



INTERNATIONAL CIVIL AVIATION ORGANIZATION

A United Nations Specialized Agency

AMHS Implementation Overview

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Surveillance**

III Workshop/Meeting on the Follow-up to the Implementation of the ATS Message Handling System (AMHS) in the NAM/CAR Regions

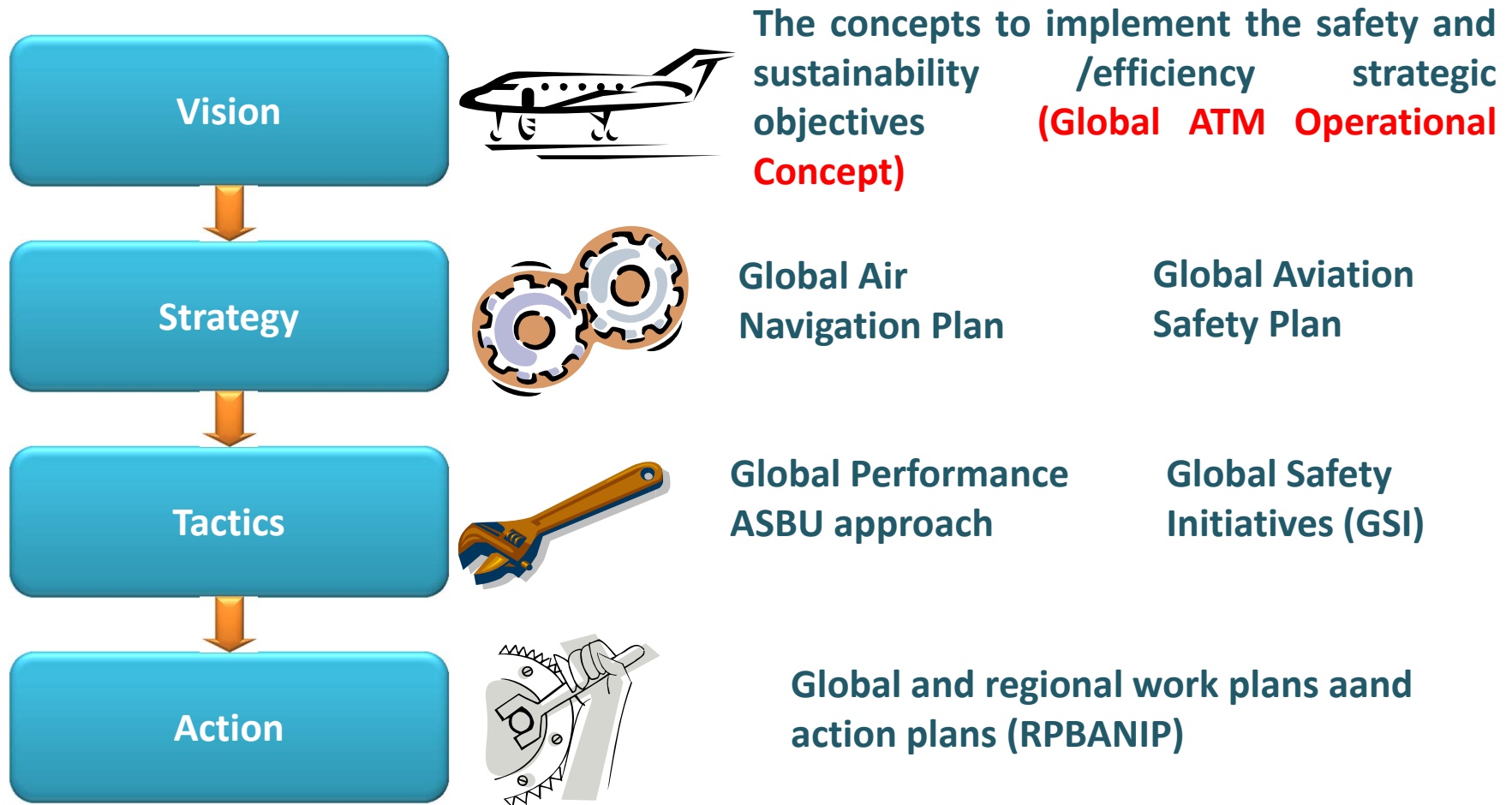
Santo Domingo, Dominican Republic, 24 to 27 September 2013

III AMHS Workshop Objectives



- a) follow-up the Regional AMHS implementation Plan;
- b) exchange information, experiences and lessons learned from the Dominican Republic AMHS interconnection and different AMHS preparatory actions made in the NAM/CAR Regions;
- c) provide guidance on the AMHS implementation within the global operational concept framework of the ICAO, the Aviation System Block Upgrades (ASBU) and the regional agreements; and;
- d) discuss AMHS implementation limitations and concerns to decide actions and agreements to streamline the implementations.

ICAO Global Implementation Overview

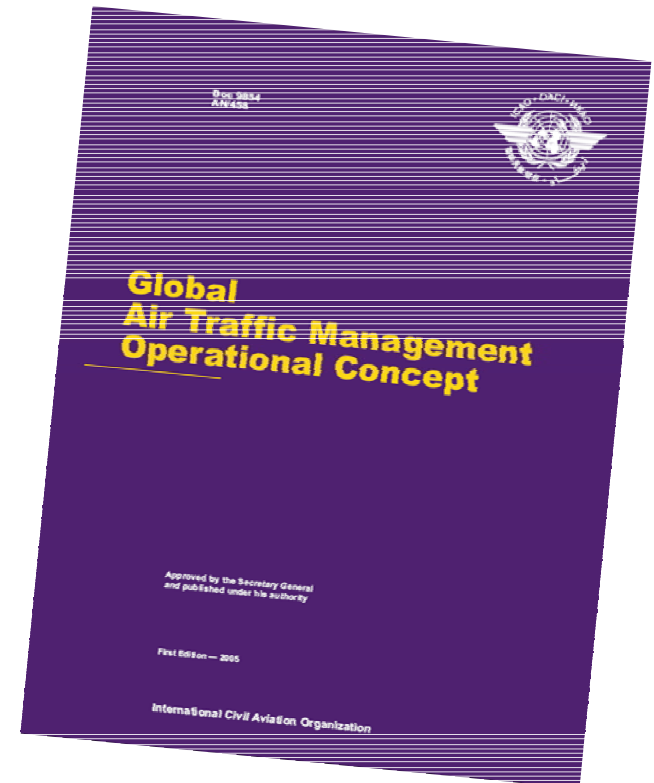


ICAO Global Implementation Overview



Global ATM Operational Concept

- ✦ The Global Air Traffic Management System Operational Concept;
 - ✦ describes how an integrated global air navigation system should operate
 - ✦ describes what is envisaged on the basis of services
 - ✦ describes how the services form an integrated system
 - ✦ utilizes an information rich environment, that solves most problems strategically, through a collaborative process
 - ✦ provides States and industry with clearer objectives for the design and implementation of ATM and supporting CNS systems
- ✦ ATM user expectations are drivers for change, requiring:
 - ✦ Safety case
 - ✦ Business case



Technical Enablers
Operational Enablers procedures
Socio-economic Enablers

ICAO Global Implementation Overview



Performance based
Global Air Navigation Systems
(2008)

Aviation System Block Upgrade
(ASBU) Methodology
(2012)

Global ATM system
(2006)

CNS/ATM systems
(1994)

Future Air Navigation Systems
(1992)

Ground based
Air Navigation systems
(Before 1992)

**EVOLUTION TO
A PERFORMANCE BASED
GLOBAL AIR NAVIGATION
SYSTEMS WITH ASBU
METHODOLOGY**

ICAO Global Implementation Overview



Current Edition of GANP GPI-22 – *Communication infrastructure*

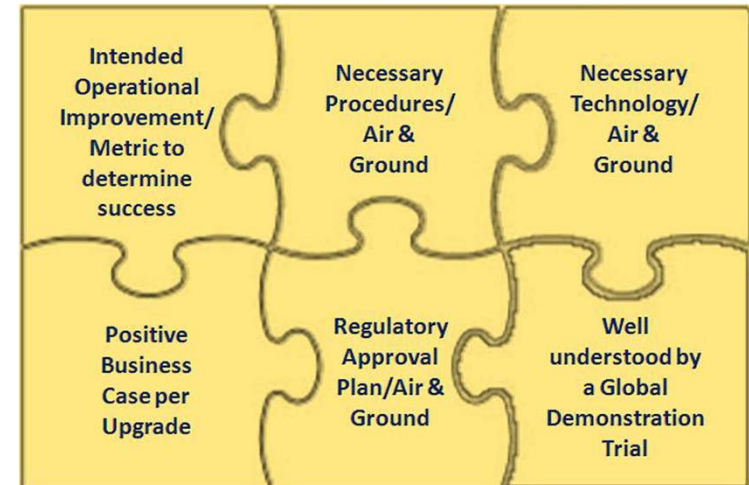
To evolve the aeronautical mobile and fixed communication infrastructure, supporting both voice and data communications, accommodating new functions as well as providing the adequate capacity and quality of service to support ATM requirements.

Common objective: to seek the most efficient communication network service providing the desired services with the required performance and interoperability required for aviation safety levels at minimum cost.



4th Edition of GANP

AVIATION SYSTEM BLOCK UPGRADE (ASBU) METHODOLOGY



ATN/ AMHS relevant SARPs

ATN Ground-ground data applications

- ✿ AFTN (Aeronautical Fixed Telecommunications Network) (between communication centres)
 - ✿ low/medium speed
 - ✿ 1800 character message limitation
 - ✿ store and forward
- ✿ OLDI (On Line Data Interchange) (between ATS centres)



- ❖ AMHS (Aeronautical Message Handling System) an ATN application between communication centers
- ❖ AIDC (ATS Interfacility Data Communication) an ATN application between ATS centers
- ❖ OLDI (IP)

Annex 10 Volume II:
4.4 Aeronautical fixed telecommunication network (AFTN)
4.6 ATS message handling services (ATSMHS).

Annex 10 Volume III:
CHAPTER 8. AFTN Network
Chapter 3: Aeronautical Telecommunication Network (ATN)



ATN/ AMHS relevant SARPs

Guidance Material

For OSI Implementations

Doc 9880 (First Ed 2010)

A/G and G/G Applications

Application Support

Detailed Technical Spec

- **Part I** - Air-Ground Applications
- **Part II** - Ground-Ground Applications - Air Traffic Services Message Handling Services (ATSMHS)
- **Part III** - Upper Layer Communications Service (ULCS) and Internet Communications Service (ICS)
- **Part IV** - Directory Services, Security and Systems Management

For IPS Implementations

Doc 9896 (2nd Ed 7 September 2011)

Detailed Technical Spec

Application Support

Guidance for implementation

Doc 9880

A/G and G/G Applications

ATN/ AMHS relevant SARPs



DOC 9880

ATSMHS: ATS Message Service , exchange of ATS messages between service users

Two ATSMHS levels of service: a) the basic ATSMHS and b) extended ATSMHS

AMHS: Set of end systems providing the ATSMHS

ATN End Users: a) ATS message server, b) ATS message user agent and c) AFTN/ AMHS gateway

DOC 9896

Ground networking elements are relatively stable, based on IPv6 and BGP routing

Compatible with on-going IP implementations

Networking protocols

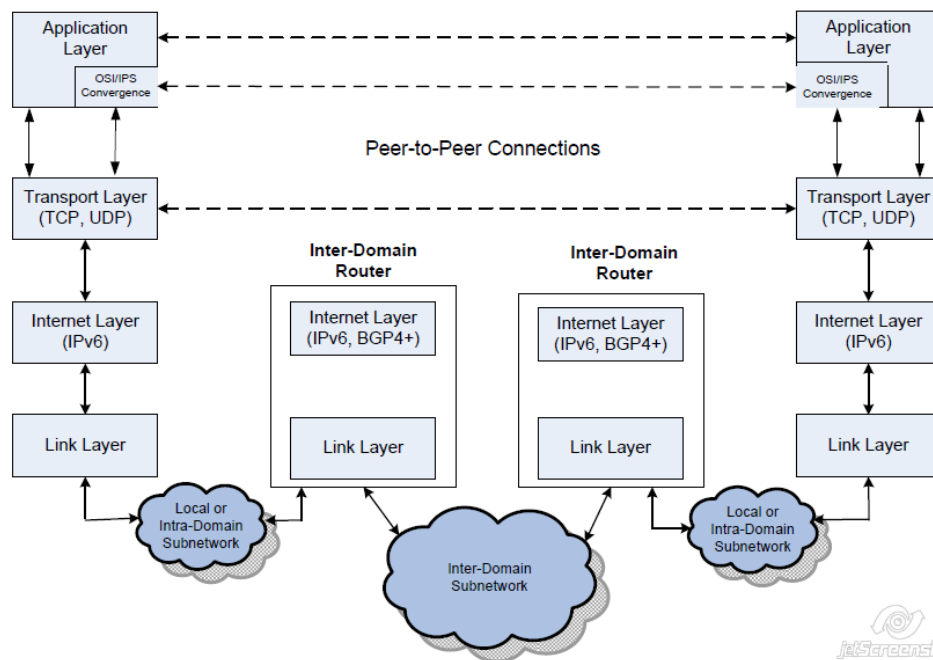
Provisions for mobility management

Provisions for security (IPSec, SSL/TLS, ATN Security)

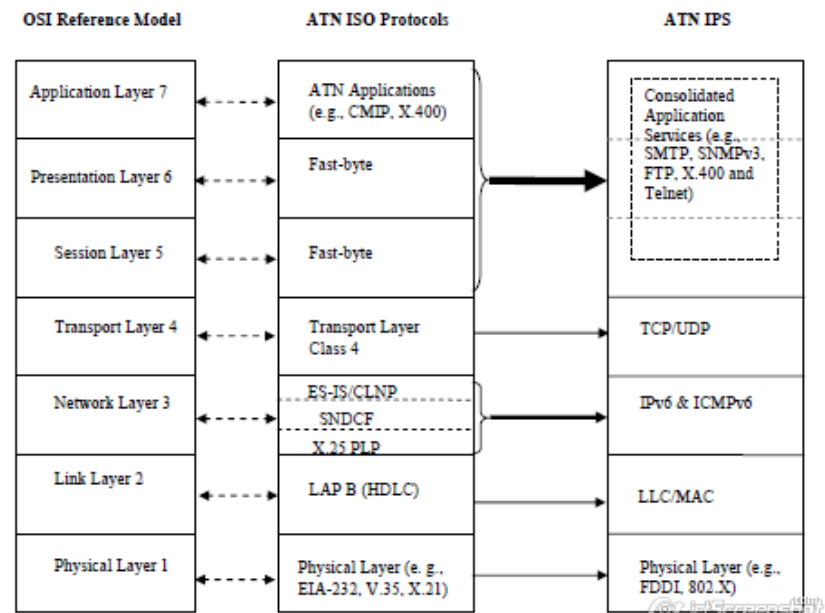
VoIP material

ATN/ AMHS relevant SARPs

DOC 9896



ATN/IPS Protocol Architecture



Protocol Reference Model

ATN/AMHS Regional References



CAR/SAM Regional References

CARSAM Regional Strategy for the deployment of the ATN and its applications

Short term (1/2)

Actions	Implementation Status
Complete the updating of the aeronautical digital communication networks by providing intra and inter-regional interconnection and interoperability.	Completed
implementation of the AMHS to replace the AFTN.	On going
Carry out the strategic deployment of a limited number of ATN routers of the ATN backbone to support other ground-ground and air-ground applications.	On going with Network improvements
The referred ATN routers must provide AFTN/AMHS gateway during the transition phase.	completed
Beginning of implementation of the AIDC within control centres	On going with delays

ATN/AMHS Regional References



CAR/SAM Regional References

CARSAM Regional Strategy for the deployment of the ATN and its applications

Short term (2/2)

Actions	Implementation Status
undertake the training of operational and technical personnel in order to provide the necessary knowledge to introduce the ATN and its ground-ground applications (AMHS and AIDC).	On going with delays
Based on the relevant deployment of the ATN ground-to-ground infrastructures and ground applications, gradual introduction of ATN air-ground applications is suggested	2015 onwards
Implementation will be in full agreement with SARPs, ICAO PANS and GREPECAS guide.	completed

ATN/AMHS Regional References



CAR/SAM Regional References

AFTN PLAN CNS TABLE 1A

Chart CNS 1A – Rationalized AFTN Plan for CAR/SAM Regions

Table CNS 1Ba –Routers Regional Plan

Table CNS 1Ba –Routers Regional Plan (Chart)

All FASID References available at:
<http://www.icao.int/NACC/Pages/edocs-cns.aspx>

Overview of ATN/AMHS Regional Implementation Follow-up



2010: Workshop on the Implementation of the ATS Message Handling System (AMHS) in the NAM/CAR Regions (Miami, Florida, United States, 19 to 21 October 2010)

- ICAO references and guidance material
- Procedure/activities to follow-up for AMHS trials
- System Configuration and Procurement
- Test considerations with the FAA
- Training aspects
- Monitoring edge device services
- Exchange of experience and lessons learned: AMC/ FAA Websites
- Recommendation for a follow-up AMHS implementation meeting
- A website for AMHS and technical exchange of information
- Matrix: Trial sequence and technical information to follow-up

Overview of ATN/AMHS Regional Implementation Follow-up



2012: ICAO/FAA Workshop/Meeting on the Follow-up to the Implementation of the ATS Message Handling System (AMHS) in the NAM/CAR Regions and ATN Meeting (Miami, Florida, United States, 10 – 13 April 2012)

- United States/FAA exchanged their information, experiences and lessons learned from the different AMHS tests carried out with United Kingdom, Japan, Fiji and NAM/CAR States and followed up on the corresponding AMHS implementation issues.
- Update on ICAO AMHS SARPs and guidance material on the AMHS implementation within the global operational concept framework of the ICAO, ASBU methodology, NAM/CAR Regional Performance-based Air Navigation Implementation Plan (RPBANIP NAM/CAR) and the regional agreements
- Update to NAM/CAR AMHS implementation matrix by States
- Regional agreements (CAR Test and Service Cutover plan) for tests and service cutover to AMHS: 7 States/International Organization defined their dates and activities for AMHS implementation for 2012 and 1st semester 2013: Implementation Plan
- Six States and COCESNA registered in the AMC Database for AMHS implementation
- Knowledge on the current and future status of the AMHS implementation in the NAM/CAR Regions

Overview of ATN/AMHS Regional Implementation Follow-up



2012: 1st AMHS Implementation Teleconference (18 April 2012)

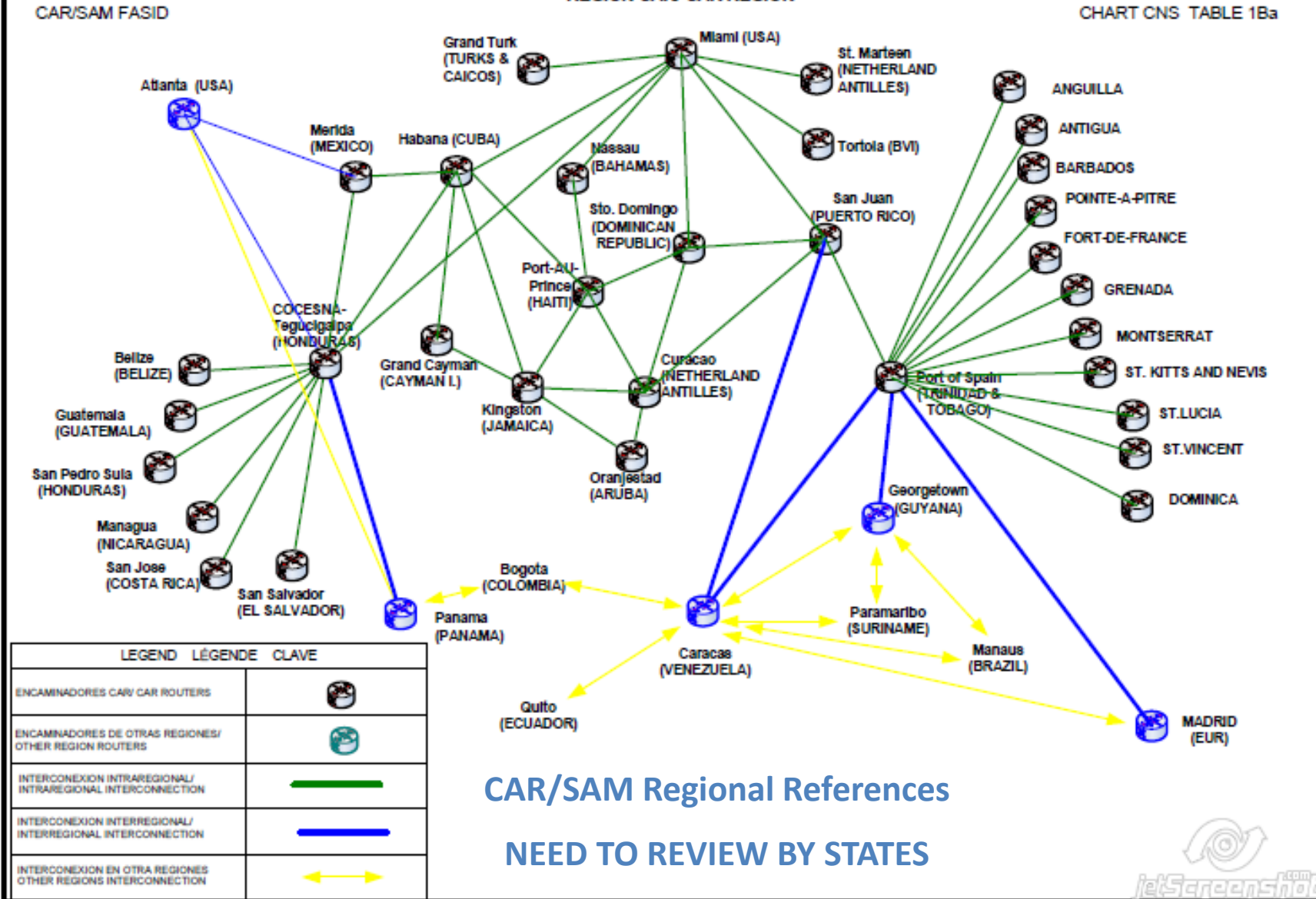
1. Update of milestones of AMHS implementation action Plan (Signature of Technical Letter, Interoperability tests and service cutover), agreeing in the following:
 - a) All States/ANSPs involved in this action plan shall complete the dates of the remaining activities to the milestones by **June 29, 2012** and send it to ICAO for posting it on the ICAO AMHS Webpage.
 - b) Jamaica, Curacao, Turks and Caicos, Aruba, Cuba and Trinidad and Tobago will signed the requested technical letter to carry out the AMHS test and implementation activities preferably before **30 May 2012**.
 - c) For testing, Dominican Republic and COCESNA plan to use a VPN connection, Trinidad & Tobago will used either a VPN or dedicated MPLS connection and the rest of States/ANSP plan to have a dedicated MEVA circuit.
 - d) All States plan to have a full AMHS implementation within their local users and with United States. COCESNA will have several AFTN users within Central American once AMHS connection with United States is completed.
 - e) All States/ANSPs will have the AFTN service available as a backup, for an agreed period of time for example 1 month, once AMHS service is implemented.
2. Trinidad and Tobago indicated that they had already coordinated testing with Venezuela, and so will inform ICAO by **20 April 2012** of the progress achieved for ICAO NACC Office to continue the coordination with SAM Office.
3. United States will send the test procedures to Dominican Republic by **20 April 2012**, which shall be used as reference for the other States/ ANSP and for its availability in the AMHS Webpage. Also United States will send by **20 April** the Technical Letter to those States/ ANSP that has not signed it and are scheduled for test.
4. Regarding the potential meeting on FAA Tech Center, all agreed that this matter shall be review by the end of this year for its scheduling for 2013 if necessary.
5. ICAO recommended to States/ANSP involved in these test/implementation activities that they should informed the Directors and working Group Meeting on their planning and progress made, for the benefit of the regional and the AMHS users.

ATN/AMHS Regional IMPLEMENTATION Issues



TABLE CNS 1Ba
 ROUTERS REGIONAL PLAN / PLAN REGIONAL DE ENCAMINADORES
 REGION CAR/ CAR REGION

CHART CNS TABLE 1Ba



CAR/SAM Regional References

NEED TO REVIEW BY STATES



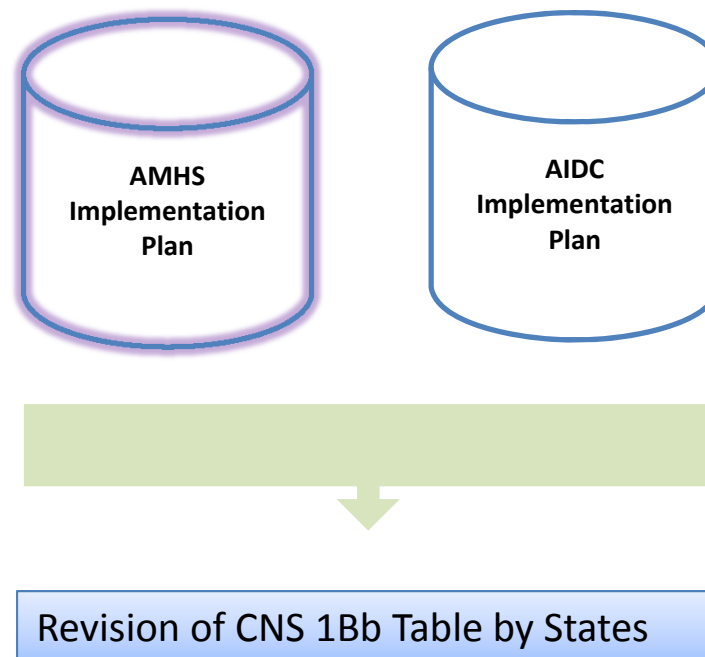
ATN/AMHS Regional IMPLEMENTATION Issues



CAR/SAM Regional References

Table CNS 1Bb – ATN Ground- Ground Applications Plan

- Due to the implementation of the New Flight plan format, several States have speed up the implementation of their AMHS Systems
- With the recognition of the operation benefits achieved through the implementation of CPL-LAM functionalities, several States plan to implement AIDC shortly
- The modernization of regional telecommunication networks are facilitating the implementation of ATN applications



ATN/AMHS Regional IMPLEMENTATION Issues



Adoption of AMHS
CAAS Addressing
Scheme for CAR
Region (only 2 States
in CAR)

IPv4 Addressing Scheme
— NAM/CAR Regions
Inter/Intra Regional G-G
Links (Under review)

ATS Messaging
Management Centre
(AMC) Registration
(almost all)
[http://www.icao.int/NAC
C/Documents/eDOCS/CN
S/AMCTrainingSlidesV3-
0b.pdf](http://www.icao.int/NAC/C/Documents/eDOCS/CN S/AMCTrainingSlidesV3-0b.pdf)

ATN/AMHS Regional IMPLEMENTATION Issues



NAM/CAR REGIONAL PERFORMANCE-BASED AIR NAVIGATION IMPLEMENTATION PLAN (NAM/CAR RPBANIP)

Harmonized implementation of Air Navigation Services and Systems under PBA.

States, Air Navigation Implementation Working Group (ANI/WG) and other regional implementation groups follow-up this Plan, and formulate detailed Action Plans

Among the 9 Regional Performance Objectives (RPO), the implementation of the ATN is considered under RPO No. 6 Optimization and Modernization of Communication Infrastructure.

Version 3.0 of the RPBANIP is ASBU compliant and includes new ICAO ANRFs for monitoring and reporting



ATN/AMHS Regional IMPLEMENTATION Issues



NAM/CAR Telecommunication Media

MEVA II Network:

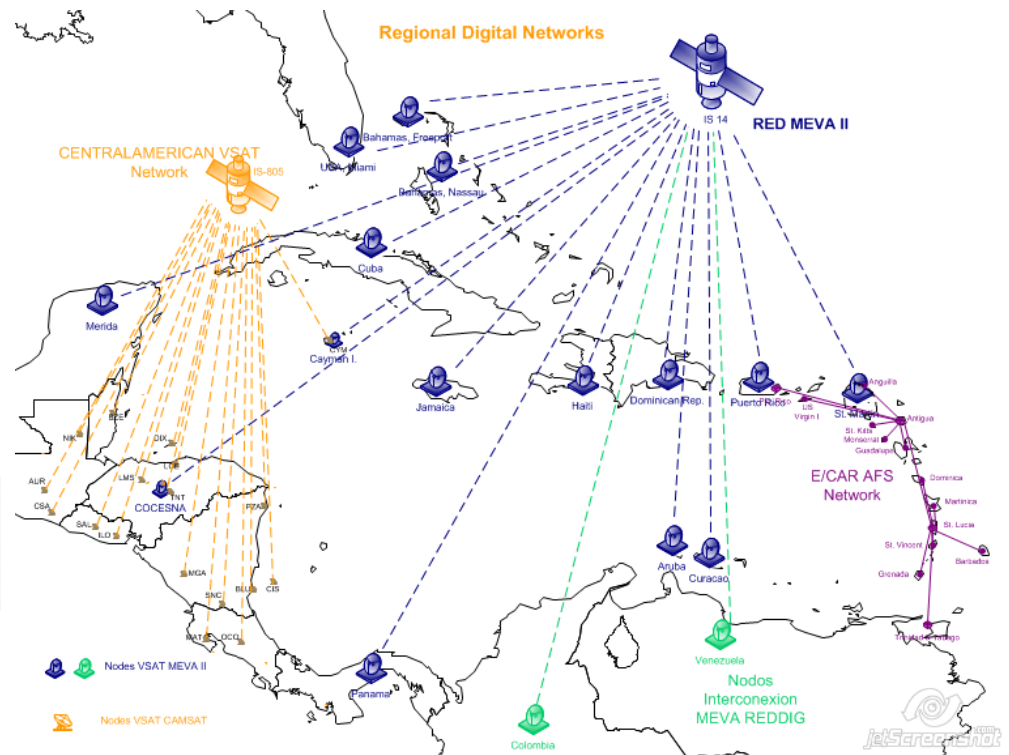
VSAT Network / Frame Relay	Provides services to all Central Caribbean, Mexico and Central America	Main Network for AMHS implementation	interconnection with REDDIG and E/CAR Networks	MEVA III
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E/CAR Network:

MPLS Network / IP	Provides services to all Eastern Caribbean States	Main Network for AMHS implementation		
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CAMSAT Network:

VSAT Network / Frame Relay	Provides services to all Central America	In support of ground based Telecom Network	New node in Panama and Central America	
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ATN/AMHS Regional IMPLEMENTATION Issues



ICAO NACC Office Regional Website:

AMHS common References:

<http://www.icao.int/NACC/Pages/docs-cns.aspx>



Regional Groups

Links to Regional Groups and Regional Documents
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Regional Aviation Safety Group – Pan America (RASG-PA)
Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA)
MEVA Technical Management Group (MEVA TMG)
NAM/CAR Air Navigation Implementation Working Group (ANI/WG)
Haiti Civil Aviation Steering Committee (Haiti CASC)
NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (NAM/CAR RPBANIP) Version 2.0, May 2011

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CNS - Communications, Navigation and Surveillance

Regional Officer: **Julio Siu**
Assistant: **Lizette Morales**

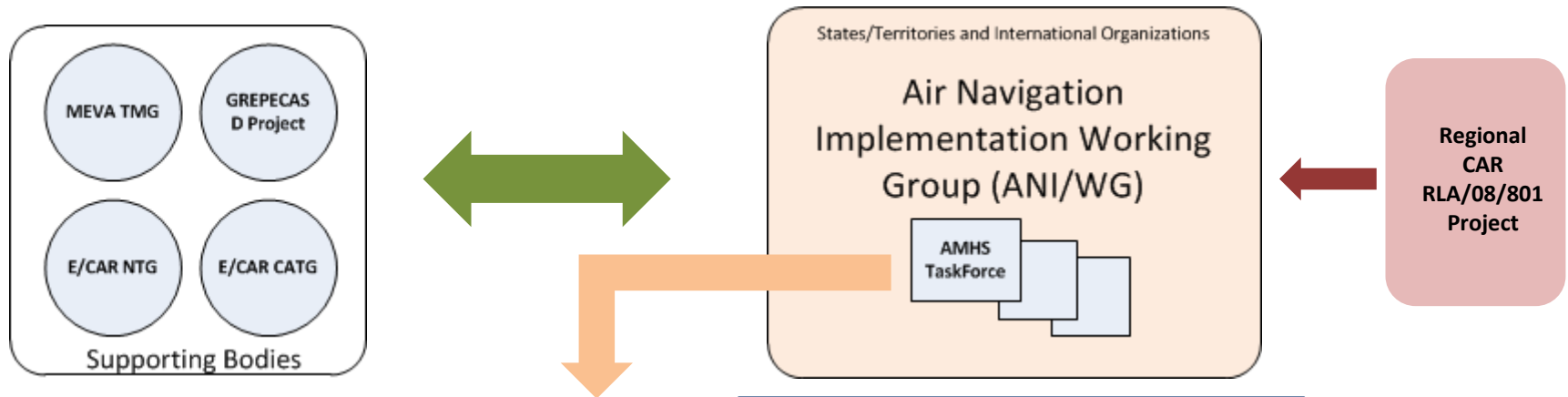
AMHS

Subject	Language
CAR-AMHS ImplementationPlan	en
CAR Regions AMHS Implementation Matrix	en
AMHS Interoperability Test Plan v1.0	en
AMHS Implementation Workshop Web Page	Link
List of participants Web	en
Draft Technical Letter of Agreement for AMHS	en
1st Teleconf Meeting for AMHS Implementation	en
FAA Transition Process	en
ATS Messaging Management Centre (AMC) Users Training Including AMC Phase 2 functions	en

ATN/AMHS Regional IMPLEMENTATION Issues



NAM/CAR Implementation supporting and implementing Bodies



Task Force Member- Name:	State/T/IO
Carlos Jimenez Guerra	Cuba
Carmen Dearmas	
Jean Baptiste Getrouw	Curacao
Fernando A. Casso	Dominican Republic
Raul van Heyningen	Sint Maarten
Veronica Ramdath	Trinidad-Tobago
Randy Gomez	
Emmanuel Rigby	Turks and Caicos Islands
Dulce M. Rosés (Rapporteur)	United States
Mayda Avila	COCESNA
Eduardo Vega	
Roger Pérez	

NAM/CAR Regional Performance-based Air Navigation Implementation Plan (RPBANIP)

- AMHS TaskForce Responsibilities:**
- a) Work Programme Management
 - b) Coordination, implementation and trials of ATN ground applications/AMHS implementation (AMHS Regional Plan)
 - c) Revising and updating the IPv4 address plan and other CAR Region technical implementation issues in accordance with ICAO technical principles and guidelines



North American
Central American
and Caribbean
(NACC) Office
Mexico City

South American
(SAM) Office
Lima

ICAO
Headquarters
Montreal

Western and
Central African
(WACAF) Office
Dakar

European and
North Atlantic
(EUR/NAT) Office
Paris

Middle East
(MID) Office
Cairo

Eastern and
Southern African
(ESAF) Office
Nairobi

Asia and Pacific
(APAC) Office
Bangkok

Thank You

A world map is shown in a light blue color. Eight colored dots (blue or orange) are placed on the map, each connected by a thin line to a text label describing an ICAO office. The orange dot is located in North America, representing the ICAO Headquarters in Montreal. The other seven dots are blue and represent regional offices in Mexico City, Lima, Dakar, Paris, Cairo, Nairobi, and Bangkok. A large, rounded rectangular box with a grey gradient background and a black border is centered over the map, containing the text "Thank You" in a bold, dark blue font.