



# Cost of SMS

Cost model for the development, maintenance and day-to-day operation of a SMS

CND – Network Development Pillar

Tony Licu





# What is the challenge beyond the SMS technicality?

- Have you already been requested to financially justify safety initiatives and/or your activities?
- Do you think that the possibility to provide financial figures to your management or to the Board would help the deployment and operation of Safety Management?



## Scope & Rationale of the Cost of SMS project

To assess the feasibility of the definition of a cost-model for SMS activities.

### Scope

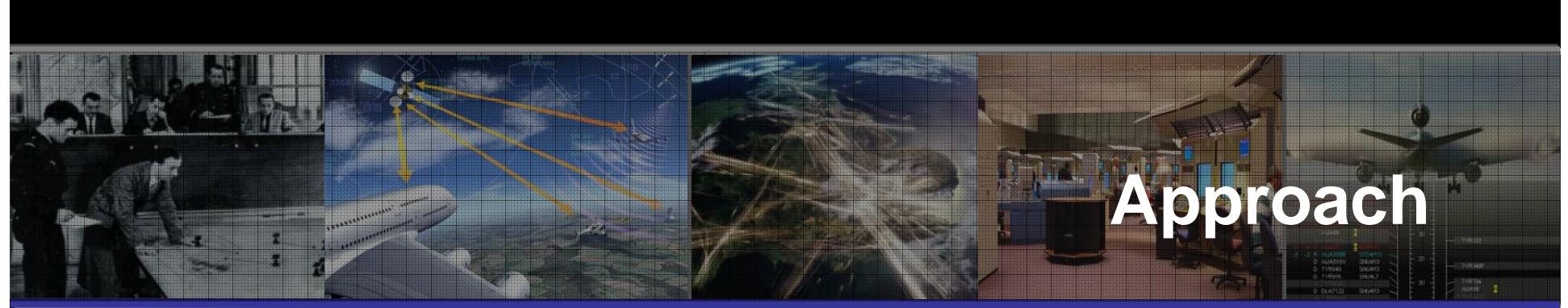
Development & Introduction

▪ Day-to-day Operations & Maintenance

### Rationale

... to make a “business case” for the initiatives

ANSPs/EUROCONTROL want to realize. In this context, every single recruitment and every investment needs to be substantiated by a “return of investment” analysis ....



# Approach

Cost model  
principles

Regulatory  
framework

**SMS  
COST  
MODEL**

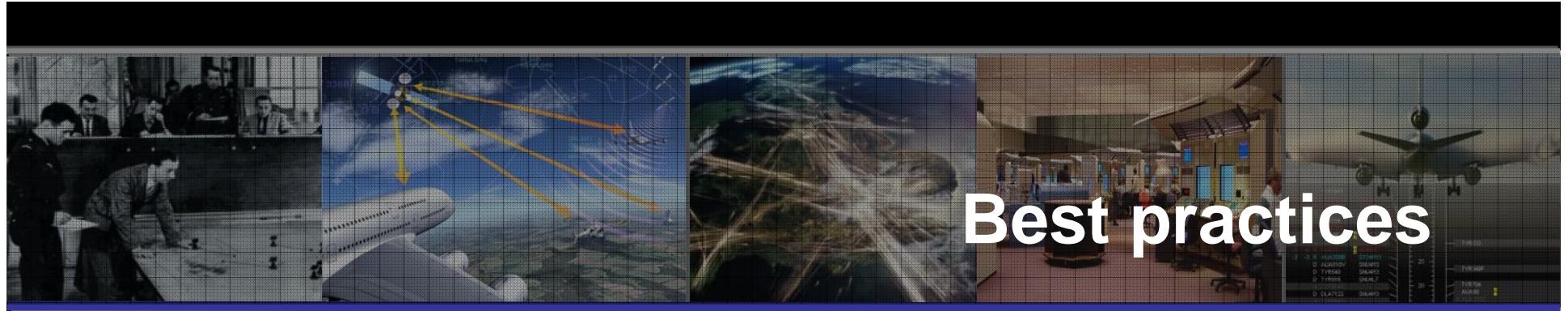
**EUROCONTROL  
& ICAO charging  
principles**

SMS model



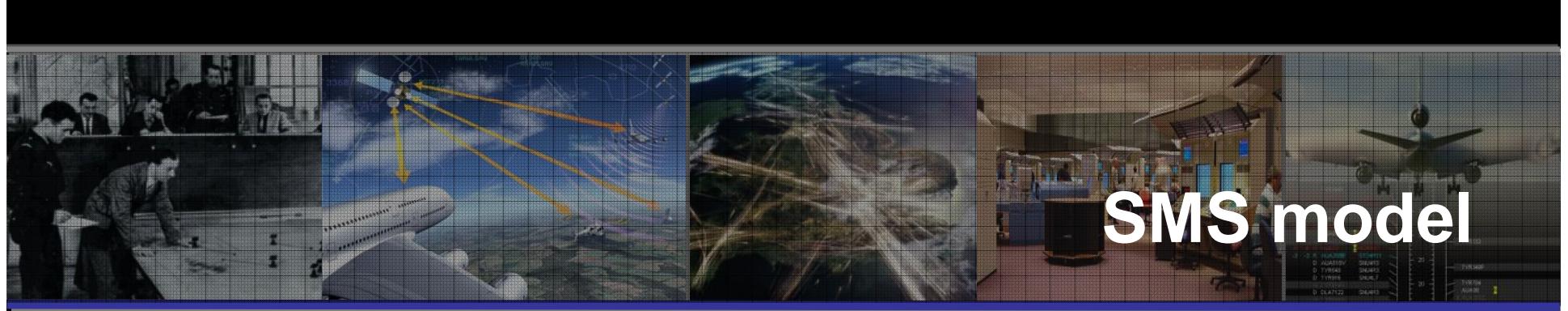
# Regulatory framework

- EUROCONTROL ESARRs
- Commission Regulation 2096/2005
- Directive 2006/23/EC on a Community air traffic controller licence
- Directive 2003/42/EC on occurrence reporting in civil aviation
- Directive 94/56/EC establishing the fundamental principles governing the investigation of civil aviation accidents and incidents
- Commission Regulation 1315/2007 on safety oversight in ATM
- Commission Regulation 482/2008 on software safety assurance in ATM



## Best practices

- EGSMM
- ESARRs' implementation guidance materials (SRC website)
- ICAO Doc 9859 – Safety Management Manual



## SMS model

- SMS scope
- Scope of SMS components
- Inventory of SMS cost elements



# Future alignment with the 2010+ ANSPs ATM Safety Framework Study Areas (in partnership with CANSO) & Mapping ICAO GASR





- SMS Development and Implementation Plan
- Organisation's Safety Policy
- Safety Targets and Safety Indicators



## SMS scope Safety achievement

- SMS Documentation
- Competency Assurance
- Safety of External Services
- Mandatory Reporting System
- Voluntary Reporting System
- Investigation of Safety Occurrences
- Management of Safety Related Changes
- Risk Assessment and Mitigation
- Software Safety Assurance System



## SMS scope Safety assurance

- Safety Surveys
- Safety Monitoring
- Safety Records



## SMS scope Safety promotions

- Safety improvement
- Lesson dissemination and safety awareness



## Scope of SMS components/procedures

- Definitions for cost of safety management and cost of safety
- Decomposition of the safety procedures in terms of:
  - Objective
  - Input (e.g. regulatory requirements)
  - Activities (tasks)
  - Type of resources used (e.g. OPS, ENG)
  - Infrastructure & equipment
  - Training needs, and
  - Output (of SMS procedure)



# SMS procedure demo

## Investigation of safety occurrences

[EGSMM, Part 1, Chapter 10]

### Objective

- The prevention of accidents or incidents by identification of risk areas and hazards, causal and contributory factors and appropriate remedial actions

### Input

- ICAO Annex 13 - Aircraft Accident and Incident Investigation
- EUROCONTROL ESARR 2 and related guidance material
- Directive 2003/42/EC on occurrence reporting in civil aviation
- Directive 94/56/EC establishing the fundamental principles governing the investigation of civil aviation accidents and incidents
- National safety regulatory requirements
- Best practices
- Organisation's Safety policy
- ANS related legislation and regulations
- Operations and system maintenance manuals
- Operational data records
- Occurrence reports from the mandatory reporting system
- Reports from the voluntary reporting system
- Other reports

### Training

- Trainee effort:
  - Safety experts - for procedures and guidance material development, and conduct of investigations (various modules)
  - Specialists (investigators) - for conduct of investigations (various modules, e.g. data/records collection and processing; occurrence analysis/assessment; HF related modules)
  - Safety experts/investigators - for safety database use
- Training provision effort:
  - External (e.g. IANS)
  - Internal (for example courses for investigators)





# Inventory of SMS cost elements Eligible costs in the ANSP cost base

- Staff costs
- Other operating costs
- Depreciation costs
- Cost of capital
- Exceptional (non-recurring costs)



# Inventory of SMS cost elements Eligible SMS costs

- Human effort costs
- Training costs
- Investment costs  
*(e.g. infrastructure & equipment)*
- Non-effort costs  
*(e.g. publications, leaflets, production cost of manuals, etc.)*



# EUROCONTROL & ICAO charging principles

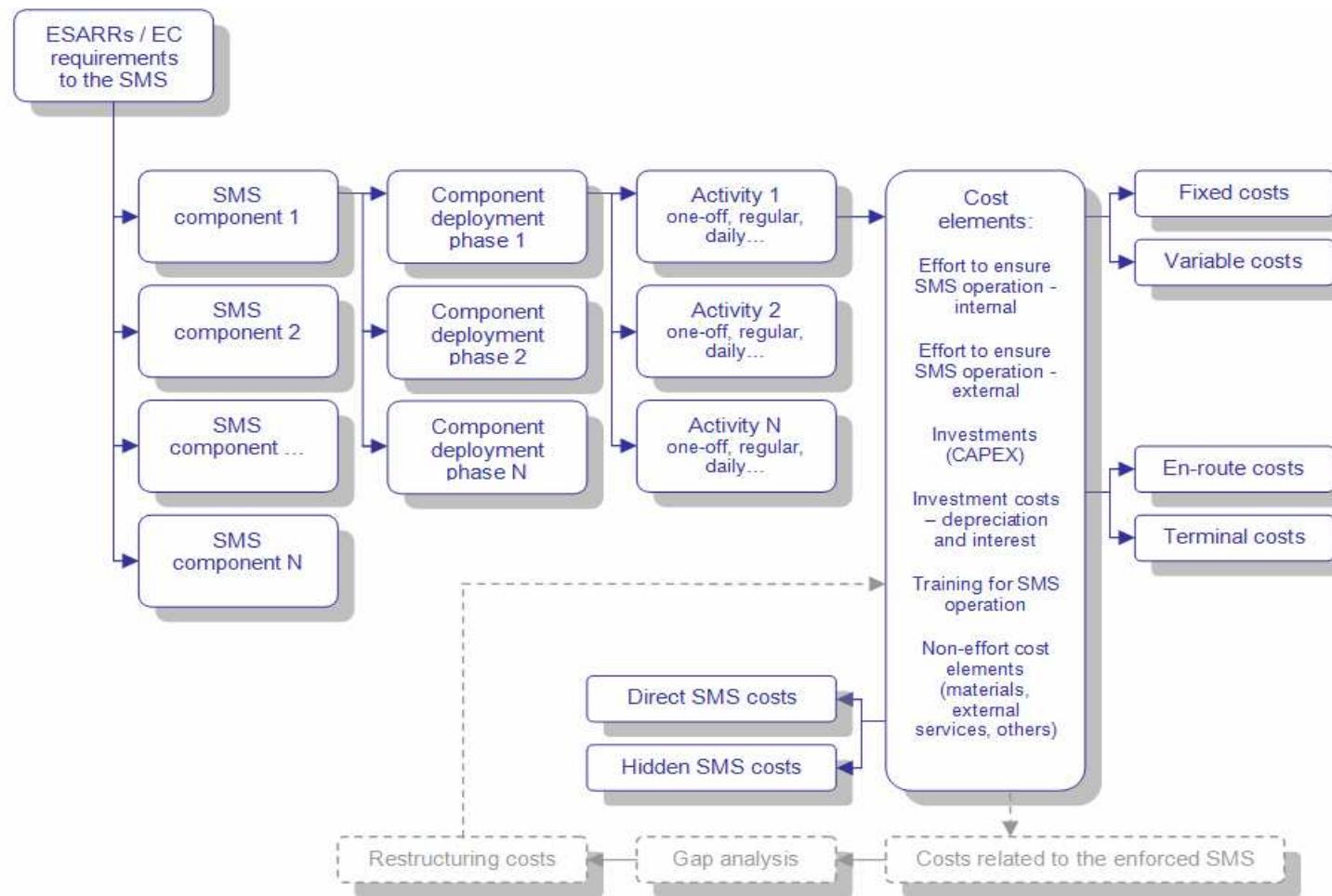
- ICAO Manual of Air Navigation Services Economics, Doc. 9082 and Doc. 9161
- EUROCONTROL Principles for Establishing the Cost-Base for En-route Charges and the Calculation of the Unit Rates
- EUROCONTROL Guidance on the Rules and Procedures of the En-route Charges System
- EC Regulation 550/2004 on the provision of air navigation services in the single European sky
- EC Regulation 1794/2006 on common charging scheme for air navigation services



- Standard cost model
- Activity based
- Quantitative methodology



# Outline model structure





- Human effort
- Training
- Infrastructure & equipment
- Non-effort elements



# SMS cost cards - demo

## 11 INVESTIGATION OF SAFETY OCCURRENCES

*Implementation Cost Card*

### Human Effort

	Internal						External
	SAF [mandays]	OPS [mandays]	ENG [mandays]	MAN [mandays]	ANC [mandays]	ADM [mandays]	[mandays]

#### Procedure Design

1	Review applicable regulatory requirements	<number>	N/A	N/A	N/A	N/A	<number>
2	Review guidance material and available best practices	<number>	N/A	N/A	N/A	N/A	<number>
3	Review existing in-house investigation arrangements and practices and perform gap analysis	<number>	N/A	N/A	N/A	N/A	<number>
4	Establish list of data to be recorded, recording and records management procedures	<number>	<?>	<?>	<?>	<?>	N/A <number>
5	Establish the occurrence investigation procedure, including severity classification and risk assessment schemes	<number>	<?>	<?>	<?>	<?>	N/A <number>
6							
7							



## Criteria for cost efficient SMS

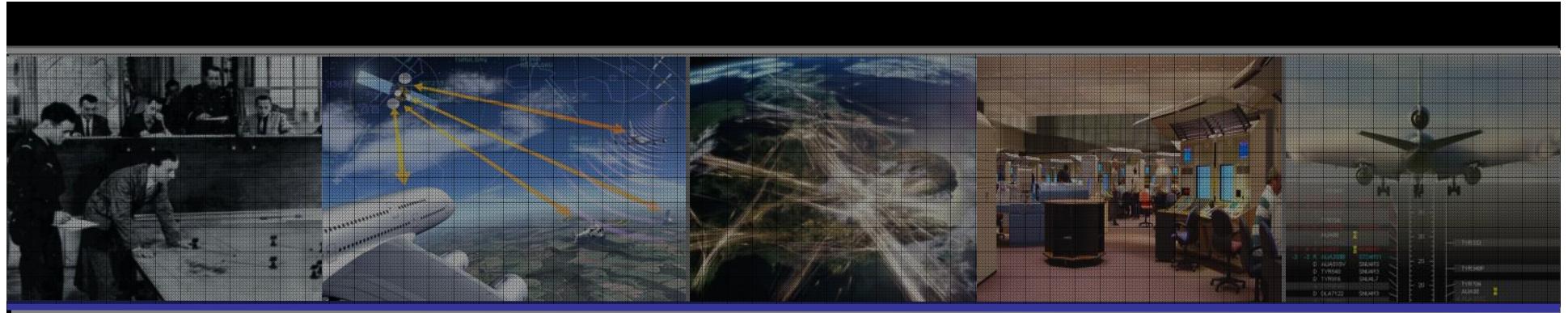
- National safety regulatory framework
- Organisational structure of ANSP
- Number of staff per competency category
- Human resources dedicated to safety
- Capital expenditure for safety-related equipment
- Training of safety skills



- Identify implementation and operation costs per SMS procedure or for whole SMS;
- What will be the cost of a new procedure;
- Different analyses of human effort distribution;
- Costs of different elements of SMS;
- Optimise costs.



- +/- 5 ANSPs as a minimum for a reliable validation;
  - We need to cover all SMS procedures
- Analysis of the results;
- An update of the model based on the analysis & documentation;
- Development of a user friendly tool to be used with the updated model;
- Training and awareness for usage;
- Link with Safety Maturity.



# Any Questions

