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Transition to CNS/ATM Systems in the CAR and SAM Regions

SECOND MEETING OF THE GREPECAS ATM/CNS SUBGROUP ATM COMMITTEE AIR TRAFFIC MANAGEMENT TASK FORCE – (ATFM/TF/2)

(Bogotá, Colombia, 6 to 8 July 2006)

Agenda Item 4: Cost-benefit analysis

MINIMUM REQUIREMENTS FOR THE PREPARATION OF A COST-BENEFIT ANALYSIS

(Presented by the Secretariat)

Summary

This working paper presents to the meeting the minimum requirements for the preparation of a cost-benefit analysis, so that, in attention to Task 1.13 for the implementation of an ATFM system in the CAR/SAM Regions, it may adopt the corresponding decisions.

1. Introduction

1.1 GREPECAS/12 approved the Terms of Reference and Work Programme of the ATFM Task Force (ATFM/TF), as well as the composition, as proposed by the GREPECAS ATM/CNS Subgroup ATM Committee. During the analysis of this matter, different aspects having direct relationship with the implementation and which could somehow modify the Terms of Reference and the Work Programme of the Task Force were evaluated.

1.2 GREPECAS/13, based on the experience obtained in the implementation of different ATM functions in these last years, approved the MODEL ACTION PLAN FOR ATFM IMPLEMENTATION IN THE CAR/SAM REGIONS, so that the ATFM implementation groups take it into consideration in the development of their activities. Among the tasks which such action plan contemplates is Task 1.13 - *Provide data to the Cost Benefit Analysis*.

2. Analysis

2.1 The cost-benefit analysis is used to calculate the economical viability of an investment project, for example, to obtain the point in which the total benefit of the investment exceeds its total cost. In this connection, for the services provider, most of the benefits of CNS/ATM systems are the reductions in the cost of efficient flight operations and the obtaining of reduced flight times.

2.2 The development of the Business Case of a service provider or operator implies the financial cost-benefit analysis and other aspects. In particular, resulting changes in profitability must be taken into account. The evaluation of the net financial impact, in terms of updated value, should include not only the cost of the implementation and operation, but also positive changes produced as regards profitability, environment and/or social benefits.

2.3 In order to identify the different scenarios and detect specific variables contemplated in a cost-benefit analysis, it is advisable to have as accurate as possible details of the expenses which require investment, personnel expenses, and the identification of airspace sectors, current capacity of air navigation infrastructure and aerodromes selected and identify requirements and ATFM coverage.

2.4 As per the above, air navigation services providers (ANSPs) and users should collect all the pertinent information in order to prepare its own cost-benefit analysis and have this information available, at the time it is required, to attend Task 1.13 of the Action Plan, which the corresponding ATFM implementation groups should execute.

2.5 **Appendix A** to this working paper includes some of the minimum requirements which ANSP and users, should keep in mind, also, some minimum requirements for airports selected to apply ATFM are included.

3. Suggested action

3.1 The meeting is invited to examine this working paper and if deemed pertinent, encourage ANSPS to collect the information required in order to carry out the corresponding cost-benefit analysis, taking into account guidance material shown in Appendix A.

APPENDIX A

MINIMUM REQUIREMENTS FOR THE PREPARATION OF A COST-BENEFIT ANALYSIS

What is a cost-benefit analysis?

1.1 The cost-benefit analysis is the process to place numbers in a reference currency in the different costs and benefits of an activity. When using it, we may calculate the financial impact of what we wish to achieve.

1.2 It should be used when comparing costs and benefits of the different decisions. A cost-benefit analysis itself may not be a clear guide to make a good decision. There are other items to be taken into account; for example, the workload of ATCOs, safety oversight, legal obligations, environment protection, saving produced in users operations, etc.

1.3 Cost-benefit analysis involves 6 basic steps:

a) Carry out a brainstorm or gather data from important factors related with each one of the decisions.

b) Determine costs related with each factor. Some costs, as labour shall be accurate while others will be estimated.

c) Add total costs for each proposed decision.

d) Determine benefits in a reference currency for each deicsion.

e) Place the amounts of costs and total benefits in a relationship whre benefits are the numerator and costs are de denomintor:

$$\frac{\text{BENEFITS}}{\text{COSTS}}$$

f) Compare the relationship for the different proposed decisions. The best solution, in financial terms, is that with the highest relationships benefits to costs.

INFORMATION REQUIRED FOR THE EVALUATION OF AN ATFM IMPLEMENTATION PROJECT

Following is an example of some criteria and elements that ANSPs and users would require to contribute with the information that shall be required in attention to Task 1.13 – Provide information for the cost-benefit analysis" of the Action Plan for ATFM implementation in the CAR/SAM Regions.

I. By the service providers

1. Situation with and without project (Impact)

a) Current situation.
b) Situation if ATFM were implemented.

2. Techcnical-operational aspects

a) Quantification of the demand in time. Historical data and forecasts.
b) Ejectution phases of the project and time required for each phase (study, coordination, quaotation of equipment, obtaining of resources, acquisition, arrangements in hiring of personnel, training, acquisition/offices renting, installation, operation, trials.
c) Time required for the system operation.
d) Requirements of the system in the short/mid and long terms.

3. Investment

a) Value of acquisition of equiopment, with breakdown of each one of the system components.
b) Useful life of each component
c) Value of intangible assets of the project (software, data entry information to feed the ssytem), feasibility studies, technical-operational training, trials.
d) Physical valued infrastructure (if available)
e) Other investments: computers, printers, photocopying machine, office furniture, fax, etc.

4. Annual expenses

a) Professional, technical and administrative and security personnel required.

   i) Provision required per specialization in function of the operation hours of the system (H-24, H-12), uon requirement or other, such as administrative schedules.

b) Operations expenses

i) acquisition of services, communications service, security, cleaning, etc.
ii) renting of offices and other facilities.
iii) Maintenance
iv) General servcies (in case the current provision is not sufficient):

- water
- energy supply
- cleaning
- telephone/fax

c) Supplies:

- desk supplies
- paper, etc.

II. <u>By the users</u>

1. Situation with and without project (impact)

a) Current situation
b) Situation if ATFM were implemented

2. Technical operational aspects

a) Assessing of the demand in time. Historical data and forecasts.

3. Investment

a) Costs

i) Avionics equipment
ii) Supplies
iii) Planning
iv) Maintenance
v) Training
vi) Services acquisition

b) Benefits foreseen with ATFM

i) economy during flight hours
ii) expenses avoided
iii) others.

MINIMUM REQUIREMENTS FOR THE PREPARATION OF A COST-BENEFIT ANALYSIS

Following is an example of some of the criteria and elements that selected airports could require from selected airports to contribute with the information that shall be required in attention to *Task 1.13– Provide information for the cost-benefit analysis" of the Action Plan for ATFM implementation in the CAR/SAM Regions,* which the ATFM implementation groups shall execute.

Criterion	Elements
Non-regular traffic shape	Traffic arriving and departing
	Large amount of non-scheduled traffic (e.g. General Aviation)
Non-homogenous traffic mix	Integrated operations among heavy, medium and light aircraft
	Mixture of fast and slow aircraft
	Mixture of commercial and other traffic (e.g. training or General Aviation)
	Mixture of civil and military traffic
Delay situation unsatisfactory	Delays are higher than agreed with airlines as acceptable
	Delays are too high to achieve desired minimum connecting times
	Total delays per day and per month due to traffic congestion
Complex layout	Intersecting runways
	Converging runways
	Runways parallel but cannot be used independently of each other
	Aircraft need to cross active runway when taxiing
	Design permitting possible incursions in runway/taxiway.
	Complex deicing situation at airport (if applicable)
Airspace factors	Airspace surrounding airport limited, fragmented or used by neighbouring airports
	SIDs and STARs over centres of population
Scope for efficiency improvement	Results achieved not sufficient relative to human resources employed
	Results achieved not sufficient relative to financial resources employed
Latent arrival capacity	Arrival demand is unsatisfied. Declared to attend arrivals capacity is sustained capacity less than existing daily normal capacity.
Latent departure capacity	Departure demand is unsatisfied. Declared departure capacity to attend departures is less than existing daily normal capacity.

High traffic volume	Every co-ordinated airport could be expected to have high traffic volume at least during peak periods of the day
	Estimate of traffic volume during peak hours of the day
Frequent low visibility conditions	Estimate number of days with low visibility
Still to implement some technical improvements	Landing aids are not up to date
	Surveillance facilities are not up to date
	RNAV departures and arrivals have not been implemented
	Other facilities such as lighting, signs, etc. are not up to date and complete
Scope for improving work environment	ATCO working position does not have an optimised intelligent / ergonomic point of view, data presentation
	Tower to ground control and arrival/departure sector visibility has not been optimised (also from an ergonomic point of view)
	Social/contractual environment can be improved
Scope for optimising procedures	A strategic removal of conflicts between arrival and departure routes or sectors has not been implemented
	Reduced runway separation has not been implemented
	No adequate procedures to accelerate operations are used of aircraft in runway, keeping safety
	Conditional clearances have not been implemented
	Landing clearance is not based on adequate procedures to accelerate operations
	Non optimised runway occupancy time
	Visual turns are not carried out
Critical environmental sustainability issues	Airport in close proximity to residential areas
	Environmental regulations or constraints apply
	Major airport development envisaged