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WORKING PAPER

FIFTH MEETING OF THE ALLPIRG/ADVISORY GROUP

(Montreal, 23 – 24 March 2006)

Agenda Item 2.6: Business case for the implementation of CNS/ATM Systems

BUSINESS CASE MODEL FOR THE IMPLEMENTATION OF CNS/ATM SYSTEMS

(Presented by the Secretariat)

SUMMARY

This paper provides a brief description of a business case model for the implementation of the CNS/ATM Systems developed by ICAO. The Database and Financial Analysis Computer System (DFACS) is intended for use by States, air navigation service providers and airspace users in the evaluation of alternative CNS/ATM implementation scenarios to determine cost-effective implementation options.

Proposed action by ALLPIRG/5 is in paragraph 6.

1. INTRODUCTION

1.1 Planning for the implementation of CNS/ATM Systems has been a complex process. Decisions on what conventional technology equipment to keep operating, what new technology to implement, and the timing of such implementation have significant economic implications on both the air navigation service providers and the airspace users.

1.2 Since the primary influences on investment decisions are financial in nature, it is critical to develop a sound business case. To evaluate these implications, a disciplined process for the development of business cases should be made available to all partners, which can be adapted to a particular homogeneous air traffic management (ATM) area or a specific traffic flow. Once the business case is completed and agreed upon by the partners concerned, an integrated development plan can be established.

1.3 Generic spreadsheet based software is available, but such tools may not be suitable for the analysis of various alternative implementation options. Financial analysis of the business case must demonstrate the rationale used for generating revenue and expense streams to determine the expected cash flow.

1.4 In order to achieve these objectives and to facilitate the economic aspects of the planning process, ICAO has developed the CNS/ATM Database and Financial Analysis Computer System (DFACS) model. DFACS is an interactive analytical tool that enables air navigation services providers (ANSPs) and airspace users to build, evaluate and compare the economics of alternative options or scenarios for the implementation of CNS/ATM Systems. A CD-ROM accompanied by a user's manual providing a systematic guide to using the software along with an illustrative example will be made available to States and Regional Offices.

2. MAIN COMPONENTS AND CHARACTERISTICS OF THE MODEL

2.1 This interactive model has three main components: database, scenarios, and reports. The database component helps the software users manage the reference data required for the creation and evaluation of CNS/ATM implementation scenarios. The reference data is classified into three segments each of which correspond to a particular menu item: geographical data, air navigation service providers data, and airspace users data.

2.2 **The geographical data** segment organizes data on the physical locations of air navigation equipment into a location, a State, and a region. For example, all locations published in ICAO *Location Indicators* (Doc 7910) can be loaded into the database with their corresponding States. The users can define the region by selecting the appropriate States as required. Based on the requirement, this provides the necessary tools to manage the geographical data.

2.3 **The air navigation service providers** segment allows users to manage equipment categories and/or functions (such as communication, navigation and surveillance), the list of conventional and new technology equipment types and associated costs (purchase, installation, average annual maintenance and inspection, communication, etc.) and the list of the conventional technology equipment currently in operation by physical location. The categories of additional costs (not equipment-related), such as labour and material, are also defined through this option.

2.4 **The airspace users** segment helps users to manage the various aircraft types in operation with their average operating costs as well as the avionics types and their related costs.

2.5 Once the database component for each of the three segments has been completed, various CNS/ATM systems implementation scenarios can be built, analysed and compared using the scenarios component of the model. The scenario creation involves the definition and selection of a homogeneous air traffic management (ATM) area (region, State, or a combination of States and regions), the selection of conventional technology equipment to be covered by the scenario, the decisions concerning withdrawal of conventional equipment, and the decisions concerning the installation of new technology equipment from the perspective of the service providers. With respect to airspace users, the scenario includes air traffic and fleet forecasts by aircraft type, decisions concerning introduction and timing of avionics equipage, and estimates of the average rate of reduction in flight time resulting from the use of new technology. Other related costs (not equipment related) for the ANSPs such as controller and technician costs and overhead, as well as the similar costs for the airspace users, are also included in the scenario.

2.6 The scenario analysis option provides a series of output results in aggregate terms and in the form of tables and graphs explaining the financial implications of the selections and decisions made in the scenario. These results can be saved as a report into an MS Excel file, as needed. The software has the capability of providing tables illustrating the annual costs by component or grouped by equipment, by location, by State and/or by cost type. Similarly, graphical displays of the expenditures and revenues streams illustrating the cost recovery (if any) for both the ANSPs and the airspace users are also available.

2.7 A sound business case would involve the development of a set of scenarios based upon reasonable assumptions related to the specific CNS/ATM project at hand. These scenarios would then been analysed and compared using the business case model.

3. STRENGTHS OF THE MODEL

3.1 The model allows its users flexibility in the scenario-building process through the definition of a set of parameters. These include the following: the analysis horizon, the dates on which each component of the new systems becomes operational, the extent of the transition period, the average equipment lifecycle, the period of cost recovery, etc.

3.2 Through the scenario option, the users could determine the manner in which conventional technology equipment may be withdrawn as well as the introduction of new technology equipment. The users can also create scenarios with a full new technology configuration and any other combination thereof.

3.3 The model provides the users with the traditional profitability measures. It will allow them to examine the time profile of the expenditures resulting from a given implementation scenario and compare it to the time profile of the revenues in order to determine if and when additional financing would be needed. The model is developed with the premise that ANSPs would recover their costs through the collection of user charges. The comparison of the cumulative revenues and costs streams would enable the users to determine the breakeven point at which cumulative revenues equal cumulative costs.

3.4 The average annual amount of user charges to be collected by the ANSPs during the cost-recovery period is among the output results of the model. In general, revenues from user charges are directly related to traffic levels but the average value provides a basis for both the ANSPs and airspace users to set user charges.

3.5 The output for each scenario could also provide the annual costs by State, by location and by equipment. These costs can also be grouped by cost-type such as purchase, installation, maintenance**,** operation, communication, etc.

3.6 Since the implementation of the CNS/ATM System may lead to changes in the way air navigation services are provided, the model offers the capability of performing sensitivity analysis to determine the options, with a view to minimizing financial risks.

3.7 The model provides the option of adding data to its database from other sources and of manipulating them as required. It is also extendable, allowing integration with other models such as a traffic forecasting module developed independently. The model’s software and database are separate in the sense that, once the software is installed, the database file can be copied separately.

3.8 The model addresses the concerns of both the ANSPs and the airspace users and provides similar output results for both partners.

4. LIMITATIONS OF THE MODEL

4.1 Generic costs are used for all air navigation services equipment. While the capability of assigning specific costs to particular locations or equipment does not currently exist, changes to these generic costs can be made by users, taking into account factors involved in the equipment and/or the location.

4.2 Currently, a separate module does not exist to estimate the flight efficiency benefits achieved by airspace users. This is an input to the model rather than a built-in analysis. These rates have to be estimated by the users for each of the scenarios concerned. The module allows for such an enhancement to be included in the future.

4.3 In the case of a multinational facility/service, the model has the capability of including the segments attributed to each State separately but would not include the shared segments in the scenarios, although such an extension is possible.

5. REGIONAL IMPLEMENTATION

Support for the States/Regional Offices

5.1 For cost-effective implementation of CNS/ATM Systems and to attract investment, a sound business case is required. In order to strengthen the ability of the Regional Offices to support the application of the business case model by States, a workshop is proposed to be organized by ICAO at the Regional Offices, subject to the availability of resources. The purpose of the workshop is to provide training to States and Regional Offices to assist with the development of business cases and to ensure a common understanding of the processes and mechanisms. Accordingly, ALLPIRG is invited to consider adopting the following conclusion:

Draft Conclusion 5/X– Workshop on the business case model for CNS/ATM Systems

That, in support of the development of business cases for the implementation of CNS/ATM systems, ICAO convene a training workshop for States at the Regional Offices through an appropriate mechanism, such as Special Implementation Projects (SIPs).

Implementation by PIRGs

5.2 The approach to the application of the business case model builds on the progress already achieved by PIRGs/States in the previous cycle of cost/benefit analysis for CNS/ATM Systems implementation. In light of this, ALLPIRG might wish to proceed with the development of business cases through the following conclusion:

Draft Conclusion 5/X – Application of the business case model for CNS/ATM Systems implementation

That PIRGs, States and airspace users:

a) note that business cases for the implementation of CNS/ATM Systems leading to a global ATM system is a key element in the development of regional and national plans; and

b) develop business cases, taking into account the initiatives across regions in the formulation of national and regional plans that facilitate achieving a global ATM system.

6. ACTION BY ALLPIRG

6.1 The ALLPIRG/5 Meeting is invited to:

a) note the progress achieved in developing a business case model for the implementation of CNS/ATM systems; and

b) adopt the conclusions cited in paragraph 5 above.

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