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**Agenda Item 2:                      Air Navigation Issues**  
**2.5 Other air navigation matters**

**OPERATIONAL INTEGRATION OF THE ATS AUTOMATED SYSTEMS**

(Presented by the Secretariat)

<b>SUMMARY</b>	
The working paper presents a strategy for the operational integration of ATS automated systems.	
<b>References:</b>	
<ul style="list-style-type: none"><li>• Doc 9750, Global Air Navigation Plan for CNS/ATM Systems</li><li>• Report of GREPECAS/12 (Havana, Cuba, 7 to 11 June 2004)</li><li>• Report of the Fourth Central Caribbean Working Group (Santo Domingo, Dominican Republic, 9 to 13 February 2004)</li></ul>	

**1.                      Introduction**

1.1                      The Global Air Navigation Plan for CNS/ATM Systems points out the automated systems as an element that must have the capability to integrate, compile and diffuse the information required for the different elements of the ATM system, which includes the requirement of inter-operability of equipments and facilities of the CNS/ATM systems to increase the efficiency of the surveillance systems.

1.2                      The C/CAR WG/4 Meeting formulated Draft Conclusion 4/2 – “Guidance for the Study of RVSM Operational requirements in ATM Automated Systems”

1.3 The GREPECAS/12 Meeting approved Decisions 12/31 – *Regional Strategy to for integration of ATM Automated Systems* to guide States in a regional strategy for ATM automation which is presented in the **Appendix** to this working paper. The meeting recognized that technology was not an end in itself, and that the implementation of CNS/ATM technologies should be based on well-developed plans taking into account particular the objectives and operational requirements for the ATM system with a gradual, harmonized and evolutionary vision for the interoperability among systems allowing the exchange de data among ATS units (AIDC) and the collaborative decision-making (CDM), as well as to attain the flexible, transparent, *seamless* and optimum airspace management, that will additionally increase the ATM safety required levels, taking into account the necessary services for the operation of the ATM global system until and beyond year 2025.

1.4 GREPECAS, through its contributory bodies, has also developed several tasks that will provide guidance to the States/International Organizations of the CAR/SAM Regions for radar systems data exchange, use of the MSAW and the RVSM operational requirements in the ATS automated systems. In this respect, also Central Caribbean Working Group has defined the RVSM requirements to be introduced in the ATS automated systems.

## 2 Analysis

2.1 Nowadays many States have implemented several automated technologies with interconnectivity capabilities that facilitate the interaction among the airborne, ground and human elements of the ATM system considering the heterogeneous situation and the evolution of the available ground infrastructure that complies with several users' requirements. This advanced solid state technology allows to design equipment with modular manufacturing, which facilitates its maintenance, the application of a bigger number of functions, the inter-operability of different systems which may transmit its signals from different channels as telephone cable, optic fiber and/or modem, depending on the technical characteristics, as well as the reduction of operation costs; which means a higher versatility and operational-technical function.

2.2 For the implementation and integration of ATM automated systems, it is advisable to carry out a strategy as pointed out in the Appendix to this Working Paper, through different complementary activities as the specification, design and planning of the future ATM system starting with the identification of expectations of the ATM community, as well as the development of the standards, procedures and guidance material necessary for the functional operation of the ATM system that ensures the required cohesion links. The automated systems should be able to provide information to all the ATM system in order to optimize the capabilities of the services provided to the airspace users.

2.3 In the aeronautical industry, the meteorological weather is also a very important factor impacting the cancellation or delays of air operations at a world-wide level. The provision of meteorological information is a function integrated to the ATM system; the automated systems should be adapted in an inter-active manner in order to provide enough meteorological information to fulfill the requirements of the ATM community so as the system be safe, efficient, predictable and stable enough to ensure that timely measures and advantageous results may be obtained at a strategic level rather than at a tactical level.

### 3 Conclusion

3.1 It is obvious that a collaboration approach may attain very important advantages with little investment. Therefore it is advisable that the ATM community of the CAR/SAM Regions carry out a strategy of the activities in order to determine requirements, coordination and implementation of programmes that facilitate the implementation and integration of the ATS automated systems, through bilateral or multilateral agreements, with a view to an ATM regional automation.

3.2 This strategy should have a gradual, harmonious and evolutionary vision for the interoperability among systems allowing data exchange among ATS units in order to attain a flexible, transparent, seamless and optimum airspace management, increasing at the same time the required ATM safety levels.

3.3 To this end, the work developed by the contributory bodies of GREPECAS and the Central Caribbean Working Group on the requirements and guidelines for the implementation of ATM in the C/CAR should be taken into consideration.

3.4 Bearing in mind the background expressed in the paragraphs above, the Meeting is suggested to carry out a strategy, as pointed out in Appendix to this Working Paper, for the operational integration of the C/CAR ATS automated systems, considering other operational requirements for the ATM regional automation.

### 4 Suggested Action

4.1 The Meeting is invited to approve the following:

#### **DRAFT**

#### **CONCLUSION 7/XX: SUPPORT FOR THE OPERATIONAL INTEGRATION OF THE ATM AUTOMATED SYSTEMS IN THE CCAR**

That States/Territories/International Organizations in the Central Caribbean:

- a) support the work developed by Central Caribbean Working Group for the inclusion of RVSM requirements in ATS automated systems;
- b) request the Central Caribbean Working Group to develop, in coordination with ICAO NACC Regional Office, an action plan for the regional strategy of ATM automation in the C/CAR based on the information pointed out in the Appendix to this Working Paper; and
- c) request the Central Caribbean Working Group to present in the next C/CAR DCA/8 meeting an action plan for regional strategy of ATM automation in the CCAR.

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## **APPENDIX**

### **GUIDELINES FOR STRATEGY OPERATIONAL INTEGRATION OF THE ATM AUTOMATED SYSTEMS OF THE CAR/SAM REGIONS**

(Appendix K to the Report on Agenda Item 3 of the GREPECAS/12 Meeting)

**Objective:** Through a committed participation of the States, users and ATS providers of the CAR/SAM Regions,

- 1) to cooperate jointly in the integration of technologies for ATM automation, in accordance with ICAO guidelines available, considering the best regional and global alternatives;
- 2) develop a strategy for the integration of ATM automated systems with a safe, gradual, evolutionary and interoperable vision that facilitates the information exchange and the collaborative decision-making of all the components of the ATM system for a seamless, flexible, optimum and dynamic management of airspace and international aerodromes, and at the same time that it increases the required operational safety levels.
- 3) take into account the data processing and network environment, taking into consideration the use of ground and space segments for an interactive ATS information process, under the criteria of integrity, quality and real time.

### **FRAMEWORK**

- a) identify homogeneous areas on the basis of traffic flows operating in the different airspace and international aerodromes;
- b) analyze the operational environment scenarios of the air traffic services currently provided and those that are planned;
- c) determine the scope, architecture design, characteristics and attributes of the operational requirements for the short-term integration of the current automated systems of the ATS units depending on the current provided service levels, as well as other operational requirements that respond to future expectations of the components of the ATM system, considering:
  - i) arranging the requirements in logical sequence, through the following stages.

Stage	Function
Stage I	- <b>Flight plan processing</b> (FDPS/Flight Data Processing System)
Stage II	- <b>Radar data processing</b> and ATS surveillance (RDPS/Radar Data Processing System, ADS and exchange of radar information); - <b>Monoradar</b> ; - <b>Multiradar</b> ; - <b>Radar data sharing</b> .
Stage III	- <b>Automated</b> digital communications (radar control transfer/automated traffic hand off, AIDC/CPDLC, etc.).
Stage IV	- Implementation of CDM (Collaborative Decision Making) for other ATM requirements (AOM [Airspace Organization and Management], CM [conflict management], DCB [Demand/Capacity Balancing], AO [Aerodrome Operation], TS [Traffic Synchronization], AUO [Airspace User Operation], ASDM [ATM Service Demand Management], AIS, Meteorology, Statistics, etc.);

**NOTE:** SAR should be taken into consideration in all the lower airspace stages.

- ii) identify the automation level required according to ATS functions defined in States' classification of airspace and international aerodromes, as follows:

ATS Operational functions required in the automated systems (ATC, FIS, SAR)							
APPLICABLE ATS FUNCTIONS	ATS Airspace						
	A	B	C	D	E	F	G
Identification							
Separation							
Navigation guide							
Surveillance							
Transfer							
Coordination							
Information of flight plans in real time							
Visualization of the geographical position of the aircraft (longitude, latitude, history)							
Statistical data of flight plans (past and forecasted information).							
Radar data processing system (RDPS)							
Flight data processing system (FDPS)							
ATS inter-facility data communications (AIDC)							
Controller-pilot data link communications (CPDLC)							

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ATS Operational functions required in the automated systems (ATC, FIS, SAR)							
APPLICABLE	ATS Airspace						
ATS FUNCTIONS	A	B	C	D	E	F	G
Flight profile information (altitude, vertical speed, offset speed, predictive vector, turn angle, etc.)							
Automatic alerts (STCA, MSAW, DIAW, emergency, communication failure, unlawful interference, etc.)							
AIS Interface							
Meteorological information							

- iii) define the incoming and outgoing data, and functional interfaces data applicable to functions and sub-functions of the service;
  - iv) define from the highest to lowest level the functional decompositions for all the ATM components;
  - v) successively determine the different operational applications from the functional level or lowest interface to the upper interface;
  - vi) define the current and future operational applications needs;
  - vii) determine the short-term operational requirements; and
  - viii) determine the future operational requirements.
- d) determine the existing facilities and technological equipments in the CAR/SAM Regions, especially in adjacent States/Territories/Organizations, as well as the inter-operability technical requirements, data bases, equipped aircraft, software tools, etc., required that ease the integration of automated systems;
  - e) develop a cost-benefit analysis for the integrated implementation of ATM automated systems;
  - f) establish bilateral and multilateral agreements as appropriate, among States/Territories/International Organizations of adjacent airspace and regions for trials and the operational implementation/integration of ATS automated systems;

- g) develop standards, procedures and guidance material required (as *the Interphase Control Document (ICD) for data communications and common coordination between ATM centres, based on ICAO SARPS*) for the functional operation of ATS automated systems, including critical contingency cases, so as to serve as an aid to users;
- h) take the necessary measures for human resources training on a national and regional basis and allowing the facilitation of the implementation/integration of ATS automated systems;
- i) identify other potential benefits for the ATM community that may be obtained in the long-term; and
- j) document an action plan permitting the interoperable implementation of ATS automated systems.