



Organización de Aviación Civil Internacional
Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS)
**Primera Reunión del Grupo de Tarea sobre Aspectos Institucionales del
GREPECAS**
Río de Janeiro, Brasil, 12 al 14 de mayo de 2004

Cuestión 3

del orden del día: Aspectos económicos de la transición e implantación de los sistemas CNS/ATM en las Regiones CAR/SAM – Herramientas de Planificación y Evaluación (PET)

(Nota presentada por la Secretaría)

1. Propósito

1.1 Esta Nota Informativa presenta, para referencia de la Reunión, el Capítulo 16 – Aspectos Institucionales contenido en el documento “Material de orientación para la evolución hacia el ATM Global de la OACI en las Regiones CAR/SAM”, desarrollado por el Proyecto Regional de Cooperación técnica RLA/98/003. El presente material, que se adjunta como **Apéndice A**, sólo se encuentra disponible en Inglés.

Chapter 16

Institutional Aspects

16.1 Introduction

16.1.1 The ICAO CNS/ATM systems received the support of the Tenth Air Navigation Conference held in 1991 at the ICAO Headquarters in Montreal, Canada. During the same year, the South American/Caribbean Regional Planning and Implementation Group (GREPECAS) started working on the regional application of this new concept of air navigation services.

16.1.2 In keeping with the guidelines established by the ICAO Council concerning the facilitation of inter-regional harmonization, the regional plans for the implementation of the CNS/ATM Systems in the Regions had to be developed following the general outlines provided through the Global Air Navigation Plan for CNS/ATM Systems. GREPECAS, after carefully analyzing the guidelines, adopted them incorporating characteristics peculiar to the CAR/SAM regions and took as its basis the definitions of Homogeneous Areas and Main Traffic Flows. Homogeneous areas are understood as those portions of airspaces having similar ATM requirements and degrees of complexity. On the other hand, main international traffic flows consist of airspaces where there is significant traffic using the same routing area or proximate traffic trajectories.

16.1.3 This chapter shall analyze institutional aspects for the implementation of the CNS/ATM systems in the CAR/SAM Regions. Initially, the different kinds of managerial structures of the air navigation services are described stressing, as necessary, their specific aspects. Subsequently, a summarized discussion of the “General Guide on the establishment and provision of facilities/services in the CAR/SAM Regions” is presented. Finally, the possibilities for the establishment and provision of multinational facilities/services in the CAR/SAM Regions are explored.

16.2 General Principles

16.2.1 The following are the general principles established in the CAR/SAM Regional Plan for implementation of the CNS/ATM systems:

- a) All States in the CAR/SAM Regions should be guaranteed without restriction the possibility of access to the provision of the air navigation services covered in the plans,
- b) There is an acknowledged need for the States in the CAR/SAM Regions to complete their national plans, as well as the provisions that govern the use of the new systems.
- c) The States must accept the global nature of the new CNS/ATM systems and the determined intention of facilitating the integration mechanism for their timely implementation.

- d) The communications, navigation and surveillance services must be carefully planned in keeping with the requirements identified for an appropriate level of air traffic management in the CAR/SAM Regions.
- e) The new CNS elements must be introduced progressively, bearing in mind the benefits they will yield for ATM and the savings for both the users and providers of the systems.

16.3 Regional Implementation Strategy

16.3.1 The Regional Implementation Strategy defined by GREPECAS is expressed as ATM improvements and resulting needs for supporting services (communications, navigation and surveillance) on the main international traffic flows identified in homogeneous areas. Nine homogeneous areas and 18 main flows have been taken as the basis for planning in the CAR/SAM Regions. The most significant air traffic flows in the CAR/SAM Regions involve both regions and many of them extend to adjacent regions such as the AFI, EUR, NAM, NAT and PAC Regions.

16.3.2 The organizational aspects related to the implementation of the CNS/ATM Systems are of special importance. Advanced communications, navigation and surveillance technology offers the possibility of expanding the capacities of individual air traffic facilities. As a result, it will be possible, and technically and economically viable, to provide services over large geographical areas and, consequently, reduce the quantity of air traffic facilities and services required.

16.3.3 Taking into account the above, future CNS/ATM scenarios contemplate greatly expanded service areas and as such will require institutional arrangements different from those developed in the course of years for the present decentralized air navigation systems which were generally provided, owned and operated by the individual States. Consequently it is felt that in the regional planning processes, centralized control for some of the CNS/ATM facilities and services would be operationally and financially beneficial.

16.3.4 Concerning the afore mentioned and, also, the GLOBAL ATM OPERATIONAL CONCEPT, which calls for a seamless airspace management with the objective of achieving a single airspace continuum, we can perceive that, at the strategic level, in the CAR/SAM Regions a number of ATM functions will need to be provided by regional or at least sub regional installations and/or services.

16.4 Specific aspects of some ANS structures

16.4.1 Given the diversity of circumstances and aspects which must be considered in the study and in the decision-making process regarding the operational, technical, economic and institutional options for the implementation of the CNS/ATM systems in the CAR/SAM Regions, a summary description of some pertinent aspects of the different organizational structures recommended in ICAO documents (Manual on ANS Economics - Doc. 9161-AT\724) is presented bellow.

16.4.2 It would be worthwhile stressing that, independently of the organizational structure used to provide the air navigation services, whether locally or regionally, as stipulated in Article 28 of the Chicago Convention, the States bear the final responsibility for providing and operating air navigation facilities and services.

16.4.3 Basic characteristics of the organization to provide ANS

16.4.3.1 Aeronautical infrastructure is made up by the following three major facilities and services:

- air navigation services
- airports
- aircraft operations.

16.4.3.2 The basic characteristic of ANS operations, as opposed to airport operations, is that the air navigation facilities and services provided by a State extend throughout the national territory or even beyond, and frequently depend on the facilities and services of some other State. Furthermore, in a significant number of States not all air navigation services are managed by one sole agency (e.g. Aeronautical Meteorological Services, SAR, Mapping Services).

16.4.4 Organizational structures of Air Navigation Services

16.4.4.1 The main objective of all air navigation services providers in the regional and sub-regional sphere is to plan and operate safe and efficient services within the national airspace under the jurisdiction of one State or a group of States. These services must focus, primarily, on meeting user needs.

a) **At the national level** - There are three basic forms of organization to provide air navigation services at the national level:

- i. Government department
- ii. Autonomous agency
- iii. Private sector organization

b) **At the regional or sub-regional level** - Air navigation services at the regional or sub-regional level may be provided through the options described below, or through a combination of them.

i. **International exploitation organizations**

These are agencies charged with providing air navigation services, mainly en-route services and/or facilities, within a given area and on behalf of two or more sovereign States.

Experience shows that international exploitation organizations have frequently made a significant contribution to a higher efficiency in the supply of air navigation facilities and services, and at a lower cost for both the users and suppliers. In addition, it provided for a more efficient use of human resources, facilities and services and research and development, by avoiding/reducing duplication of efforts.

Furthermore, given the wider geographical covered, the collection mechanisms of these organizations are usually more effective and show a higher cost/benefit ratio. In addition, the fact that these organizations represent several States places them in a

strong position in negotiations and in financial and commercial transactions, making it possible for them to get more advantageous conditions.

The organization charts of such operating agencies vary with each case. There are, however, certain common basic characteristics, such as:

- The general criteria regarding the operations and economic affairs of the organization on basic concerns such as capital investments and the appointment of key personnel, representatives of the member States.
- Similarly, the Chief Executive usually reports to the Board of directors, which would have the final say concerning the general management of the organization.
- Solid and well defined financial and economic criteria and methods have to be established with regard to recovering costs and controlling finances, including accounting and budgetary controls.
- The hiring of staff also demands special care.

ii. Joint charge collection agency

An efficient but less encompassing method for the States to benefit from international cooperation in supplying air navigation services involves resorting to a user-charge collection agency.

By these means, a group of States could benefit by setting up some joint agency to collect facility charges derived from en-route air navigation services on behalf of all participating States, including the over-flown States. The agency would subsequently, as per the agreement, transfer to each participating State portions of the revenues. Setting up this type of agency would also benefit the users (or aircraft operators) since the cost of collection should be lower than if each and every State proceeded separately.

The setting up such agencies is relatively less complex from the point of view of equipment, staff and involves rather low implementation and operating costs.

iii. Multinational facilities and services

For many years now, and for purposes of implementing the services/facilities recommended in the ICAO Air Navigation Plan, many States have provided diverse bilateral services to each other with benefits for both parties. Even though bilateral agreements continues to be the common practice in the implementation of the Air Navigation Plan, technological advances, high cost, and the multinational nature of the ICAO CNS/ATM systems make it necessary to consider different organizational arrangements for the financing, implementation and future administration of air navigation and airport systems.

In line with the above, a viable alternative to the implementation of the CNS/ATM Systems could be a multinational agency. An ICAO multinational facility or navigation service could be defined as that facility or service, included in an ICAO

ANP, whose purpose is to serve international air navigation in an airspace beyond the airspace managed by a single State, in keeping with the aforementioned plan.

An aspect that must be carefully considered has to do with equitability in pro-rating costs of a multinational facility or service and recovering the costs by levying charges on the users.

The share of the costs to be assigned to international civil aviation and to other uses of the facilities and services must be determined in such a way that no user is affected by costs not corresponding to it.

iv. Collective financing agreements

Collective financing of air navigation services is contemplated in Chapter XV of the Chicago Convention. At present there are two of this kind of agreements between Iceland and Denmark, which ICAO manages on behalf of the 2 contracting governments.

The services required are periodically reviewed and amended if necessary. All capital outlays have to be authorized by the ICAO Council.

The agreements themselves basically stipulate the manner in which the services are to be financed and the costs shared by the participating governments.

The charges levied on the users are based on the forecast costs authorized by the Council and only include those costs necessary for civil aviation purposes.

Another application of the collective negotiation concept is being negotiated between ICAO and the six States providing air navigation services in the North Atlantic. Those States have requested ICAO to accept the responsibility for managing the altitude monitoring system used for RVSM.

v. Delegation

This type of agreement is usually between two States, where one State, under special condition, accepts to provide facilities and services to another State. In some cases, because of the limited traffic or size of the airspace, it might be more efficient and economic to simply delegate, under well-defined conditions, the provision of air navigation services to an adjacent State.

vi. State-owned

This has been the traditional way of providing facilities and services. Some parts of the facilities/services may be leased from public services (i.e. communications) or vendors (computer systems) but the end-product (air navigation services) is provided by the State.

16.5 General Guidelines on the establishment and provision of multinational facilities and services in the CAR/SAM Regions

16.5.1 In keeping with Recommendation ANSEP/2-3 approved by the ICAO Council during the 6th meeting of its 146th session, the RAN CAR/SAM/3 (1999) Meeting prepared the guidelines (Recommendation 13/2), which were subsequently amended at the 10th meeting of GREPECAS as per Conclusion 10/5.

16.5.2 These guidelines contain the relevant ICAO provisions as well as the established criteria that govern the regional planning of the Organization and the implementation of the facilities/services required for air navigation in the CAR/SAM Region. The guidelines similarly acknowledged the principles approved by the Council for recovery of costs corresponding to facilities and services provided in keeping with the CAR/SAM Regional Plan, as well as with the principles and criteria stipulated in the Declarations by the Council of contracting States regarding charges for the use of airports and air navigation services (Doc 9082, para. 34 ii).

16.5.3 In keeping with Article 28 of the Convention and with ICAO criteria regarding formulation of regional plans and their implementation, all multinational facilities/services will appear in the regional plan as determined by the Council. Similarly, the principles approved by the Council to determine the basic costs that justify the charges for the use of en-route facilities and services must be applied. That is, the costs to be taken into account shall be those determined for the facilities and services provided and implemented in keeping with the CAR/SAM Regional Plan.

16.5.4 Steps to be followed in the process of setting up a multinational air navigation facility/service.

16.5.4.1 The following guidelines give a step by step description of the process to set up a multinational air navigation facility/service in the CAR/SAM Regions. The different stages are commented in the paragraphs below.

- a) The proposal to set up a multinational air navigation facility/service can originate from:
 - i. the CAR/SAM (GREPECAS) regional planning and implementation group;
or
 - ii. a State or group of States.
- b) The facility/service proposals must be supported by documentation regarding the following aspects:
 - i. purpose of the proposal and operational and technical justifications;
 - ii. financial implications and cost/benefits ratio;
 - iii. management implications; and
 - iv. alternative solutions.
- c) The proposal shall be evaluated by GREPECAS, particularly as regards to its justification, acceptability and cost/benefits ratio.

- d) If some preliminary agreement has been reached within GREPECAS the latter, through the mediation of the ICAO Caribbean and South American Offices, shall take the following steps:
 - i. consult those directly interested States as to the possibility of providing them with multinational facility/services, as well as to the States that would use them; and
 - ii. re-evaluate the proposal based on the comments made by such States and decide whether to continue or not.
- e) Having consulted all the interested parties, GREPECAS prepares a comprehensive draft amendment to the CAR/SAM Regional Plan, which shall be processed in keeping with the procedure approved by the Council.

16.5.5 Financial, managerial and other contractual aspects

16.5.5.1 State participation in providing a multinational facility or service is based on the assumption that any State that has given its support and has agreed to the implementation of that facility/service and makes use of them, should bear its corresponding share of the costs involved. It would be necessary for the participating States to formalize, through an agreement, the terms under which such multinational facility/service shall be provided. One of the essential objectives of the agreement should be that of making sure that the corresponding costs are shared, in a fair and equitable manner, among the participating States.

16.5.6 Types of agreements

16.5.6.1 An agreement involving the creation, implementation, management and maintenance of a multinational facility/service may take the form of a formal international treaty or that of an “administrative agreement”. Both forms establish an international obligation, but the treaty requires the signature of the Head of State or of Government and also demands ratification or approval by the national Legislative Assembly, which constitutes a rather lengthy regulatory process. An “administrative agreement”, on the other hand, ranks at a lower level with regards to formalities and procedures, since a minister or director of civil aviation can sign it or some other authorized person, and could be finalized through an exchange of letters or notes.

16.5.6.2 The recommendation is, that whenever possible, the “administrative agreement” and not the formal international treaty be chosen, since the former can come into effect within a minimum term and is more flexible with regards to incorporating any subsequent amendment. It is recognized, however, that in some States constitutional or juridical stipulations may mandate approval by the Legislative Assembly for the State to commit itself to any financial obligation, particularly if large sum of moneys are involved or the agreement extends beyond a given period of time. Whatever the form used, the agreements should be drafted in such a way that any subsequent amendment demanded by circumstances be easily incorporated. To this end, the more detailed texts which may be more susceptible to amendments and which do not affect the agreement’s basic provisions should be included as annexes or appendices.

16.5.6.3 It is, furthermore, recommended that whenever possible a sole general agreement (treaty or “administrative agreement”) be adopted which covers all aspects of the facility/service in question through all its phases. It may happen, however, that all of this may not always be possible. In some circumstances it may be necessary or preferable to have more than one agreement (treaty or “administrative agreement”) of different scopes and content. The objective must then be that of covering as many aspects as possible in the “administrative agreement” and to limit the use of the treaty to those aspects for which this kind of agreement is essential for the States involved. Having admitted this, an agreement may, for example, cover formalities, including the pre-financing, which must be implemented by the States accepting the responsibility of taking the facility/service up to the operational phase, while another agreement will be concluded among all the States (including the aforementioned first group of States) which are going to use, or benefit from, the facility once it comes into operation. In such a case, the first agreement shall be important since the first Group of States will have to guarantee the financing (with their own resources) of the implementation of the facility/service, since there will be no income from user charges (aircraft operators) until the facility/service comes into operation.

16.6 Institutional aspects anticipated in the CAR/SAM regions

16.6.1 The decentralized nature of the present CNS system, whose facilities and services are generally provided, owned and operated by individual States, contrasts significantly with the need to have centralized control for some CNS/ATM facilities and services due to the extremely large service zones and a series of other characteristics of the new CNS/ATM system.

16.6.2 The treatment of the Institutional Aspects of CNS/ATM system implementation and operation acquires special importance due to the fact that the global nature of the new systems requires institutional arrangements different from those, which have been developed in the course of the years for the present air navigation systems.

16.6.3 In this sense, there have been many attempts to establish guidelines and principles which would make such arrangements possible without affecting the sovereignty of the States, while concurrently complying with the provisions of the Chicago Convention and its Annexes as regards the provision of air navigation services.

16.6.4 Considering all the above, the Council has adopted an ICAO policy statement regarding the implementation and operation of CNS/ATM systems, which must be complied for purposes of guaranteeing the safe, orderly and efficient growth of international civil aviation, in terms of cost.

16.6.5 Similarly, the FANS Committee drafted a series of institutional guidance principles to be used by the States, suppliers of services and users, to help them set up institutional arrangements suitable for these systems. Considering that these arrangements may take many forms, it would be convenient that their economic, institutional and political implications be evaluated through the use of scenarios, so that the States can be pro-active in designing implementation, administration and operation programs, instead of reacting, generally too late, to a situation which is already beyond control.

16.6.6 Some of the topics discussed over and over again are those of sovereignty, national security, harmonization, duplication of equipment and services, coordination and planning, availability and application of standards, technical assistance, requirements as to the financing of costs, and training.

16.6.7 The way of solving these institutional problems should be, in their final phase, that ICAO, through its Regional Offices, promote meetings of DGCA's of the CNS/ATM Regions, assemble members from the ministerial, political and technical areas in a forum for open discussion of these topics and, if necessary, refer those matters requiring further study to GREPECAS. It is indispensable for the organizations involved to have political support, if not, there will not be any political willingness or commitment for the implementation of the CNS/ATM systems. The following paragraphs briefly describe the major topics associated with the development of institutional arrangements.

16.7 Sovereignty and political willingness

16.7.1 In the process of planning for the implementation of the CNS/ATM systems, the discussions have frequently bogged down on problems of sovereignty. These problems, whether explicit or not, mostly had to do with a potential operational dependence, a threat to profits and to employment, and control over the airspace and the systems. Consequently, it is important to tackle these concerns at a very early stage and to develop possible formulas or mechanisms for their solution. The concerns regarding sovereignty differ significantly from one region to the next and from one State to the next, making it necessary to use a regional approach to overcome them. Only if scenarios are available will it be possible to mitigate, or even solve, these problems, specially those related to the sharing of systems or facilities and services. Furthermore, it would be worth recalling that the ICAO General Policy Statement regarding the implementation and operation of CNS/ATM systems, as well as the Chicago Convention, in its Article No. 1, clearly establishes the rights of the States.

16.7.1.1 However, taking into account the political implications of many of the institutional aspects and future implementation options, it would be extremely important for the States to express their political willingness to go ahead with the migration process toward the new systems.

16.7.2 National security

16.7.2.1 Some States are afraid that, once the provision of services, that is, satellite navigation and communications systems, is taken over by third parties, whether private or public, their level of authority and control over their airspace will be reduced. National security aspects have to be carefully considered and discussed, clearly and transparently. There can be no doubt that this is a critical requirement on which the States have to be sure that the implementation and operation of the systems will include safeguards to make sure that their peaceful operation does not affect the individual national security of the States and that, in certain contingencies, direct control of the system's operation in one or more States, can revert to the States involved.

16.7.3 Coordination and planning

16.7.3.1 To get all the benefits which the CNS/ATM technologies offer, it is important that the States, through GREPECAS, set up links with their neighbors and coordinate their implementation plans so as to integrate the systems to the extent possible or, at least, rationalize them. This approach does, somehow, reduce autonomy, but also offers substantial technical, operational and economic benefits by reducing duplication and simplifying coordination.

16.7.4 Harmonization

16.7.4.1 To be able to enjoy all the benefits, which the CNS/ATM technologies offer, it is indispensable that the States of the Regions harmonize the capacities of their systems, their implementation programs and the application of the ICAO SARPs so as to create a transparent operational environment for the users. This means that for the sake of efficiency and continuity of a given traffic flow, or that of a region or a sub-region, some States might have to replace their systems, even if their service life has not expired, or who could have to implement systems which would have been different or less complex if they only had had to meet their national requirements.

16.7.4.2 One of the best examples of the efficiencies obtained through special arrangements are the airlines, which have been able to reduce their costs of operation through arrangements for the shared use of facilities and services, while concurrently guaranteeing protection of their interests, their survival and even their continuous growth.

16.7.4.3 The same can be achieved with ATS providers, either by sharing certain functions, systems or, even, delegating airspaces. Furthermore, in some cases the implementation of certain CNS facilities and services would be technically and physically impossible without a multinational arrangement. Such is the case of SBAS where, in addition to the astronomical cost of installing master stations in every State, the available frequency spectrum would not be sufficient to meet world demand. Hence, for the suppliers of ATS services to be able to enjoy all of the economic, technical and operational benefits, it would be logical to duly take into account the study of the institutional arrangements to permit more efficient implementation, administration and operation, in terms of costs, of the CNS/ATM systems.

16.7.4.4 The planning process would in the first place describe the way in which the CNS/ATM systems, or parts of them, would integrate with the facilities and services provided by the States, civil aviation administrations, international organizations, service providers and aircraft operators. Secondly, scenarios would be developed to determine conditions under which these systems would be managed and operated. Some good examples of these arrangements are: ASECNA, COCESNA, EUROCONTROL and, with a slight different bent, the joint financing agreements of Iceland and Denmark. All of these arrangements, at different levels, make for the provision of air navigation facilities and services.

16.7.4.5 It should also be considered that the present ANS could include components, which could be administered with greater operational and economical efficiencies through multinational mechanisms or joint financing/operation arrangements.

16.8 Comments on operational and technical organization aspects

16.8.1 Implementation of the CNS/ATM systems will demand considerable investment in the ATM area as well as in the communications and navigation infrastructures. The size of the investments involved, the capabilities of the systems, the operational advantages and the economies of scale that CNS/ATM system facilities and services can generate are such that it would not be wise or practical for one State to implement such systems solely for its own exclusive use.

16.8.2 To fulfill the complete ANS requirements (ATS, MET, AIS, etc.) of the CNS/ATM systems using satellite-based communications systems, a major network of ground installations will be required.

16.8.3 As for the organizational aspects, implementation of the CNS/ATM systems is of special importance for ATM since the advanced communications, navigation and surveillance technology offers the possibility of expanding the capacity of air traffic services. The result will be that it shall be possible to supply ATS in broad areas and as such, reduce the number of air traffic facilities and services.

16.8.4 Based on the above, we can conclude that while some CNS/ATM facilities and services may be individually operated by the States with their own facilities, a very significant portion, particularly with regard to the provision of ATM, databanks (MET, AIS, etc), and access to satellite services should be carried out mainly through regional agencies and service providers which provide direct access to satellites, or act as coordinators for satellite operators.

16.9 Multinational Arrangements

16.9.1 From the organizational point of view it is possible to choose among several options for implementation or to adopt a combination of implementations.

16.9.2 The following paragraphs present a listing of CNS/ATM systems and facilities and services that can be considered candidates for management and operation through a multinational mechanism.

- a) Multi-service/multi-protocol voice and data digital networks (REDDIG) used as communication platforms to support cost-efficient implementation of current and future communications requirements.
- b) ATM automation for centralized functions such as the implementation of a Regional Air Traffic Flow Management (ATFM) Unit.
- c) SBAS augmentation in keeping with the results of the planning of regional augmentation based on the regional needs.
- d) AIS/database automation systems to facilitate implementation of the integrated automated AIS system, as recommended in the CAR/SAM Air Navigation Plan.
- e) A regional programme for the implementation of Flight Tests for conventional and satellite-based nav aids that would facilitate the cost-efficient application of the ICAO SARPs in this area through agreements for regional collaboration and sharing of the resources of the flight testing units.
- f) Aeronautical Mobile-Satellite System (AMSS) and or High Frequency data link (HF DL) that would facilitate the implementation of data-links for ADS/CPDLC in remote areas (oceanic and continental).
- g) Airspace Safety Monitoring and Management Agency that would make it possible to ensure fulfillment of the necessary requirements for RVSM and RNP implementation in the CAR/SAM Regions (Conclusions 10/12, 10/13 and 10/14 of the GREPECAS/10 Meeting).

16.9.3 With a view to providing guidance for the decision-making process regarding the most suitable options for implementation and operation of the CNS/ATM Systems in the CAR/SAM Regions, a listing of the facilities whose functions and/or duties must be analyzed on the basis of their operational feasibility and viability through regional or sub-regional mechanisms.

a) COMMUNICATIONS FACILITIES

- CTRL/MGT OF MULTI-SERVICE/MULTI-PROTOCOL VOICE+DATA NETWORK;
REDDIG,
MEVA II
COCESNA
E-CAR
MEX
- CTRL./MGT AMSS
- MASTER STATION SBAS

b) ATM FACILITIES

- REGIONAL ATM CENTRE
- REGIONAL ATFM CENTRE
- CAR/SAM SAFETY ASSESMENT AND MONITORING AGENCY

c) AIS FACILITIES

- CAR/SAM REGIONAL DATA BASE [CASADAB].
- INTEGRATED AIS/MET/FPL DATABASE [PIS/DB]
- REGIONAL WGS-84 DATA BASE [WGS-84/DB]
- GEOGRAPHICAL INFORMATION SYSTEM DATA BASE [GIS/DB]
- DIGITAL TERRAIN MODELING SYSTEM DATA BASE [DTMS/DB].

d) MET FACILITIES

- OPMET REGIONAL DATA BANK
- WAFS REGIONAL MAINTENANCE SUPPORT CENTER

e) FLT CALIBRATION PROCEDURES FACILITIES

- REGIONAL MGT/CTRL. FLT CALIBRATION
- REGIONAL MGT/CTRL. GNSS NPA/PA IFR PROCEDURE

f) TRAINING FACILITIES

- REGIONAL MGT/CTRL. TRAINING CENTRES

g) SAR

- REGIONAL SARSAT MGT/CTRL.

h) JOINT CHARGES COLLECTION AGENCY

- REGIONAL JOINT CHARGES COLLECTION AGENCY.

16.9.4 From the listing established above on 16.9.2 and 16.9.3, the following comments can be made:

(1) Multi-service/multi-protocol voice and data digital networks (REDDIG) used as communication platforms to support cost-efficient implementation of current and future communications requirements. Besides the REDDIG, the following services are, already, operational or in the way to being so: MEVA II; COCESNA; E-CAR and MEXICO Systems.

With exception of the MEXICO System, which is a national operated system, the others are regional or sub-regional service providers directed to be used as communications platforms to support service/multi-protocol voice and digital networks which should support current and future communications requirements.

The differences between these communications platforms are the institutional arrangements through which they are operating.

MEVA II and E-CAR are regional private owned and operated networks, providing services, mainly, to the CARIBBEAN STATES.

COCESNA (OKI) network is the communications platform of the multinational organization COCESNA, representing or providing the ANS for the 6 Central America States.

REDDIG is the SAM multi service/multi-protocol voice and data digital network and is considered de base of the future ATN platform for the Region. Presently managed on an interim basis by an ICAO RLA TC project, is planned to migrate its operational, technical and administrative management to a SAM multinational institutional arrangement on a medium term future.

(2) Although it can be foreseen that, the final goal at the regional level is to provide ATM Services through one regional or a very limited number of sub-regional ATM CENTRES, it is considered that the first ATM function which will need a supra-national institutional arrangement for its management is the ATFM for the following reasons:

- It is foreseen, by studies made on the traffic forecasts for the CAR/SAM Regions that, in the forthcoming years these Regions will present a significant increase of air traffic that will present an operational need to increase the ATFM strategic measures to be applied to these main air traffic flows. Moreover, due the geographical dimensions of the Regions and, also, the extension of the air traffic flows involving both Regions and many of them extending to adjacent regions such as the AFI, EUR, NAM, NAT and PAC Regions, we can conclude that these ATFM strategic actions can only be established through a centralized regional ATFM unit.

- It should be noted that the establishment of a Regional ATFM CENTER doesn't preclude the need and use of ATFM National and local units exercising tactical and local flow control actions that will be part of the Regional ATFM System.

(3) SBAS augmentation in keeping with the results of the planning of regional augmentation based

on the regional needs.

The studies on the augmentation system to be adopted by the CAR/SAM Regions are still ongoing. Nevertheless it is considered fairly sure that the system is going to be composed, inter alia, by Reference Stations (one or more for each State) a very limited number of Master Stations per Region and a very limited number of Up-link Satellite Stations per Region. A regional centralized management of the system is going to be needed. On the other hand the system will use the ATN (REDDIG, COCESNA, MEVAII etc.) as its communications platform for the ground-ground information interchange.

(4) Aeronautical Mobile-Satellite System (AMSS) and or High Frequency data link (HF DL) that would facilitate the implementation of data-links for ADS/CPDLC in remote areas (oceanic and continental).

Most routine air-ground communications in the en-route phase of flight will be via digital data interchange. The transmission of the air-ground messages in this phase of flight will be carried out, basically, on the AMSS radio link, using geostationary communications satellites. In the CAR/SAM Regions a reduced number of Ground Earth Stations, GES, (not more than 2 per Region), will link the voice/data messages to the satellites. The ATN, REDDIG in the case of the SAM Region, will provide the ground -air-ground communications platform for the AMSS.

As these services are going to be extensively used by the Regional ATFM Centres and, on a long term, by regional ATM Centres, under a multinational arrangement, it is expected that the GES and the AMSS be managed, as a whole, by regional multinational institutional arrangements.

(5) AIS/database automation systems to facilitate implementation of the integrated automated AIS system, as recommended in the CAR/SAM Air Navigation Plan.

- CAR/SAM REGIONAL DATA BASE (CASADAB)
- INTEGRATED AIS/MET/FPL DATABASE (PIS/DB)
- REGIONAL WGS-84 DATA BASE (WGS-84/DB)
- GEOGRAPHICAL INFORMATION SYSTEM DATA BASE (GIS/DB)
- DIGITAL TERRAIN MODELING SYSTEM DATA BASE (DTMS/DB).

In the CAR/SAM Region, it is highly needed to ensure in any moment the availability of aeronautical information with the required level of quality and integrity and updated in real time. The provision to users with all required aeronautical information/ data during the course of its operations is also required as an important planning requirement for the effective implementation of the GNSS and ATM operational systems. The implementation of the Regional Integrated Automated AIS System in the CAR/SAM (CASADAB), having as its nucleus the CAR/SAM REGIONAL DATA BASE and with all its complementary automated elements (NASCs, PIS/DB, WGS-84/DB, GIS/DB and DTMS/DB), is considered as the basic tool, through which the above referred objectives could be extensively reached, in order to effectively satisfy the operational requirements of international users.

(6) A regional programme for the implementation of Flight Tests for conventional and satellite-based nav aids that would facilitate the cost-efficient application of the ICAO SARPs in this area through agreements for regional collaboration and sharing of the resources of the flight testing units.

In general the CAR/SAM Regions have a number of very well managed, equipped and fully operational national Flight Tests installations/services covering all the needs of its States. On the other hand there are

many States in both Regions, which are facing difficulties, due a variety of reasons, to provide this very important safety related service.

It is perceived that some of the units referred above could even have an oversized capacity that could be used by other States of the CAR/SAM Regions, which do not have these services or have difficulties in providing the services with the current means available in their States.

A centralized planning of the means available in the afore mentioned States, made through or by the multinational institutional arrangement upon an regional agreement between the CARSAM State could enhance the actual status of the Flight Tests services in both Regions.

(7) MET FACILITIES

- OPMET REGIONAL DATA BANK
- REGIONAL WAFS MAINTENANCE SUPPORT CENTER

In the meteorological field, the Washington and the Brasilia OPMET data banks already provide the OPMET information, to the CAR/SAM Regions respectively.

Concerning the WAFS system, it is considered convenient the existence of a Regional Maintenance Support Centre to coordinate and control the maintenance of the WAFS National nodes.

(8) TRAINING FACILITIES

- REGIONAL MGT/CTRL. TRAINING CENTRES

Both Regions have a well-structured network of national training centers as well as some regional training centers. The activity of these units are regionally coordinated and harmonized by the ICAO Regional Offices of Lima and Mexico. It is our perception that a centralized institutional unit in charge of establishing the CNS/ATM regional needs in terms of training and human resources and, in coordination with the States and ICAO Regional Offices, manage the regional training program.

(9) JOINT CHARGES COLLECTION AGENCY

- REGIONAL JOINT CHARGES COLLECTION AGENCY

An efficient but less encompassing method for the States to benefit from international cooperation in supplying air navigation services involves resorting to a user-charge collection agency.

By these means, the States and the Regions as a whole could benefit by setting up in the multinational institutional arrangement a joint agency to collect facility charges derived from en-route air navigation services on behalf of all participating States, including the over-flown States. The agency would subsequently, as per the agreement, transfer to each participating State portions of the revenues. Setting up this type of agency would also benefit the users (or aircraft operators) since the cost of collection should be lower than if each and every State proceeded separately.

The setting up such agencies is relatively less complex from the point of view of equipment, staff and involves rather low implementation and operating costs.

Finally it is considered that the establishment of a Regional Multinational ANS structure will call naturally to a Regional Joint Charges Collection Agency.

(10) SAR

- REGIONAL SARSAT MGT/CTRL

The incorporation of some kind of SAR activities management in the future CAR/SAM Regional institutional arrangement although desirable should be considered as a long term objective and will need to be the object of a specific study. The CARSAM SAR activities are basically performed by the national CAAs supported with a strong participation of the Armed Forces, mainly the Air Force, and using the information provided by the SRSAT System which is not an ICAO regulated or coordinated Organization.

At present the CAR/SAM SAR activities and installations and services structure are being revised by the States, coordinated by the ICAO Lima and Mexico Regional Offices.

(11) REGIONAL FLIGHT SAFETY COOPERATION SYSTEM
- REGIONAL FLIGHT SAFETY OVERSIGHT AGENCY

The System is, already, operational and called the CARSAMMA- the CAR/SAM SAFETY AND MONITORING AGENCY, managed by Brazil on a DELEGATION TO A STATE regional arrangement type and is, at the present, providing services to 9 Latin American States and open for participation of all States of the CAR/SAM Regions. It was created with the support of ICAO and the LACAC and is managed, by the time being, by an ICAO TC RLA. In case that the SAM Region establishes an institutional arrangement option for the management of the future regional ANS, it will be advisable to accommodate the CARSAMMA in that same arrangement. . Therefore the inclusion of the System with the establishment of a Regional Agency under the Regional Multinational Institutional arrangement has its merits and should be considered for further more in depth studies.

16.10 Comparative study of multi-regional mechanism options for the CAR/SAM Regions

The study is carried out in 3 phases:

16.10.1 Phase I

16.10.1.1 In this Phase, and through a comparative analysis methodology, we try to establish which would be the most advisable multinational organizational arrangements to be used for the administration/operation of the ANS facilities and services, individually, as a whole, or as a group of facilities/services.

- a) Initially we compared the list of facilities/services included in paragraph 16.9.3 above, with the types of multinational organizational arrangements detailed in chapters 16.4 and 16.9.2.
- b) By matching the CNS/ATM facilities and services with the regional arrangement options and establishing a grading for the option, the latter has been analyzed on the basis of certain criteria, such as:

INSTITUTIONAL ASPECTS CRITERIA

Legal Criteria	Operational Criteria	Technical Criteria	Economic Criteria	Administrative Criteria
National sovereignty	Safety	Management Maintenance	Profitability	Overhead
National security	Operational efficiency	System sharing	Cost Recovery	Labour cost Training
Accessibility	Gradual Implementation		Resource sharing	Staffing
	Coordination			

- c) Critical criteria: **National sovereignty**
National security
System accessibility

SAFETY

Note: if seen that the in the matching any or all the critical criteria is (are) not applicable, the proposed option is automatically considered as not valid.

- d) For purposes of a comparative analysis, the following numerical values were assigned to the criteria:

highly applicable	3
applies	2
applies with reservations¹	
does not apply	0

- e) Upon matching the list of CNS/ATM System facilities and services whose functions and/or powers could have a more cost/efficient use if operated by means of a regional or sub-regional mechanism with the diverse regional Air Navigation Service management and operations options, the following values were established as regards the options:

NA - non applicable option:
AWR - option applicable with reservations:
A - applicable option
HA - highly applicable option

- f) In **Appendix A** to this document can be found the comparative analysis, which, initially, establishes each facility/service's score as regards its operation/administration, for each operational arrangement option. Subsequently,

using the numerical grades and values of paragraph e) above, establishes the facility score with respect to the option under consideration. As an additional tool for subsequent more specific analyses, we can find in this Annex the tables that analyze the facilities and services with respect to the criteria under the different multinational organizational contexts. This analysis is, obviously, subjective and involves an individual interpretation. It is for this reason that it should be carefully evaluated and can, certainly, be refined or corrected.

In every multinational organizational option we can notice some common aspects that could be considered as a characteristic of that option with regard to facilities.

Thus, with the NATIONAL (status quo) operation/administration option, it can be seen that with reference to the critical criteria, particularly those pertaining to national sovereignty and security, these are facilities and services with a high degree of applicability. This option, however, has its weak points, *inter alia*: the requirements for operational efficiency, coordination, profitability and administrative cost. Another interesting aspect of this option is that in the traditional ANS a certain improvement can be noticed in the indexes having to do with the administration of facilities which are currently operational. E.g.: flight calibration, training, SAR, JCCR.

Even though the operation/administration through the NATIONAL DELEGATION option presents certain weakness, it also presents a more positive aspect in the operation, coordination, training and human resources areas. There are some exceptions, such as the Agency to Manage SARSAT, where, coordination requirements are considered to offer some degree of difficulty; while in the Center of Maintenance Support of WAFS it is felt that there could be problems with the operational efficiency and cost recovery requirements.

The PRIVATE organization option seems to be more solid in the economics and operational efficiency areas. It does, however, face problems in the labor costs area (strikes, etc.) and is also rather affected by the aforementioned critical criteria.

The INTERNATIONAL ORGANISATION, MULTINATIONAL ORGANISATION and JFARR organizational options, have significantly similar characteristics and, in general, their indexes seem to be quite good. Hence, the degree of differences among them and their weak points or, better said, their not so strong points are the following:

INTERNATIONAL ORGANISATIONS – could have some weaknesses in aspects related to the critical criteria of national sovereignty and security and in labor costs.

MULTINATIONAL ORGANISATIONS - evidence a certain weakness in aspects related to overhead and, to a lesser degree, to profitability.

JFARR – the management of facilities by ICAO (e.g.: Iceland Agreement) is fully successful in specific scenarios but has truly never been tested nor considered within a context as broad as the one being discussed in this paper. The option, however, is quite valid, particularly for a situation of transition from a NATIONAL management to a multinational organizational arrangement.

g) The following chart (Table 1), presents the consolidated results of the tables and the detailed analyses in Appendix A.

TABLE 1

TYPE OF ORGANISATION						
FACILITIES	NAT	NAT DELEG	PRIV	INTL	NAC MULTI	JFARR
COM						
REDDIG	27-AWR	40-A	38-A	41-HA	44-HA	44-HA
AMSS	26-AWR	42-HA	38-A	41-HA	44-HA	44-HA
SBAS Mst	26-AWR	42-HA	36-A	41-HA	44-HA	44-HA
TOTAL COM	79	124	112	123	132	132
ATM						
Reg. ATM CENTRE	25-AWR	39-A	29-AWR	43-HA	44-HA	40-A
Reg. ATFM CENTRE	28-AWR	41-HA	30-AWR	45-HA	44-HA	42-HA
Airspace S/M CENTRE	24-AWR	43-HA	38-A	46-HA	47-HA	47-HA
TOTAL ATM	77	123	97	134	135	129
AIS						
AIS DATA BANK	27-AWR	36-A	41-HA	46-HA	46-HA	41-HA
TOTAL AIS	27	36	41	46	46	41
MET						
WAFS MTC. Supp. CENTRE	28-AWR	36-A	42-HA	46-HA	46-HA	42-HA
TOTAL MET	28	36	42	46	46	42
FLT CAL/IAP						
Reg MGT FLT. CAL	31-A	40-A	34-A	40-A	40-A	41-HA
MTC GNSS NPA/PA	35-A	38-A	40-A	45-HA	45-HA	45-HA
TOTAL FLT CAL/IAP	66	78	74	85	85	86
TRG						
Reg MGT AG	36-A	40-A	41-HA	41-HA	47-HA	41-HA
TOTAL TRG	36	40	41	41	47	41
SAR						
Reg SARSAT MGT AG	38-A	36-A	34-AWR	43-HA	41-HA	42-HA
TOTAL SAR	38	36	34	43	41	42
JCCA						
Reg JCCA	33-A	40-A	40-A	45-HA	46-HA	45-HA
TOTAL JCCA	33	40	40	45	46	45
GRAN TOTAL	384	513	481	563	578	558

Orange = AWR

Yellow = A

Green = HA

- (1) In analyzing Table 1, let us take the values detailed in paragraph 16.9.1 e) and let us establish the range of points with their respective grades as regards each **grand total** of the score indicated in the table.

> = 260 pts.	Non applicable	NA
< = 261 > = 390 pts.	Applicable with reservations	AWR
< = 391 > = 520 pts.	Applicable	A
< = 521 > = 624pts.	Highly Applicable	HA

Matching the **grand total** figures with these parameters we could consider a ranking for the management/operation options of multinational organizational arrangements for a scenario of implementation of all, or of a set ANS facilities, whether CNC/ATM or not.

OPTION 1	MULTINATIONAL ORGANISATIONS	HA
OPTION 2	INTERNATIONAL ORGANISATIONS	HA
OPTION 3	JFARR	HA
OPTION 4	STATE DEL.	A
OPTION 5	PRIVATE	A
OPTION 6	NATIONAL (STATUS QUO)	AWR

We could also analyze sets of facilities, as well as a mix of facilities of areas of ANS complementary activities.

- (2) The options for organizational arrangements more convenient for the management and operation of the aforementioned facilities on the basis of the score and grading achieved by each facility (Table 1) are given below. To this end, P1 was considered as the best option and would include the highest scoring facilities. Following, in a decreasing grade of priority sequence, we would have options P2, P3, P4, P5, P6.

h) **Table 2** provides us with a view of the implementation of each facility should the intention be to manage each of them separately, through a multinational organizational arrangement.

TABLE 2

PRIORITY OF OPTION FOR FACILITY IMPLEMENTATION						
Types of Organizations						
FACILITIES	NAT	NAT DEL	PRIVATE	INTL ORG	MULT ORG	JFARR
COM						
REDDIG	P5	P3	P4	P2	P1	P1
AMSS	P5	P2	P4	P3	P1	P1
SBAS	P5	P2	P4	P3	P1	P1
ATM						
REG. ATM CENTRE	P6	P4	P5	P2	P3	P3
REG. ATFM CENTRE	P6	P4	P5	P1	P2	P3
REG. AIRSP.SFTY. AG.	P5	P3	P4	P2	P1	P1
AIS						
REG. AIS DATA BANK	P4	P3	P2	P1	P1	P2
MET						
WAFS REG. MTC.SUPP.AG.	P4	P3	P2	P1	P1	P2
FLT.CAL/GNSS IAP/PA						
REG. FLT.CAL. AG.	P4	P2	P3	P2	P2	P1
REG. GNSS IAP/PA AG	P4	P3	P2	P1	P1	P1
TRG						
REG TRG. MGT. AG	P4	P5	P2	P2	P1	P2
SAR						
REG.SARSAT MGT.AG.	P4	P5	P6	P1	P3	P2
JCCA						
REG.JCCA AG.	P4	P3	P3	P2	P1	P2

Conclusions or observations:

- (1) It can be seen that, in general, the most advisable options follow a decreasing order of preference as regards these types of organizations: Multinational Organizations, International Organizations and JFARR.
- (2) Approaching it from the opposite end, we can see that the National (status quo) option has a low degree of viability in the full implementation and operation of CNS/ATM systems.

- (3) Furthermore, the NAT DEL option may be considered as one with a satisfactory degree of viability, with the exception of the REG. TRG. MGT. AG. and REG. SARSAT MGT AG.
- (4) The PRIVATE option has a satisfactory degree of acceptability for the REG. AIS DB., WAFS REG. MTC. SUPP. AG., REG. FLT. CAL. AG., REG. GNSS IAP/PA AG., REG. TRG. MGT. AG and REG. JCCA AG.

16.11.1 Final comments

16.11.2 The analyses and comments made in the previous chapters offer a large number of options and combinations of options. What is intended is not to exhaust this process at this phase of the study. Consideration has been given to the most important or interesting proposals, with the concrete data available and taking the opinion of experts with long experience in ANS. It must be recognized that it was impossible to avoid a certain degree of subjectivity, which is very difficult to measure, in some of the aspects analyzed. It is felt that this work will require adjustments and validations, but it is also intended to establish a methodology to study the problems of the institutional aspects and of the use of administrative/operational arrangements for the ANS facilities in the CAR/SAM Regions. It can, furthermore, be an important tool and serve as guidance material for the discussion of the institutional aspects, a mandatory subject for the implementation of CNS/ATM systems in the CAR/SAM Regions.

16.11.3 With the data collected in Phase 1, the Phase 2 of this exercise must be harmonize and adapt to the ATM scenarios established as a result of the study of traffic flow profiles, State profiles and ATM transition plans. This task would produce and propose options for multinational organizational structures for the administration/operation of CNS/ATM system facilities in the CAR/SAM Regions.

16.11.4 It must always be borne in mind that the transition and implementation of facilities, both of the present ANS as well as of the CNS/ATM systems, shall be gradual, evolutionary and tailored to meet regional operational needs in keeping with the established planning. The proposal for final multinational organizational arrangements still has a long way to go but in some cases, immediate attention must be given to some facilities and services already in an advanced stage of implementation (REDDIG, CARSAMMA) to ensure that it can, at a later stage, be gracefully incorporated into the macro-regional multinational organizational proposal. Hence, the need to urgently establish a common policy and methodology to analyze interim solutions so as to make it possible to harmonize and integrate them.

16.11.5 After these options have been consolidated, they could be the subject of cost/benefit and sensitivity analyses and finally, be turned into business cases. Phase 2 of the process would thus be concluded.

16.11.6 In Phase 3, through business cases, the proposals shall be referred to decision-making levels in which political aspects will play a major role.

16.11.7 The final decision will likely be political. Notwithstanding this, it must always have major operational, technical and economic support. Failing to adequately address these issues, particularly with regards to the operational/technical aspects, would make the proposal regarding global planning of the CNS/ATM systems, incompatible and expensive.

Appendix A

Analysis of comparative tables

1. Upon matching the list of CAR/SAM system facilities, whose functions and/or powers could have a more cost-efficient use if operated by means of a regional or sub-regional mechanism, with the various regional air navigation service management and operation options, the following conditions were established as regards the options:

- NA - Non-applicable;**
- AWR - Applicable with reservations;**
- A - Applicable**
- HA - Highly applicable**

2. Likewise, when matching the CNS/ATM facilities with the regional arrangement options and establishing a grading for the option, the latter was analysed on the basis of certain criteria, namely:

Institutional criteria	Operational criteria	Technical criteria	Economic criteria	Administrative criteria
National sovereignty	Safety	Maintenance Management	Profitability	Overhead
National security	Operational efficiency	System sharing	Cost recovery	Training Labour cost
Accessibility	Evolutionary implementation		Resource sharing	Staffing
	Coordination			

3. For purposes of a comparative analysis, the following numerical values were assigned to the criteria:

- Highly applicable 3**
- Applicable 2**
- Applicable with reservations 1**
- Non-applicable 0**

4. Critical criteria:

- National sovereignty**
- National security**
- System accessibility**
- Safety**

Note: If it is seen in the matching that any or all the criteria is (are) not applicable, the proposed option is automatically considered as not valid.

5. Finally, for purposes of classifying facilities according to their score, let us consider the following ranges:

=< 48 >= 41	HA	Highly applicable option
=< 40 >= 31	A	Applicable option
=< 30 >= 21	AWR	Applicable option with reservations
=< 20	N	Non-applicable option

6. Upon analysing tables 1 to 6, we note that the behaviour of CNS facilities (REDDIG, AMSS, SBAS Mstation) and ATM facilities (REG ATM CENTRE, REG ATFM CENTRE, REG AIRSPACE SAFETY MONITORING CENTRE), is very similar. Therefore, all of the CNS facilities will be subject to an analysis similar to the one for ATM facilities.

7. National organization

7.1 CNS

7.1.1 It may be noted that the positive side of the NATIONAL operation and management of CNS facilities is that the critical requirements of national sovereignty, national security, accessibility and safety would not be affected by this type of management and operation. The weak points are in the important requirements of operational efficiency, evolutionary implementation, coordination, maintenance management, cost recovery, cost sharing, overhead and training. It is felt that the improvement of these requirements will demand great effort. It is also felt that the profitability requirement will be largely affected.

7.1.2 Therefore, in view of the above and since the score for the facilities adds up to 27/26/26, we conclude that national operation and management of CNS facilities is a viable option with reservations (AWR).

7.2 ATM

7.2.1 As in the case of CNS facilities, the positive aspect of NATIONAL management and operation of ATM facilities is that the 4 critical criteria are not affected. The weak points are outstanding. Operational efficiency, evolutionary implementation, coordination, maintenance management, system sharing, profitability, cost recovery, resource sharing and overhead are requirements whose improvement will demand great effort, and some will be very difficult to improve.

7.2.2 The score of ATM facilities is 25/27/24, respectively. Therefore, we conclude that the national operation/management option for ATM facilities is a viable option with reservations (AWR).

7.3 REG AIS DATA BANK

7.3.1 The NATIONAL management and operation of the Regional AIS Data Bank presents a viable critical criterion, but requires some safeguards: accesibility. National operation of a Regional AIS Data Bank is feasible, pero presents a high degree of difficulty in terms of its implementation, management and operation, which affects many of the requirements, particularly operational efficiency, coordination, maintenance management, system sharing, profitability, resource sharing, overhead and labour cost.

7.3.2 The score of this option is 27 points and, therefore, we consider that this NATIONAL operation and management option of Regional AIS Data Banks is viable with reservations (AWR).

7.4 WAFS REG MTC Support CENTRE

7.4.1 NATIONAL management and operation of the WAFS maintenance support centre, while not affecting the 4 critical criteria, presents the same inconveniences as the facilities previously analysed, the solution of which will require great effort. The aspects of coordination, profitability and overhead should be especially highlighted.

7.4.2 The score of this option is 28 points and, therefore, it is considered to be viable with reservations (AWR).

7.5 REG FLT CAL MGT Agency

7.5.1 In-flight calibration management and operation does not affect the 4 critical criteria. The big problem with the NATIONAL, decentralised management of a Regional in-Flight Calibration Agency lies in the areas of operational efficiency, evolutionary implementation, coordination, profitability, overhead and training. To meet these requirements, a joint effort by the parties involved will be required.

7.5.2 The score of this option is 31 points, which makes it a viable option (A).

7.6 GNSS PA/NPA Coordination Agency

7.6.1 NATIONAL, decentralised management of a Regional GNSS NPA/PA Procedure Agency does not affect the 4 critical criteria and is feasible, but will require special attention, particularly in the areas of coordination and profitability.

7.6.2 The score of this option is 35 points, which makes it viable (A).

7.7 REG TRG MGT Agency

7.7.1 NATIONAL, decentralised management of regional training is viable, but will require intense work in the areas of coordination, profitability and resource sharing.

7.7.2 The score of this option is 36 points, making it a viable one (A).

7.8 REG SARSAT MGT Agency

7.8.1 NATIONAL management of SARSAT resources does not affect the 4 critical criteria. Its implementation and operation will require great effort in the areas of coordination, cost recovery and overhead.

7.8.2 The score of this option is 38 points, making it a viable one (A).

7.9 REG JCCR Agency

7.9.1 NATIONAL, decentralised management of JCCRs could affect the critical criterion of accessibility. Therefore, strict rules and safeguards should be established, and special attention and effort will be necessary to solve the deficiencies in the fields of evolutionary implementation, coordination, maintenance management and overhead.

7.9.2 The option has a score of 33 points, and is viable (A).

8. Delegation to States

8.1 CNS

8.1.1.1 With respect to critical criteria, we could say that, although national sovereignty and national security could be affected, the measures required to overcome these deficiencies correspond, mainly, to the legal sphere. There is already international jurisprudence on the matter, creating effective safeguards through agreements and legal, operational and institutional procedures to deal with this matter. As to the remaining requirements, many of these--evolutionary implementation, maintenance management, profitability and overhead--can be met with some corrective action. Likewise, there are several important requirements, such as coordination, system sharing, cost recovery, cost sharing, training, labour cost and staffing that are fully viable.

8.1.2 The score for CNS systems is 40/42/42 points, which makes them highly viable (HA) if managed and operated under the organisational modality of DELEGATION TO STATES.

8.2 ATM

8.2.1 In ATM facilities, some critical requirements could be affected. As in CNS facilities, there are some precedents that provide guidance as to the corrective action to be taken. Likewise, some of the other requirements, like operational efficiency, coordination, maintenance management, equipment sharing, profitability and overhead can be met with some corrective action. There are other requirements that are fully met.

8.2.2 The score of the facilities, 39/41/42, shows that the operation and management of a Regional ATM Centre has a lower score than the rest, and its degree of effectiveness is viable (A), while the facilities of the Regional ATFM Centre and the Regional Airspace Safety Assessment and Monitoring Agency have a score that makes their management and operation through the modality of DELEGATION TO STATES highly viable (HA).

8.3 REG AIS DATA BANK

8.3.1 Management and operation of Regional AIS Data Banks through the modality of Delegation to a State deserve the same remarks as those already expressed for CNS and ATM elements in terms of the critical criteria and, therefore, require the same corrective action. As to the other requirements, it should be noted that the evolutionary implementation and cost recovery have a lower degree of viability and will require stronger action. Likewise, there is a significant number of them that, although viable, will require corrective measures for optimisation. The maintenance management, system sharing, resource sharing and staffing requirements are fully viable.

8.3.2 The score of the facilities is 36 points, which makes the management of this option through the modality of DELEGATION TO STATES a viable one (A).

8.4 WAFS MTC Support CENTRE

8.4.1 Full compliance with the critical requirement of accessibility could offer some degree of difficulty. Procedures and safeguards should be established. The weak areas are the operational efficiency, profitability and resource sharing requirements. Strict measures should be adopted to solve these problems. Evolutionary implementation, coordination, cost recovery, overhead and labour cost will also require some measures and special care. Finally, maintenance management, which is the main reason for this proposal, will be fully viable, just like system sharing, training and staffing.

8.4.2 In this case, the score is 36 points, which makes it viable option (A).

8.5 REG FLT CAL AG/REG GNSS IAO/PA AG

8.5.1 Both proposals present critical requirements that will demand special care. Corrective action is the same as that specified in the analysis of the previous options. In the proposal for a regional calibration agency, the maintenance management, system sharing, cost recovery, labour cost and staffing requirements are highly viable, while the strong points of the GNSS agency are the system sharing, cost recovery, resource sharing and staffing requirements. The remaining requirements for both facilities will require some corrective action.

8.5.2 In both cases, the score is 40/38 points, which makes them viable (A).

8.6 TRG

8.6.1 The situation with respect to the critical criteria is similar to that presented in the previous facilities. Therefore, the corrective action follows the same line as that suggested above. The operational efficiency, evolutionary implementation, profitability, overhead, training and labour cost requirements will demand special attention for full feasibility. The coordination, maintenance management, system sharing and staffing requirements are fully viable.

8.6.2 The score, 40 points, makes it a viable (A) proposal.

8.7 REG SARSAT AG

8.7.1 This proposal has 3 critical criteria that will require special care. The corrective action has already been explained and is valid for this facility. The weak points of this option are the evolutionary implementation and coordination, which will require strong action and safeguards by the States and bodies involved. The strong points of this option are maintenance management, system sharing, resource sharing, training and labour cost. Similarly, the operational efficiency, profitability, overhead and staffing requirements will need corrective action and monitoring for full feasibility.

8.7.2 The score of this proposal, 36 points, makes it viable (A).

8.8 REG JCC

8.8.1 Regarding critical criteria, the proposal presents the same characteristics as the facilities discussed above. Therefore, the same corrective measures need to be applied. The strengths of the proposal are the operational efficiency, system sharing, profitability, cost recovery, resource sharing, training and staffing. The evolutionary implementation, coordination, maintenance management, overhead and labour cost requirements will need some action and special attention.

8.8.2 The score of this proposal, 40 points, makes it a viable one (A).

9. Private

9.1 CNS

9.1.1 As to critical criteria, this is obviously the weakest point for CNS facility management and operation. The national sovereignty, national security and accesibility criteria will be very difficult to meet. The mechanisms for solving this situation have already been explained in previous analyses and the comments made are fully valid for the feasibility of CNS system management and operation under the PRIVATE model. It should also be noted that the labour cost requirement will demand effort and very strict safeguards; otherwise, the model could be unfeasible. The coordination, overhead, training and staffing requirements will demand the adoption of some actions and special attention. On the other hand, coordination, maintenance management, system sharing, profitability, cost recovery and resource sharing are completely feasible.

9.1.2 The score in this case is 38/38/36 points, respectively, which makes it a viable option (A).

9.2 ATM

9.2.1 The comments made regarding the critical criteria for CNS facilities are fully valid for ATM facilities. With respect to non-critical requirements, evolutionary implementation, coordination and labour cost present a high degree of difficulty. The latter requirement is particularly negative for the ATM Regional Centre management and operation option, since it is considered not applicable for this type of organisation. It is a viable option with reservations (NA).

9.2.2 According to the score, 29/30 points, the first two facilities are viable with reservations (AWR) while the Regional airspace safety assessment monitoring and assesstment

agency option has some important requirements which are highly feasible: operational efficiency, maintenance management, system sharing, profitability, cost recovery and staffing.

9.2.3 Its score is 38 points, and could be a viable option (A).

9.3 REG AIS DATA BANK

9.3.1 The critical criteria present the shortcomings specified for the previous facilities, so the corrective measures are the same as for AIS Regional Data Banks. We see some strengths in the other requirements, such as operational efficiency, maintenance management, system sharing, profitability, cost recovery, resource sharing, training and staffing. The evolutionary implementation, coordination, overhead requirements need adjustments to be fully applicable. The implementation of the labour cost requirement presents a high degree of difficulty, and will require special effort.

9.3.2 The score is 40 points, making it a viable option (A).

9.4 WAFS REG MTC SUPP CENTRE

9.4.1 The critical criteria are not affected by the PRIVATE operation of a Regional WAFS maintenance support centre. Furthermore, the operational efficiency, maintenance management, system sharing, profitability cost recovery, cost sharing, overhead and staffing requirements are fully viable. The evolutionary implementation, coordination, overhead and training requirements are viable after making some adjustments. The labour cost item has serious shortcomings and safeguards should be established in order to make it viable.

9.4.2 The score is 42 points; therefore, this option is fully viable (HA).

9.5 REG FLT CAL MGT AGENCY

9.5.1 The critical criteria of national sovereignty and national security can have serious shortcomings. To prevent this, strict regulatory, operational and institutional measures should be adopted. Furthermore, the coordination and labour cost requirements will need strong and strict action. The strengths to be highlighted are the maintenance management, system sharing, cost recovery, resource sharing and staffing requirements.

9.5.2 The score is 34 points, making it a viable option (A).

9.6 REG GNSS IAP/PA AGENCY

9.6.1 This option has no serious effects on the critical criteria that cannot be corrected. The operational efficiency, maintenance management, system sharing, profitability, cost recovery, resource sharing requirements are fully met and the evolutionary implementation, coordination, overhead and training requirements can be met after adopting some corrective action. The labour cost requirement deserves special attention and needs the establishment of strict corrective measures.

9.6.2 The score is 40 points, making it a viable option (A).

9.7 REG TRG, MGT AGENCY

9.7.1 The critical criteria present no shortcomings in this option. Likewise, the system sharing, cost recovery, overhead, training and staffing requirements are highly viable. The operational efficiency, coordination, evolutionary implementation, maintenance management requirements can be met after adopting some corrective action. As for the other facilities, the labour cost requirement in the privatisation option will need very strict corrective measures.

9.7.2 The score is 41 points, and the option is highly viable (HA).

9.8 REG SARSAT MGT AGENCY

9.8.1 The critical criteria of national sovereignty and national security present serious shortcomings. To solve them, strict regulatory, operational and institutional measures need to be implemented. Likewise, the evolutionary implementation, coordination and overhead requirements are highly viable. The labour cost requirement is considered to be practically insurmountable for the private operation of this system.

9.8.2 For the reasons mentioned above, despite the score of 34 points, this option is considered to be viable with reservation (AWR).

9.9 REG JCC

9.9.1 This option has a good degree of viability for the operational efficiency, system sharing, profitability, cost recovery and staffing requirements. With the exception of the labour cost requirement, all the others are viable after adopting some corrective action. The aspects related to the labour cost requirement have been already considered in the analysis of the other facilities, and the proposed corrective action for those is also valid for the REG JCC.

9.9.2 The score of this option is 40 points, making it a viable option (A).

10. International organisation

10.1CNS

10.1.1 In this option, the critical criteria of national sovereignty and national security may present some shortcomings which need to be corrected through institutional arrangements and operational agreements between the parties. The other requirements, operational efficiency, coordination, maintenance management, system sharing, cost recovery, resource sharing and staffing are fully viable, and the remaining requirements are viable with the adoption of some corrective action.

10.1.2 The score for the facilities in this option is 41/41/41 points, showing that it is fully viable (HA).

10.2 ATM

10.3 Although two critical criteria, national sovereignty and national security, need special attention in the ATM Regional Centre facility and, as in the CNS facilities, need to be corrected through institutional arrangements and operational agreements, the critical criteria in the other facilities are fully viable. A significant number of the other requirements (7) fully comply with the viability conditions. On the other hand, some of the requirements (4) will need some corrective action to reach a full degree of viability.

10.2.1 The score of 43/45/46 confirms the full viability of this option (HA).

10.3 REG AIS DATA BANK

10.3.1 The critical criteria are not affected and there are 10 non-critical requirements that are fully viable and 2 requirements that need some corrective action.

10.3.2 The score is 46 points, so this option can be considered as highly viable (HA).

10.4 WAFS REG MTC SUPPORT AGENCY

10.4.1 The analysis of this option shows results that are very similar to those for the Regional AIS Data Bank.

10.4.2 The score is 46 points, making the option highly viable (HA).

10.5 REG GNSS IAP/NP AGENCY

10.5.1 The results are similar to those for the two previous options.

10.5.2 The score is 45 points, making the option highly viable (HA).

10.6 REG FLT CAL MGT AGENCY

10.6.1 In this option, the critical criteria of national sovereignty and national security are partially affected and corrective action needs to be taken to solve these problems. The option has 6 non-critical requirements which are fully viable and 6 requirements that need some corrective action.

10.6.2 The score for this option is 40 points, making it a viable one (A).

10.7 REG TRG MGT AGENCY

10.7.1 This option has the same characteristics for critical and non-critical criteria as the option analysed under paragraph 9.6, with the exception of maintenance management, which is fully viable.

10.7.2 The score is 41 points and the option is highly viable (HA).

10.8 REG SARSAT MGT AGENCY

10.8.1 The critical criteria have no shortcomings in this option. Also, the option has 7 non-critical requirements that are fully viable and 5 requirements that need some corrective action to be fully viable.

10.8.2 The score is 43 points, showing that this option is highly viable (HA).

10.9 REG JCC

10.9.1 This option has 3 non-critical requirements--evolutionary implementation, administrative cost and labour cost--that need some corrective action. The others are fully viable.

10.9.2 The score is 45 points, showing that this option is highly viable (HA).

11. Multinational organisation

11.1 CNS

11.2 ATM

11.3 REG AIS DATA BANK

11.4 WAFS REG MTC SUPP CENTRE

11.5 REG TRG MGT AG

11.6 REG JCCA

11.7 REG SARSAT MGT AG

These options present 14 to 15 criteria, including critical criteria, which would not be affected.

We consider that the profitability and overhead criteria could be affected if this organisation is state-owned, that is, managed by the associated States, whose financial policies could be subject to pressure by associates who might neglect the cost-benefit aspects of the option. Obviously, being a hypothesis, it can be avoided through strict administrative measures. As to overhead, a rigorous budget control and human resource management policy is highly advisable.

The scores of these facilities are: CNS 44/44; ATM 44/44/46; REG AIS DB/46; WAFS REG MTC SUPP CENTRE/46; REG TRG MGT AG 47; REG JCC 47; REG SARSAT MGT AG. 41 points. The proposals are considered to be highly viable options (HA).

11.8 REG FLT CAL MGT AG

11.8.1 The facilities of this option have 13 highly viable requirements and 3 requirements that need adjustment and correction, particularly in the areas of operational efficiency, overhead and staffing.

11.8.2 The option has a score of 40 points and the option can be considered viable (A).

12. JFARR

12.1 CNS

12.1.1 CNS facilities have 12 highly viable requirements. The operational efficiency, coordination, maintenance management and staffing requirements need corrective action and adjustments.

12.1.2 The score of these facilities is 44/44/44 points, and the option is highly viable (HA).

12.2 ATM

12.2.1 The proposal of a REG Airspace S/M CENTRE presents a very high degree of viability and only the staffing requirement will need some adjustments and corrective action. The score is 47 points, and the option is considered to be highly viable (HA).

12.2.2 The proposal of a REG ATM CENTRE, although it has 8 highly viable requirements, will need some corrective action in other 8 requirements and could present difficulties in terms of operational efficiency and coordination, among others. The score is 40 points, and the option is considered to be viable (A).

12.2.3 The proposal of a REG ATFM CENTRE presents 10 highly viable requirements and 5 viable ones which will require some corrective action. The score is 42 points, and the option is considered highly viable (HA).

12.3 REG AIS DATA BANK

12.4 WAFS REG MTC SUPP CENTRE

These proposals present 9 and 10 requirements, respectively, that are highly viable, and 7 and 6 requirements, respectively, that need some corrective action.

The score is 41/42 points, and the proposals may be considered as highly viable (HA).

12.5 REG FLT CAL MGT AG

12.6 REG TRG MGT AG

12.7 REG SARSAT MGT CENTRE

The analysis of these proposals presents similar characteristics. In general, there are 9 to 10 fully viable requirements and 7 to 6 viable ones that need some corrective action, with special emphasis on operational efficiency, maintenance management, overhead and staffing.

The score is 41/41/42 points, respectively, and the proposals may be considered as highly viable (HA).

12.8 REG JCC

12.8.1 The proposal presents 13 highly viable requirements. Three requirements need some adjustments.

12.8.2 The score is 45 points and the proposal is highly viable (HA).

TABLE 1

VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: NATIONAL

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EVOL	COOR	GEST MANT	COMP SIST	RENT	REC COST	COM REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	3	3	3	3	2	1	1	1	2	0	1	1	1	1	2	2	27
AMSS	3	3	3	3	1	1	1	1	2	0	1	1	1	1	2	2	26
SBAS Mst	3	3	3	3	1	1	1	1	2	0	1	1	1	1	2	2	26
ATM																	
Reg. ATM CENTER	3	3	3	3	0	1	1	1	1	0	1	1	1	2	2	2	25
Reg. ATFM CENTER	3	3	3	3	1	1	1	2	1	1	1	1	1	2	2	2	28
Airspace S/M CENTER	3	3	3	3	0	1	1	1	1	0	1	1	1	1	2	2	24
AIS																	
AIS DATA BANK	3	3	2	3	1	2	1	1	2	1	1	1	1	2	1	2	27
MET																	
WAFS Mnt. Sup CENT	3	3	3	3	2	1	1	1	1	1	1	1	1	2	2	2	28
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	3	3	3	3	1	1	1	2	2	1	2	1	1	2	3	2	31
MNT GNSS NPA/PA	3	3	3	3	2	2	1	2	2	1	2	2	2	2	3	2	35
TRG																	
Reg MAGMT AG	3	3	3	3	2	2	1	2	3	1	2	1	2	3	3	2	36
SAR																	
Reg SARSAT MGT AG	3	3	3	3	2	2	1	3	2	2	1	3	1	3	3	3	38
JCCR																	
Reg JCCR	3	3	2	3	2	1	1	1	2	1	2	2	1	3	3	3	33
TOTAL FOR THIS PARTICULAR ORGANIZATION																	384

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3

TABLE 2

VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: DEL NATIONAL

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EV	COOR	GEST MANT	COMP SIST	RENT	REC COST	COMP REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	2	2	2	3	2	2	3	2	3	2	3	3	2	3	3	3	40
AMSS	2	2	3	3	3	2	3	2	3	2	3	3	2	3	3	3	42
SBAS Mst	2	2	3	3	3	2	3	2	3	2	3	3	2	3	3	3	42
ATM																	
Reg. ATM CENTER	2	2	3	3	2	2	2	2	3	2	3	3	2	3	2	3	39
Reg. ATFM CENTER	3	2	3	3	3	2	2	2	3	2	3	3	2	3	2	3	41
Airspace S/M CENTER	3	3	2	3	3	2	2	3	3	3	3	3	2	3	2	3	43
AIS																	
AIS DATA BANK	2	2	3	3	2	1	2	3	3	2	1	3	2	2	2	3	36
MET																	
WAFS Mnt. Sup CENT	3	3	2	3	1	2	2	3	3	1	2	1	2	3	2	3	36
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	2	3	3	3	2	2	2	3	3	2	3	2	2	2	3	3	40
MNT GNSS NP/PA	2	2	2	3	2	2	2	2	3	2	3	3	2	3	2	3	38
TRG																	
Reg MAGMT AG	2	2	3	3	2	2	3	3	3	2	3	3	2	2	2	3	40
SAR																	
Reg SARSAT MGT AG	2	2	2	3	2	1	1	3	3	2	2	3	2	3	3	2	36
JCCR																	
Reg JCCR	2	2	2	3	3	2	2	2	3	3	3	3	2	3	2	3	40
TOTAL FOR THIS PARTICULAR ORGANIZATION																	513

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3

TABLE 3
VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: PRIVATE

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EV	COOR	GEST MANT	COMP SIST	RENT	REC COST	COMP REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	1	1	3	3	3	2	3	3	3	3	3	3	2	2	1	2	38
AMSS	1	1	3	3	3	2	3	3	3	3	3	3	2	2	1	2	38
SBAS Mst	1	1	3	3	2	2	2	3	3	3	3	3	2	2	1	2	36
ATM																	
Reg. ATM CENTER	1	1	3	3	2	1	1	2	2	2	3	2	2	2	0	2	29
Reg. ATFM CENTER	1	1	3	3	2	1	1	2	2	2	3	2	2	2	1	2	30
Airspace S/M CENTER	2	2	3	3	3	1	2	3	3	3	3	2	2	2	1	3	38
AIS																	
AIS DATA BANK	2	2	3	3	3	2	2	3	3	3	3	3	2	3	1	3	41
MET																	
WAFS Mnt. Sup CENT	3	3	3	3	3	2	2	3	3	3	3	3	2	2	1	3	42
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	1	1	3	3	2	2	1	3	3	2	3	3	2	2	1	3	34
MNT GNSS NPA/PA	2	3	3	3	3	2	2	3	3	3	3	3	2	2	1	2	40
TRG																	
Reg MAGMT AG	3	3	3	3	2	2	2	2	3	2	3	3	3	3	1	3	41
SAR																	
Reg SARSAT MGT AG	2	2	3	3	2	2	2	3	2	2	3	2	2	2	0	2	34
JCCR																	
Reg JCCR	3	3	3	3	3	2	2	3	2	3	3	2	2	2	1	3	40
TOTAL FOR THIS PARTICULAR ORGANIZATION																	481

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3

TABLE 4

VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: INTNATION ERNATIONAL

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EV	COOR	GEST MANT	COMP SIST	RENT	REC COST	COMP REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	2	2	3	3	3	2	3	3	3	2	3	3	2	2	2	3	41
AMSS	2	2	3	3	3	2	3	3	3	2	3	3	2	2	2	3	41
SBAS Mst	2	2	3	3	3	2	3	3	3	2	3	3	2	2	2	3	41
ATM																	
Reg. ATM CENTER	2	2	3	3	3	2	3	3	3	3	3	3	2	3	2	3	43
Reg. ATFM CENTER	3	3	3	3	3	2	3	3	3	3	3	3	2	3	2	3	45
Airspace S/M CENTER	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	3	46
AIS																	
AIS DATA BANK	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	3	46
MET																	
WAFS Mnt. Sup CENT	3	3	3	3	3	3	3	3	3	3	3	3	2	3	2	3	46
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	2	2	3	3	2	2	3	2	3	2	3	3	2	3	2	3	40
MNT GNSS NPA/PA	3	3	3	3	3	3	2	2	3	3	3	3	3	3	2	3	45
TRG																	
Reg MAGMT AG	2	2	3	3	2	2	3	3	3	2	3	3	2	3	2	3	41
SAR																	
Reg SARSAT MGT AG	3	3	3	3	3	2	2	3	3	2	3	3	2	3	2	3	43
JCCR																	
Reg JCCR	3	3	3	3	3	2	3	3	3	3	3	3	2	3	2	3	45
TOTAL FOR THIS PARTICULAR ORGANIZATION																	563

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3

TABLE 5

VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: MULTINATIONAL

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EV	COOR	GEST MANT	COMP SIST	RENT	REC COST	COMP REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	3	3	3	3	3	3	3	3	3	2	2	3	1	3	3	3	44
AMSS	3	3	3	3	3	3	3	3	3	2	2	3	1	3	3	3	44
SBAS Mst	3	3	3	3	3	3	3	3	3	2	2	3	1	3	3	3	44
ATM																	
Reg. ATM CENTER	3	3	3	3	3	3	3	3	3	2	2	3	1	3	3	3	44
Reg. ATFM CENTER	3	3	3	3	3	3	3	3	3	2	2	3	1	3	3	3	44
Airspace S/M CENTER	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	47
AIS																	
AIS DATA BANK	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	3	46
MET																	
WAFS Mnt. Sup CENT	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	3	46
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	3	3	3	3	2	2	3	2	2	2	3	3	1	3	3	2	40
MNT GNSS NP/PA	3	3	3	3	3	3	3	3	3	2	3	3	2	3	3	2	45
TRG																	
Reg MAGMT AG	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	47
SAR																	
Reg SARSAT MGT AG	3	3	3	3	3	2	2	2	2	2	3	3	2	3	3	2	41
JCCR																	
Reg JCCR	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	2	46
TOTAL FOR THIS PARTICULAR ORGANIZATION																	578

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3

TABLE 6

VALUES ASSIGNMENT

NAME OF THE ORGANIZATIONAL SYSTEM: JFARR

INSTALLATIONS/ SERVICES	SOB NAT	SEG NAT	ACCE	SEG OP	EF OP	IMP EV	COOR	GEST MANT	COMP SIST	RENT	REC COST	COMP REC	COST ADM	TRG	COST LAB	REC HUM	TOTAL
COM																	
REDDIG	3	3	3	3	2	3	2	2	3	3	3	3	3	3	3	2	44
AMSS	3	3	3	3	2	3	2	2	3	3	3	3	3	3	3	2	44
SBAS Mst	3	3	3	3	2	3	2	2	3	3	3	3	3	3	3	2	44
ATM																	
Reg. ATM CENTER	3	3	3	3	2	2	2	2	3	2	3	3	2	2	3	2	40
Reg. ATFM CENTER	3	3	3	3	2	2	2	2	3	2	3	3	2	3	3	3	42
Airspace S/M CENTER	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	47
AIS																	
AIS DATA BANK	3	3	3	3	2	2	2	2	3	2	3	3	2	3	3	2	41
MET																	
WAFS Mnt. Sup CENT	3	3	3	3	2	2	2	2	3	2	3	3	2	3	3	3	42
FLT CAL/IAP																	
Reg MAGMT FLT. CAL	3	3	3	3	2	2	3	2	2	2	3	3	2	3	3	2	41
MNT GNSS NPA/PA	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	2	45
TRG																	
Reg MAGMT AG	3	3	3	3	2	2	2	2	3	2	3	3	2	3	3	2	41
SAR																	
Reg SARSAT MGT AG	3	3	3	3	2	2	3	2	3	2	3	3	2	3	3	2	42
JCCR																	
Reg JCCR	3	3	3	3	3	3	3	2	3	2	3	3	3	2	3	3	45
TOTAL FOR THIS PARTICULAR ORGANIZATION																	558

VALUES: Not Applicable = 0; Applicable with reserves = 1; Applicable = 2; Highly Applicable = 3