



International Civil Aviation Organization
North American, Central American and Caribbean Office
**First Caribbean Working Group Meeting
(CAR/WG/1)**
Port of Spain, Trinidad and Tobago, 21 to 23 June 2007

CAR/WG/1 - WP/15
01/06/07

**Agenda Item 4: Establishment of interfaces for ATM automated systems between adjacent
 ATS units**

**ACTION PROPOSAL FOR AN ESTABLISHMENT OF INTERFACES FOR ATM
AUTOMATED SYSTEMS**

(Presented by the Secretariat)

SUMMARY This Working Paper proposes an Action Plan for the establishment of interfaces for the ATM automated systems between adjacent ATM units.
Strategic objectives: A: Safety – <i>Enhance global civil aviation safety.</i> D: Efficiency – <i>Enhance the efficiency of aviation operations.</i>
References: • Report of GREPECAS/12, 13 and 14 Meetings.

1. Introduction

1.1 The GREPECAS/12 Meeting, held in Havana, Cuba from 7 to 11 June 2004, formulated Conclusion 12/31 – *Regional strategy for the integration of ATM Automated Systems*, which basically encouraged States/Territories/International Organizations to define an action plan for the integration of ATM automated systems using the strategy describes in **Appendix A** to this paper.

1.2 The GREPECAS/13 Meeting, held in Santiago, Chile from 14 to 18 November 2005, performed a follow-up to the Regional Strategy for the Integration of the ATM Automation Systems approved by the GREPECAS through its Conclusion 12/31, the Meeting considered that there is at present a high automation level in the control centres, therefore the States/Territories/International Organizations should continue working according to the mentioned Regional Strategy including the related activities, such as: the integrated automation systems, use of a Interface Control Document (ICD), foster the planning and development of human resources and establish coordination between the States/Territories/International Organizations.

1.3 Also, the GREPECAS/13 Meeting guided to continue reviewing the Interface Control Document (ICD). In this respect, the ATM Automation Task Force of the ATM/CNS subgroup finalized reviewing the ICD offered by Canada, United States and Mexico to obtain a uniform application material for the CAR/SAM Regions, aimed at achieving an evolutionary integration and a harmonized interoperability of the ATM automated systems in the NAM, CAR and SAM Regions.

1.4 The GREPECAS/14 Meeting, held in San Jose, Costa Rica, 16-20 April 2007, formulated Conclusion 14/43 – *Agreements for ATM Automated Systems Interface*, through which States/Territories/International Organizations were encouraged to take into account technical feasibility studies and operational benefits, and coordinate the establishment of bilateral and multilateral agreements for the interface of automated systems between adjacent units and use guidance material specified as the “*Interface Control Document for Data Communications between ATS Units in the Caribbean and South American Regions (CAR/SAM ICD)*”. The ICD is published in the ICAO NACC webpage, under “eDocuments”.

1.5 Likewise, GREPECAS/14 Meeting agreed the Conclusion 14/44 – *Establishment of an Action Plan for the Interface of ATM Automated Systems*, in which the States/Territories/International Organizations are encouraged to formulate an Action Plan for the interface of ATM automated systems, using the Table of ATS Operational Requirements for Automated Systems. This Table is presented in **Appendix B** to this paper.

2. Discussion

2.1 Based on the background expressed in the above paragraphs, and the regional guidance developed by the GREPECAS mechanism presented in Appendices A, B and C to this paper, the Meeting is advised to review and recommend the States/Territories/International Organizations the Action Plan execution presented in **Appendix C** to this working paper, for the interfaces implementation for the establishment of ATM automated systems between adjacent ATS units.

3. Suggested actions

3.1 The Meeting is proposed to:

- a) take note of the information contained in this working paper;
- b) based on GREPECAS guidelines presented in Appendices A and B this paper, review the Action Plan proposed in Appendix C to this paper;
- c) consider proposing the revised Action Plan according to previous action b), for the implementation of interfaces for the establishment of ATM automated systems between adjacent ATS units and be adopted by the States, Territories and air navigation service providers; and
- d) consider and recommend other actions as deem pertinent.

APPENDIX A

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

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	- Flight plan processing (FDPS/Flight Data Processing System)
Stage II	- Radar data processing and ATS surveillance (RDPS/Radar Data Processing System, ADS and exchange of radar information); - Monoradar ; - Multiradar ; - Radar data sharing .
Stage III	- Automated 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)							
Flight profile information (altitude, vertical speed, offset speed, predictive							

ATS Operational functions required in the automated systems (ATC, FIS, SAR)							
APPLICABLE ATS FUNCTIONS	ATS Airspace						
	A	B	C	D	E	F	G
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.

APPENDIX B

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

States should develop automation architecture requirements according to the level of service required for each ATS airspace classification and international aerodrome, as follows:

ATS Operational requirements for automated systems (ATC, FIS, SAR)							
APPLICABLE /NEED ATS REQUIREMENTS	ATS Airspace Classification						
	A	B	C	D	E	F	G
Identification of aircraft							
Separation							
Navigation guidance							
Surveillance							
Transfer							
Coordination							
Information of flight plans in real time							
Visualization of the geographical position of the aircraft (latitude, longitude, history)							
Statistical data of flight plans (past, current and future information).							
Surveillance data processing system (i.e. RDPS or ADS) a. considering future expansion capability; and b. considering format compatibility							
Flight data processing system (FDPS)							
ATS inter-facility data communications (AIDC)							
Controller-pilot data link communications (CPDLC)							
Flight track profile information (altitude, vertical speed, offset speed, predictive vector, turn angle, etc.)							
Alerting systems (STCA, MSAW, DIAW, emergency, communication failure, unlawful interference, etc.)							
Aeronautical Information Services (AIS) Interface							
Meteorological information							

- successively determine the different operational applications from the functional level or lowest interface to the upper interface;
- define the current and future operational applications needs; and
- determine the short-term and future operational requirements.

APPENDIX C

ACTION PLAN FOR THE IMPROVEMENT AND DEVELOPMENT OF ATM SITUATIONAL AWARENESS - CAR REGION

Organization:

Date

Jun-07

No.	Strategic Objective/ GPI	Global Plan/ GPI	Regional Plan / FASID	GREPCAS No. Con/Dec/Pa	Target Activity	Follow-up Action	To be developed by	Deliverable	Target date	Remarks
1	2	3		4	5	6	7	8	9	10
					<i>Near term (2010)</i>					
1	D	GPI-9		14/43 a)	Identify the feasibility to establish the bilateral/multilateral agreements for ATM automated systems.	Valid	E/T/OI	Agreements for ATS automated systems		
2	D	GPI-9		14/44	Identify the automation level required according to the ATM service provided in airspace and international aerodromes, assessing: - operational architecture design, - characteristics and attributes for interoperability, - data bases and software, and - technical requirements	Valid	E/T/OI	Requirements for ATM surveillance		
3	D	GPI-7	Tables CNS1A CNS1C	12/37	Improve ATS voice and data interfacility communication.	Valid	E/T/OI	Implementation of FASID Table 1-A, and identify other ATS comms. requirements		
4	D	GPI-9		13/79	Implement flight plan data processing system and electronic transmission tools.	Valid	OACI	Improve ATM surveillance		
5	D	GPI-9	Table CNS 4A	14/48	Implement radar data sharing programs where benefits can be obtained.	Valid	E/T/OI	Improve ATM surveillance		
6	D	GPI-9		14/44	Develop situational awareness training programmes for pilots and controllers.	Valid	E/T/OI	ATM situational awareness training programmes		
7	D	GPI-9	Table CNS 4A	14/44	Implement ATM surveillance systems for situational traffic information and associated procedures.	Valid	E/T/OI	Improve ATM capacity		

APPENDIX C

No.	Strategic Objective/ 2	Global Plan/ GPI	Regional Plan / FASID	GREPCAS No. Con/Dec/Pa	Target Activity	Follow-up Action	To be developed by	Deliverable	Target date	Remarks
1	2	3		4	5	6	7	8	9	10
8	D	GPI-9		12/31	Implement ATS automated message exchanges, as required - FPL, CPL, CNL, DLA, etc.	Valid	E/T/OI	AIDC		
9	D	GPI-9		12/31	Implement automated radar handovers, where able.	Valid	E/T/OI	Improve ATM capacity		
10	A, D	GPI-16		12/31	Implement ground and air electronic warnings, as needed -Conflict prediction -Terrain proximity -MSAW -DAIW -Surveillance system for surface movement	Valid	E/T/OI	Improve ATM safety management		
11	D	GPI-17	Tables CNS4A, CNS1B	13/72	Implement data link surveillance technologies and ATN applications: ADS, CPDLC, AIDC, as required.	Valid	E/T/OI	Improve ATM surveillance		
					Medium term (2015)					
12	D	GPI-18/19		12/31 14/44	Implement additional/advanced automation support tools to increase sharing of aeronautical information -ETMS or similar -MET information -AIS/NOTAM dissemination -Surveillance tools to identify airspace sector constraints. -A-SMGC in specific aerodromes, as required.	Valid	E/T/OI	Improve ATM surveillance		
13	D	GPI-6		14/44	Implement teleconferences with ATM stakeholders.	Valid	E/T/OI	Improve CDM Process		