implementation costs
- Operation costs
- For individual procedures and overall
- Analysis of human effort distribution
- Overall cost of different SMS elements



# Graphs and reports

Human Effort for Maintenance and day-to-day Operation of SMS							
Procedure Action	Internal						External
	SAF	OPS	ENG	MAN	ANC	ADM	
	[total mandays]	[total mandays]	[total mandays]	[total mandays]	[total mandays]	[total mandays]	[total amount]
5-Execution	10.625	0.5	0.25	3	0.25	0	
6-Output approval	0	0	0	2	0	0	
7-Completion	1.5	2	2	1	1	1	
<b>Grand Total Human Effort</b>	<b>121.25</b>	<b>25.00</b>	<b>22.50</b>	<b>60.00</b>	<b>12.50</b>	<b>10.00</b>	
R-Average Rate [per day]	220 €	200 €	150 €	260 €	110 €	90 €	
OH-Overhead [%]	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
Rate for estimations	264.00 €	240.00 €	180.00 €	312.00 €	132.00 €	108.00 €	
<b>Total Human Effort Costs</b>	<b>32 010 €</b>	<b>6 000 €</b>	<b>4 050 €</b>	<b>18 720 €</b>	<b>1 650 €</b>	<b>1 080 €</b>	<b>0 €</b>

# Graphs and reports





## Managing expenses in a financial crisis

- Planning manpower
- Strategic planning
- Estimating cost of individual SMS activities
- Optimizing SMS procedures

# Demonstration

Microsoft Excel - CM\_DEMO\_V1.0\_DATA\_2003.xls

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Human Effort for Development and Implementation of SMS							
Procedure Action	Internal						External
	SAF	OPS	ENG	MAN	ANC	ADM	
	[total mairday]	[total mairday]	[total mairday]	[total mairday]	[total mairday]	[total mairday]	[total amount]
1-Design	41	0	0	0	0	0	
2-Coordination	12	20	20	0	0	0	
3-Approval	2	0	0	1.25	0	0	
4-Initiation	39	20	20	12	10	5	
<b>Grand Total Human Effort</b>	<b>94</b>	<b>40</b>	<b>40</b>	<b>13.25</b>	<b>10</b>	<b>5</b>	
R-Average Rate [per day]	220 €	200 €	150 €	280 €	110 €	90 €	
OH-Overhead [%]	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	
<i>Rate for estimations</i>	264.00 €	240.00 €	180.00 €	312.00 €	132.00 €	108.00 €	
<b>Total Human Effort Costs</b>	<b>24,816 €</b>	<b>9,600 €</b>	<b>7,200 €</b>	<b>4,134 €</b>	<b>1,320 €</b>	<b>540 €</b>	<b>1,800 €</b>

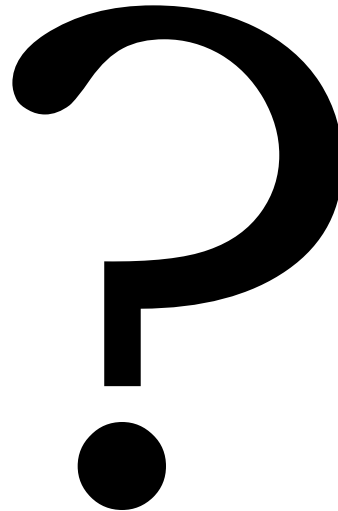
  

Human Effort for Maintenance and day-to-day Operation of SMS							
Procedure Action	Internal						External
	SAF	OPS	ENG	MAN	ANC	ADM	

Ready



## Q&A



# SMS COST Model Working Session Bucharest 2010 July

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