INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP
THIRTEENTH MEETING (APIRG/13)
(Sal, Cape Verde, 25-29 June 2001)

Agenda Item 8: CNS/ATM Cost/Benefits

TRAFFIC FORECASTING ACTIVITY AND BUSINESS CASE DEVELOPMENT FOR AIR NAVIGATION SYSTEMS PLANNING IN THE AFI REGION

(Presented by the Secretariat)

SUMMARY

This working paper provides a brief summary of the activities of the AFI Traffic Forecasting Group and presents an outline of the development of business cases for air navigation systems planning including CNS/ATM systems.

1. TRAFFIC FORECASTING ACTIVITY

1.1 Historical Background

1.1.1 The Africa Indian Ocean Traffic Forecasting Group (AFI-TFG) had its inaugural meeting in Nairobi from 3 to 6 November 1998 during which the following terms of reference were adopted:

- Identify the data requirements and sources for the development of medium term (5 years' horizon) and long-term (5 to 10 years) forecasts of air traffic to, from and within the AFI Region;
- Develop medium and long-term passenger, freight and total aircraft movement forecasts for the AFI region, to support the air navigation systems planning including CNS/ATM implementation taking into consideration that:
  - The forecasts should be developed using a methodology which links passenger and freight demand with aircraft movement forecasts directly and in a consistent manner;
  - The forecasts should also cover traffic flows taking into account the area routings in Doc 003 as well as other planning requirements of the region.
- Analyze the Data from selected flight information regions (FIRs) to establish peak period parameters required for planning purposes.
- Assist in the development of cost-benefit analysis for the implementation of CNS/ATM

Systems components, as required.

1.1.2 The inaugural meeting discussed the Air Navigation Systems Planning requirements in general and specifically for the AFI Region as well as the relationship between various sub-groups of APIRG and Traffic Forecasting activities. Various factors affecting traffic demand in general and those particularly relevant to the AFI Region were debated. Forecasting methodologies and data requirements and sources were explored. The grouping of States was reviewed for forecasting purposes taking into account the Area Routings as identified in AFI CNS/ATM Implementation Plan (AFI Doc003).

1.2 Overview of the Results of the Second Meeting

1.2.1 The Group held its second meeting in Nairobi during the period from 12 to 16 March 2001. This meeting was, however, not attended by all the Group members.

1.2.2 The meeting was presented with a brief summary of the work being carried out in the region in the field of CNS planning and implementation particularly the activities of the CNS/ATM sub-group including extracts of the air traffic movement forecasts for the African Continent covering the period 1999-2012. These forecasts are an update of a previous study conducted in 1997 by IATA, requested by the AFI GNSS Study Group and financed by the European Union. The CNS/ATM sub-group meeting had agreed that the data constituted a basis for future forecast in the area and recommended that the AFI-TFG keep up to date the traffic forecast for AR10 route group and refine those developed for AR4 route group.

1.2.3 The Group agreed to take the above recommendation into account in its future work. It was also brought to the attention of the Group, the initiative taken by ASECNA and IATA for the preparation of a business case analysis for AR4. Close coordination would be required among the sub-groups concerned and the AFI-TFG in order to ensure that the methodologies used are consistent with ICAO guidelines.

1.2.4 With regard to ATM, the meeting was requested to review the FIR data that has been collected from selected FIRs and the methodology used for further refinements. The meeting concluded that the FIR data provides useful information for the update of the air navigation plans; however, additional data would be required for peak-period analysis. Consequently, the meeting agreed to:

i) Request FIR data by month for each of the selected FIRs to examine the seasonality patterns with a view of selecting the most suitable peak period for analytical purposes;
ii) Refine the Format for data input by processing an example using already existing data from Dakar FIR with assistance from ASECNA and the Secretariat.

1.2.5 The Group agreed that data from the following FIRs should be utilized for the analysis of peak-period parameters: Algiers, Cairo, Dakar, Nairobi, N'Djamena, Johannesburg. The following alternate FIRs were also selected: Brazaville, Lagos. This work would be conducted in a progressive manner.

2. BUSINESS CASE DEVELOPMENT FOR THE IMPLEMENTATION OF CNS/ATM SYSTEMS

2.1 Background

2.1.1 Pursuant to Recommendations 3/9 and 3/16 of the World-wide CNS/ATM Systems Implementation Conference held in Rio de Janeiro in 1998, and subsequent endorsement by the 32nd Session of the Assembly (Resolution A32-12), requesting the Council to complete the follow-up work envisaged by the conference, this paper provides an outline of the work being carried out by the Secretariat to prepare guidelines for the development of business cases.

2.2 Definition and Content of a Business Case

2.2.1 The development of a business case for the implementation of CNS/ATM systems by a service provider or a user involves taking financial cost/benefit analysis a step further.

2.2.2 A business case is a written statement setting forth the objectives, the operational and financial requirements, the ownership and management structure, and the strategy to be adopted in order to achieve the objectives. It includes information and analysis on products and services, markets, employees, technologies, facilities, equipment, capital, revenues, profitability, financing, risks, contingency plans, etc. The main part of the business case is its financial plan.

2.2.3 The business case serves as a tool to convince the lending institutions of the financial feasibility and economic viability of the implementation. Funds for the required investment may come in various forms such as accumulated profits, government contribution, commercial debt financing (including loans and leasing), bond issues and equity financing.

2.3 Major Partners, their Objectives, Needs and Concerns

2.3.1 There are four major partners at the global level: ICAO, service providers, air carriers and the financial institutions. The objectives are common but the needs and concerns of each of the partners involved would be different.

2.3.2 The needs and concerns of ICAO, States and other service providers are widely known. The main concern for air carriers is to meet their preferred flight profiles and to reduce operational costs by reducing flight time and eliminating delays. The reduction of operational costs may result in lower yields that could stimulate traffic growth. However, some of these cost savings could be offset by possible increases in user charges. In addition, the technology selection process involves careful scrutiny of many different variables and reaching a consensus about a particular technology will not be easy.

2.3.3 Financial institutions seek to minimize their risks. They focus on the stability of the enterprise and the availability of positive cash flows. They require risk assessment, contingency plans, collaterals and guarantees. In some cases, it may be necessary for the State to guarantee the loan.

2.4 The Need for a Business Case

2.4.1 The implementation of the CNS/ATM systems has been slow. The delay is partly attributed to the lack of financial resources and to the hesitation of individual States, as investment in new technologies such as CNS/ATM systems has been considered risky by some air navigation service providers. A thorough

and comprehensive analysis is therefore required.

2.4.2 The need for credible business cases to guide CNS/ATM is extremely important to bring business and financial organizations into consensus on CNS/ATM. In the absence of any economic analysis presented as a business case, the partners are reluctant to make the investment decision about the new systems. The business case will serve to justify the specific CNS/ATM systems requirements of the service provider and the service users for the benefit of decision makers of States, airlines and lending institutions. Business cases might be performed jointly or separately for the service provider and the airlines. However, an integrated business case which takes into account both the provider and the user perspectives would be the most desirable.

2.4.3 For a service provider and State, the basic issue is usually to be satisfied that the changes in revenues expected from the planned changes to en-route charges will match the net change in costs. Even in the cases where air navigation services are not provided on a commercial basis, it is recommended that a business case evaluation be conducted to assess the financial impact on the service provider of the new systems.

2.5 Prerequisites to the CNS/ATM Systems Business Case Analysis

2.5.1 The following are all important prerequisites for a business case analysis:

a) the need for the new technology must be emphasized in order to meet the operational requirements;
b) consultation and coordination have to take place between service providers with adjacent areas of responsibility;
c) a consensus among the partners regarding the need and requirements for new technology should be stressed;
d) the availability of the new technology's facilities and equipment has to be proven;
e) the boundaries of the business case have to be defined and its institutional and legal formats selected (State/service provider, group of States, sub-region, region, etc.);
f) the expected costs of equipment and operations should be established with an acceptable margin of uncertainty;
g) recognition and awareness of international cost recovery policy for air navigation services (currently in the form of ICAO's Policies on Charges for Airports and Air Navigation Services, adopted by the Council in December 2000 and shortly to be published as Doc 9082/6);
h) the establishment and existence of an effective cost and revenue accounting system;
i) a sound methodology for determining the cost basis for the charges; and
j) an effective mechanism for the collection of the charges.

2.6 Work in Progress and Framework

2.6.1 The development of a business case has to focus on a homogeneous air traffic management area. It needs to take into account current and forecast traffic flows and densities, the operational requirements and the alternative facilities/equipment configurations suitable that meet those operational requirements. Such analysis could be carried out at State, sub-regional or regional levels.

2.6.2 Given the existence of multiple alternative implementation options, a scrutinizing procedure allowing for their identification, definition, evaluation and ranking has to be put in place. The definition provides the facilities/equipment configuration. The evaluation and ranking are performed both on operational and financial basis. For every option, the operational merits are identified and the costs and benefits estimated. The ranking process aims at retaining a single option for which a comprehensive financial analysis will make up the remainder of the business case analysis.

2.6.3 The following points have to be borne in mind in the development of business plans:

a) all States, airspace users, ATC service providers, and ATM equipment suppliers do not have the same motivations and benefits;
b) transition to the new system will be a gradual process and occur at different rates across each airspace and region concerned;
c) new technologies will complement rather than replace existing technologies; and
d) multi-national cooperation among provider States and users will be essential to minimize investment costs, compatibility and avoid duplication of effort.

2.6.4 In order to coordinate and prepare the CNS/ATM business case development, a multidisciplinary project team has been established within the Secretariat. The team has met several times during the last few months to discuss the overall concept, outline and methodologies. These methodologies will be complemented using illustrative examples.

2.6.5 Ultimately, this work will be published in an ICAO circular as guidance material for States to conduct their own studies to justify the investment requirements individually or collectively by sub-regions or regions. The guidance material would include a CD-ROM containing the software for analytical purposes.

2.7 Data Requirements

2.7.1 The following data are essential for the development of a business case:

a) traffic densities and traffic flows (by aircraft category);
b) traffic forecasts;
c) inventory of current air navigation equipment (communication, navigation, surveillance, decision support systems);
d) cost of current air navigation equipment (procurement, installation, maintenance, calibration, etc.);
e) cost of new air navigation equipment (CNS/ATM systems), real or estimated (procurement, installation, maintenance, calibration, etc.);
f) personnel requirements for current system (administration, operation, maintenance);
g) personnel requirements for new CNS/ATM systems operation;
h) cost of relocation or attrition of personnel and training;
i) cost of current infrastructure;
j) cost of infrastructure requirement for new CNS/ATM systems;
k) cost of vacating or re-organizing infrastructure;
l) cost of operations of service provider;
m) current level of user charges;

n) expected rate of avionics equipment installation onboard aircraft using the airspace;
o) cost of avionics equipment;
p) air carrier operating costs (by aircraft category using the airspace); and
q) transition period and evolution.

2.8 Main Impediments

2.8.1 The main impediments to a credible and reliable business case are:

a) lack of coordination and cooperation between partners;
b) lack of coordination and consultation between service providers with adjacent areas of responsibility;
c) non-homogeneity of areas selected and redundancy of facilities and equipment;
d) ambiguous institutional or legal format;
e) lack of guarantees or collaterals;
f) lack of an effective cost and revenue accounting system; and
g) unavailability or inaccuracy of data required.

2.9 Cost Benefit Analysis and Business Case Development for the AFI Region

2.9.1 The importance of the development of business cases to justify funding for the implementation of CNS/ATM systems in the AFI region is well recognized. However, only a few studies have been conducted for specific service providers within the region.

2.9.2 The guidance material currently being prepared by the Secretariat, including the work carried out by the AFI-TFG would allow for the further development of business cases for specific groupings within the AFI region.

2.9.3 In order to make efficient use of the resources made available by other organizations for the conduct of forecasts and economic analysis, close coordination among the various sub-groups of APIRG concerned and the AFI-TFG is required.

2.10 Action by the Meeting

2.10.1 APIRG is invited to note the content of this Working Paper.

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