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North American, Central American and Caribbean Office

WORKING PAPER

AIM/TF/03 — WP/05
14/01/20

THIRD MEETING OF THE NAM/CAR AIR NAVIGATION IMPLEMENTATION WORKING GROUP (ANI/WG) AERONAUTICAL INFORMATION MANAGEMENT (AIM) IMPLEMENTATION TASK FORCE (AIM/TF/3)

Mexico City, 25 to 28 February 2020

Agenda Item 3: **Review and Update of a New Updated AIM Regional Plan, including AIM collaborative Plan**

NAM/CAR REGIONAL PLAN FOR COLLABORATIVE AIM

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
This Working Paper presents a reviewed version of the Regional Plan for Collaborative AIM, for consideration by the Task Force.	
Action:	Described in Section 3
Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency
References:	• Annex 15 • Doc 8126 • PANS AIM • Asia/Pacific Regional Plan For Collaborative AIM Document

1. Introduction

1.1 During the ANI/WG/05 Meeting the NAM/CAR Regional Plan for Collaborative Aeronautical Information Management (AIM) was presented, taking into consideration that ATM needs the best integration of real-time data and information, and its management (meaning sharing and distribution of data to shareholders). Information Management is based on the strategic and tactical provision of quality assured and timely operational data in support of ATM operations.

1.2 A draft version of the Plan was considered as part of a suite of NAM/CAR AIM tasks supporting the three phases for the transition from AIS to AIM, thus, it should not be considered in isolation and it was presented to the ANI/WG/05 Meeting for discussion and review.

2. Discussion

2.1 According to the ICAO Roadmap for the transition to AIM the Plan contents should be updated and transferred into the Plan as soon as the Annex 15 or PANS AIM amendments are available, in particular the consolidated ICAO guidance material would be reviewed on the publication of expected

ICAO quality management and training manuals and ensure alignment of regional guidance with global direction on:

- *Quality Management*, incorporating existing draft Guidance Manual Doc. 9839 (including P-17 and P-18);
- *AIM Training*, incorporating existing draft Guidance Manual Doc. 9991 (including P-16);
- *Aeronautical Information Exchange Model (AIXM)*, (including P-08, P-09, P10 and P-19);
- *Electronic AIP (eAIP)*, (including P-11, incorporating P-15 and P-20)

2.2 This document, Plan for Collaborative AIM, was originally developed and presented by the ICAO APAC Regional Office with the intention to provide information, guidance and regional performance objectives supporting improvement of AIS and the transition to AIM. The objective in our region is to apply the NACC version of the adapted Document in a very similar way and make clear that is not intended to duplicate but provide a valid support to States.

2.3 The idea for the Plan was coordinated with the developer in ICAO APAC Office, in order to support the Regional implementation of AIM and to accelerate and monitor the development for all transition phases.

3. Progress on the Development of the AIM Collaborative Plan

3.1 Further progress in the development of the plan has been minor, due to no feedback from the States. Contributing factors have been the increased demand on the limited resources in the ICAO Regional Office for coordinating any further development, and the formation of a specialists group, coordinated by ICAO Headquarters and tasked with inter alia accelerating the completion of key global guidance documents including the new Quality Manual and Training Manual.

3.2 The absence of ICAO guidance for the quality management system of AIM, and for training for AIM personnel, was one of the primary motivators for the use of the draft guidance material available on both cases in our Region.

3.3 Given the effort to update Annex 15, new Doc 10066 - PANS-AIM and updated Doc 8126 – *Aeronautical Information Services (AIS) Manual* in four volumes, all three taking effect from 2018, the Meeting is invited to note that the Plan includes important guidance for the development of AIM transition

3.4 The NACC Regional Plan for Collaborative AIM reviewed version is shown in **Attachment** for analysis and discussion purposes, previous to its implementation.

3.5 The Scope of the Plan includes information on where other regional AIM planning and guidance documents may be found, and relevant information from the CAR/SAM Air Navigation Plan (CAR/SAM ANP), including specific regional requirements proposed by AIM/TF and will be formalized by the NACC/WG to be presented at the next NACC/DCA Meeting in 2020, for final agreement on the establishment of the Plan and the possibility of the integration of the AIM Steering Group with the

proposal for a review cycle amended to take account of global developments that may affect the Plan in the near and medium terms, such as Operating Procedures for AIS dynamic data, and their availability.

3.6 In line with other regional plans that are subsidiary to the Seamless ATM Plan, the Background Information section includes the Implementation Status Monitoring provisions for an AIM implementation status monitoring regime. The associated Regional AIM Monitoring and Reporting Form is an appendix to the AIM Plan.

4. Suggested Actions

4.1 The Meeting is invited to:

a) note the information contained in this WP;

b) propose the adoption of Version 1.3 of the NACC Regional Plan for Collaborative AIM; and

c) discuss any relevant matters as appropriate.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

NACC REGIONAL PLAN FOR COLLABORATIVE AERONAUTICAL INFORMATION MANAGEMENT (AIM)

Version 1.6, February 2020

AERONAUTICAL INFORMATION MANAGEMENT TASK FORCE (AIM/TF)

Disclaimer:
This Plan recognize the development made by Ms. Ying Zhou, Associate Officer ATM/AIM ICAO APAC

CONTENTS

1. SCOPE OF THE PLAN

Plan Structure

1.1 Air Traffic Management (ATM) implies the best integration of real-time, historical and prospective data and information, and the management, sharing and distribution of that data to shareholders. Information Management is based on the strategic and tactical provision of quality assured and timely operational data in support of ATM operations.

1.2 The Seamless ATM Plan references different flight levels. The upper level is from global perspective, which is guided mainly by references to Doc 9750 - *Global Air Navigation Plan* (GANP 6th Edition), Doc 9854 - Global ATM Operational Concept and the Global Aviation Safety Plan (GASP). Beneath it is regional planning, primarily provided by the NACC Plan and needs to be framed with an awareness of the ATM system as a whole and its purpose of Information Management within ATM system for Collaborative Aeronautical Information Management (hereinafter referred to as the 'Plan') and other guidance materials, to define goals and means of meeting State planning objectives.

1.3 The Plan addresses the full range of ATM, Users and Stakeholders, and was developed as part of a suite of NACC AIM Plans, thus, it should not be considered in isolation. The word 'States' in the Plan also includes the Territories.

1.4 There are three major areas of AIM Principles:

a) People (human performance, ensure complete understanding of AIM concepts including training of relevant staff, common procedures based on a Regional Operational Concept, etc.)
b) Facilities (physical equipment, Data-sharing), Technology
c) Aeronautical Information and Data sets

Plan Review

1.5 The Seamless ATM performance framework focuses on technological and human performance within Aviation System Block Upgrade (ASBU) elements. ASBU Block 0 modules contain technologies, systems and procedures which are available from 2013. However, the Plan also has references to ASBU modules in Blocks 1, 2 and 3, which will be available from 2019, 2025 and 2031 respectively.

1.6 ASBU focuses on the initial introduction of digital processing and management of information. On the process of transition from AIS to AIM, Aeronautical Information Exchange Model (AIXM), migration to electronic Aeronautical Information Publication (eAIP), better quality (QMS) and availability of data should be under consideration and in usage. Therefore, the Plan needs to be updated and take into account ASBU modules in Blocks 0, 1, 2 and 3 as well as BBBs.

1.7 The Plan requires regular updating to keep current with aviation system changes. It is intended that AIM/TF conduct and coordinate a complete review every three years (or a shorter period determined by the AIM/TF) of the Plan to align with the recent review cycle of the GANP. The Plan and its subsequent revisions should be endorsed by AIM/TF to the NACC WG.

2. OBJECTIVES

Plan Objective

2.1 The objective of the Plan is to facilitate the improvement and harmonization of AIM implementation in the NACC Region for the interoperable AIM systems in support to Seamless ATM operations, by developing and deploying AIM solutions capable of ensuring safety and efficiency of air transport throughout the Region in accordance with the SWIM requirements.

2.2 Noting that more complex and costly challenges of implementing the digitally based AIM environment expected under Amendment 40 to Annex 15, the Plan provides a framework for a transition to a collaborative AIM environment, in order to meet future global and regional performance requirements, including those included in Doc 10066 - *PANS AIM*.

Guidance for the Transition from AIS to AIM

2.3 The Plan provides a framework for the transition to a collaborative Regional AIM environment, in order to meet current and future global and regional performance requirements and it is neither isolated, nor conflicts with other plans or strategies it is well referenced in conjunction with other previous ones.

3. EXECUTIVE SUMMARY

Driving Force for Collaborative AIM

3.1 This AIM Plan addresses the full range of ATM stakeholders, and was developed as part of a suite of NACC air navigation plans, thus, it should not be considered in isolation.

3.2 AIM is envisaged as one of the most valuable and important enabling services in ATM operational concept. To satisfy new requirements of ATM, which is based on a collaborative decision-making environment, AIS has to transit to a broader concept of AIM, which provides aeronautical data and information in digital and electronic formats and is displayed graphically and geodetically, complies with ISO Quality requirements and international standards and formats for exchanges, that is accessible system-wide by all stakeholders and almost real-time, given its data-centric nature as opposed to the product-centric nature of the previous concept of AIS.

3.3 Due to economic and efficiency drivers, GREPECAS has foreseen an increasing need for States work together, which may develop into joint or shared operations, such as sub-regional Aeronautical Information Publications (AIPs Trinidad and Tobago for ECAR States, Curaçao for Netherland Territories and COCESNA for Central American States), AIM training and aeronautical databases. Moreover, it is recognized that collaboration between States inevitably improves the harmonization and interoperability of systems – it is a key basis of Seamless ATM.

3.4 Collaboration is especially important for small, less resourced States and Territories as the technical challenges increase and the maintenance of technical competency and systems becomes more difficult. In this way, Collaborative AIM is expected to benefit all States and Territories, from the most vulnerable to the better resourced, as the latter will have assurance that increasingly interconnected smaller States will also be able to fulfil their international obligations. Duties?

3.5 AIM is one of the foundation elements that supports other aspects of the current and future aviation systems dependent of data in electronic and digital formats, and as such requires a high priority. GREPECAS agreed that the transition from AIS to AIM should receive the highest priority, yet many States

are lagging behind in their implementation of this key element. Collaboration in the provision of aeronautical information and data will benefit States facing resource challenges, and benefit the broader NAM/CAR Regions through the overall improvement in the availability, timeliness and quality of aeronautical information and shared aeronautical information databases, and collaborative efforts in AIM training.

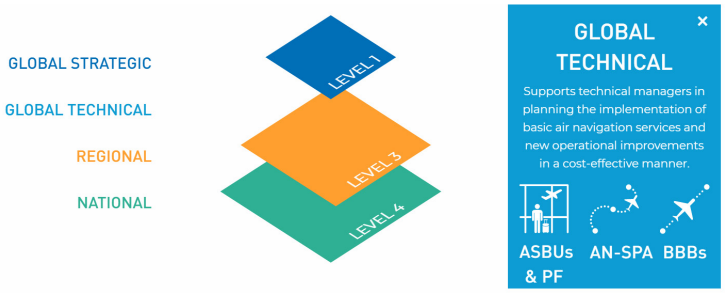
3.6 Based on safe, efficient air transport is the Aeronautical Information Management (AIM) of each State, which collates, maintains and publishes aeronautical data and information of lasting character essential to air navigation, including details of regulations, procedures and other data and information pertinent to the operation of aircraft within the area of responsibility of the State.

4. BACKGROUND INFORMATION

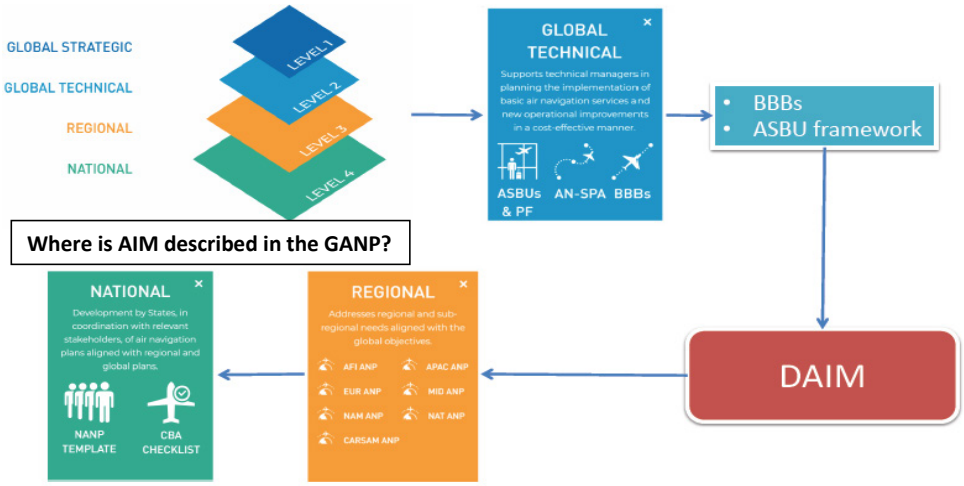
GANP Principles

4.1 The content of the GANP 6th. Ed. is organized into a multilayer structure with each layer tailored to different audiences. This allows for better communication with both high-level and technical managers with the objective that no State or stakeholder is left behind. The four-layer structure is made up of global (strategic and technical), regional and national levels, and provides a framework for alignment of regional, sub-regional and national plans. The four-layer structure facilitates decision making by providing a stable strategic direction for the evolution of the air navigation system and, at the same time, timely relevance in the technical content. (Visit https://www4.icao.int/ganpportal/)

4.3 The GANP provides a path to the safe, orderly and efficient evolution through the BBB and ASBU frameworks. Obligations in terms of the provision of essential air navigation services have been reflected in the BBB framework to ensure a robust baseline for the evolution. The evolutionary transformation reflected in the different steps of the conceptual roadmap is also reflected in the ASBU framework to ensure the interoperability of systems, harmonization of procedures and a harmonized approach to the modernization of the global air navigation system. New users, operations and roles, and all stakeholders are part of this structured transformation.

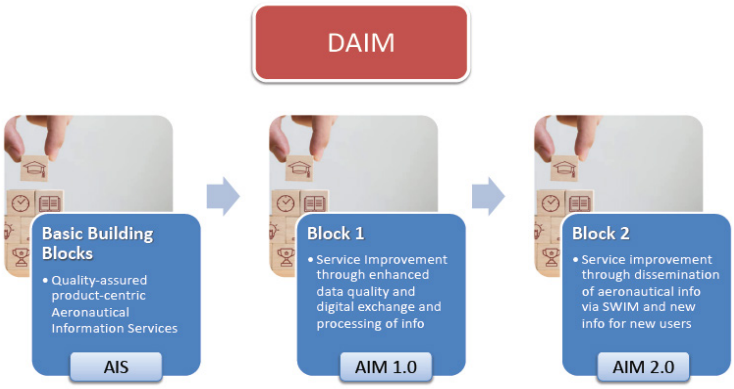


4.4 The aviation industry needs to ensure its position at the forefront of innovation by adopting an increasingly cross-domain and global perspective. There is much at stake for the global economy and for citizens if the modernization of the global air navigation system does not continue. The aviation industry needs to ensure its position at the forefront of innovation by adopting an increasingly cross-domain and global perspective. There is much at stake for the global economy and for citizens if the modernization of the global air navigation system does not continue.



Aviation System Block Upgrades (ASBU)

4.5 At the Global level, ICAO started the ASBU initiative as a programme framework including a set of aviation system solutions or upgrades intended to exploit current aircraft equipage, establish a transition plan and enable global interoperability. ASBU comprises a suite of modules organized into flexible and scalable building blocks, where each module represents a specific, well bounded improvement. The building blocks could be introduced and implemented in a State or a Region depending on the need and level of readiness, while recognizing that all the modules are not required in all airspaces.

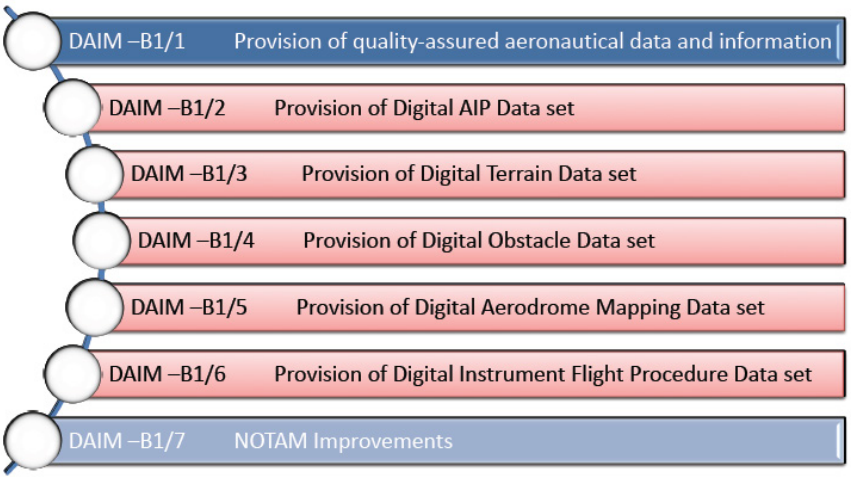


4.6 ASBU describes a way to apply the concepts defined in the Doc 9854, with the goal of implementing regional performance improvements, and is used in the new edition of the GANP to guide implementation. Since the Air Navigation Conferences (AN-Conf. /12 and 13) it was agreed that ASBU and the associated technology roadmaps are integral parts of the GANP new 6th Ed. and a valuable implementation tool kit.

4.7 ASBU is heavily dependent on AIM, as AIM is a critical prerequisite for the implementation of many current or future ATM or Air Navigation concepts that relies on the accuracy, integrity and timeliness of data.

4.8 In the AIM field domain, the main ASBU blocks which are relevant with Seamless ATM are as follows:

- B0-DAIM Service Improvement through Digital Aeronautical Information Management (AIM). A key strategy activity during Block 0 from 2013 until past 2019 that included the initial introduction of digital processing and management of information/data, through AIS/AIM implementation, use of aeronautical information exchange model (AIXM), migration to electronic aeronautical information/data publication (AIP) and better quality (QMS) and availability of data.
- B1-DAIM Service Improvement through Integration of all Digital AIM Information (2019-2025): ATM Information Reference Model (AIRM) integrates all ATM information/data and other Information/data Users (using UML, GML/XML), and implements information/data management with exchange data models: common formats are AIXM, FIXM, WIXM and internet protocols.
- B1-SWIM Performance Improvement through the application of SWIM applications and infrastructure (2019-2025): standard data models, internet-based protocols to maximize interoperability. Most of the air ground data exchanges will remain based on point-to-point communication.
- B2-SWIM Enabling Airborne Participation in Collaborative ATM through SWIM (2025-2031): aircraft as a fully connected information node in SWIM and collaborative ATM processes – exchange of data. DAIM in Block 1:



4.9 The Basic Building Block (BBB) framework outlines the foundation of any robust air navigation system. It is nothing new but the identification of the essential services to be provided for international civil aviation in accordance with ICAO Standards. These essential services are defined in the areas of **Information Management (AIM)**, Air Traffic Management (ATM), Search and Rescue (SAR), Meteorology (MET) and Aerodromes (AGA). In addition to essential services, the BBB framework identifies the end users of these services as well as the assets (Communications, Navigation, and Surveillance (CNS) infrastructure) that are necessary to provide them.

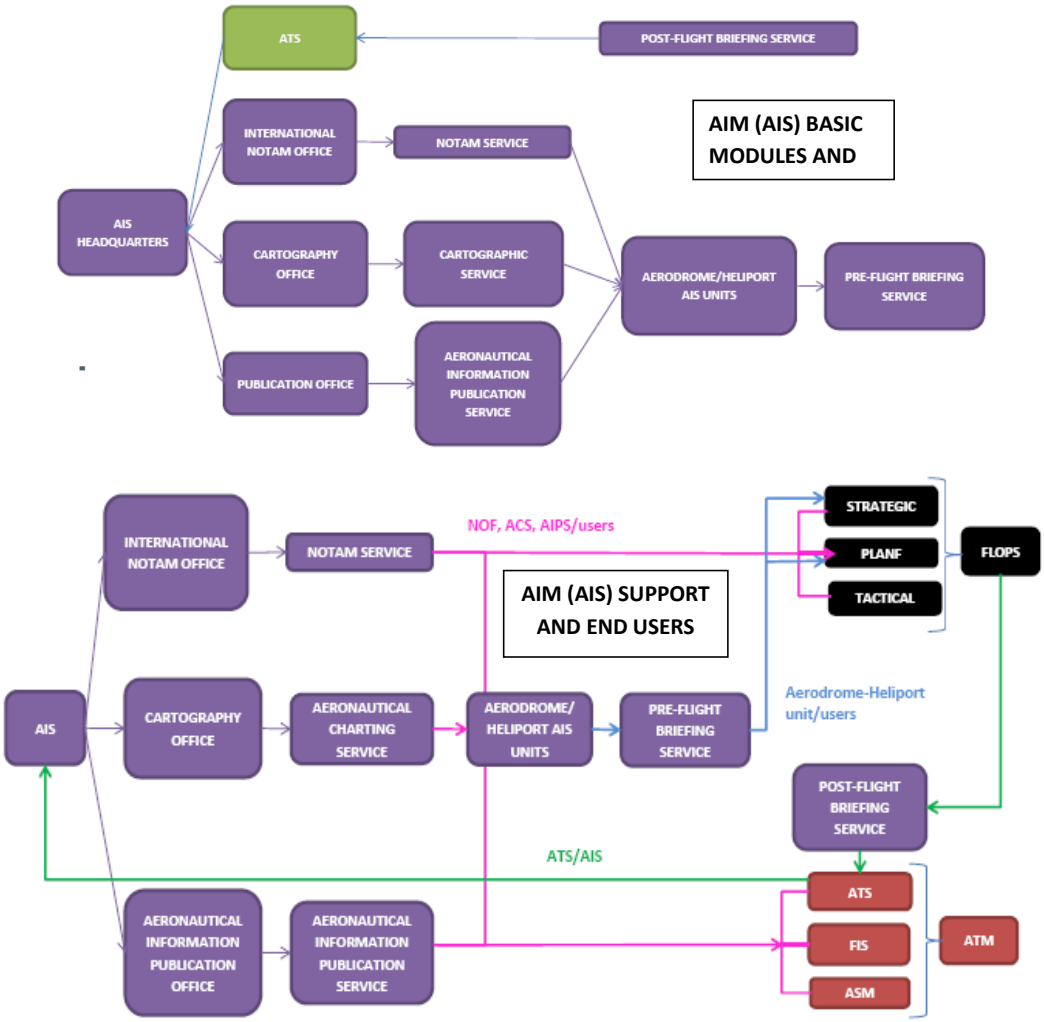
4.10 In order to ensure the provision of seamless air navigation services based on the deployment of interoperable systems and harmonized procedures, States need to leverage the implementation of the BBBs through their national air navigation plans as a strategic part of their national aviation planning framework. This will also pave the way for the future implementation of air navigation improvements to increase the quality of the services and meet the performance expectations of the aviation community.

4.11 The Basic Building Block (BBB) framework outlines the foundation of any robust air navigation system. It is nothing new but the identification of the essential services (AGA, AIM, ATM, MET and SAR), to be provided for international civil aviation in accordance with ICAO Standards. In addition to essential services, the BBB framework identifies the end users of these services as well as the assets CNS infrastructure that are necessary to provide them.

4.12 The BBB is considered an independent framework and not a block of the ASBU framework as they represent a baseline rather than an evolutionary step. This baseline is defined by essential services recognized by ICAO Member States as necessary for international civil aviation to develop in a safe and orderly manner. Once these essential services are provided, they constitute the baseline for any operational improvement.

4.13 The BBB framework will be updated every two years taking into account amendments to ICAO provisions. Although an initial draft of the BBB framework is presented online, the BBBs will be included in a web-based application in a format similar to the ASBU framework, in the GANP Portal:

https://www4.icao.int/ganpportal/BBB



5. AIS-AIM ROADMAP PHASES AND STEPS

5.1 According to AIS-AIM Roadmap, there are three phases and 21 steps. Failure to take action on any of these steps would increase the duration of the transition and negatively affect the enabling role of AIM. The three phases, according to the AIS-AIM Transition Roadmap, are as follows.

- Phase 1– **Consolidation**. Quality Management System (QMS), is a prerequisite for commencement of the transition from AIS to AIM. In this phase, States were expected to enhance the quality of their existing AIS products, attach great importance to AIRAC adherence and WGS84 implementation and publish their Differences related to ICAO Annexes (AIP and/or electronically).
- Phase 2 – **Going Digital**, In this phase, States were expected to create national or regional

database to produce existing products and services with better quality and availability, such as the delivery of eAIP, eTOD, etc.

- Phase 3 – **Information Management**. This is the final phase in the evolution to AIM, is also known as SWIM. Keywords of this phase are integration, collaboration and self- regulation. For all of the information domains, a range of supporting information applications will be discoverable and made available to all authorized users on the SWIM network.

5.2 **Phase 1** - Consolidation and **Phase 2** – Going digital, are important preparatory phases of the final transition to AIM. Consolidation is the main theme of Phase 1, whereas Phase 2 is the step to going digital, when information is increasingly being managed and exchanged digitally. **Phase 2 can be characterized as being the most critical in the transition, and should be kept as short as possible. Nevertheless the below illustrated deadlines do not indicate that States have implemented the phases.**

The 21 steps and deadline for implementation are shown below:

ROADMAP PHASE	ROADMAP STEPS	DEADLINE
PHASE 1	P-03 — AIRAC adherence monitoring	November 2010
	P-04 — Monitoring of States' differences to Annex 4 & 15	
	P-05 — WGS-84 implementation	
	P-17 — Quality	
PHASE 2	P-01 — Data quality monitoring	November 2013
	P-02 — Data integrity monitoring	
	P-06 — Integrated aeronautical information database	
	P-07 — Unique identifiers	
	P-08 — Aeronautical Information Conceptual Model (AICM)*	
	P-11 — Electronic AIP	
	P-13 — Terrain	
	P-14 — Obstacles	
	P-15 — Aerodrome mapping	
PHASE3	P-09 — Aeronautical data exchange	November 2016
	P-10 — Communication networks	
	P-12 — Aeronautical information briefing	
	P-16 — Training	
	P-18 — Agreements with data originators	
	P-19 — Interoperability with meteorological products	
	P-20 — Electronic aeronautical charts	
	P-21 — Digital NOTAM	

5.3 The main regional priorities for AIM implementation requirements are:

a) Establishment of AIM either as a separate entity within or, ideally, separated from the civil aviation administration in accordance with the guidance provided in ICAO Doc 8126 – *Aeronautical Information Services Manual* Chapter 3
b) Implementation of Quality Management Systems for aeronautical information
c) Establishment of formal agreements between AIM providers and aeronautical data originators specifying the content, quality, maintenance and timing of provision of aeronautical data that is required to be promulgated in AIP, and the quality management process that shall be applied
d) Implementation of internet-accessible electronic AIP generated from a digital database of aeronautical information

Note: some existing aeronautical information products may not be suitable for migration into digital datasets

e) The taking of all necessary measures to develop and implement AIM training programs for AIS personnel, including training in digital data management, and end-to-end quality management processes
f) Provision of full access to the relevant ICAO Annexes and Documents to all personnel having responsibility for the origination, reception, management and/or distribution of aeronautical information and aeronautical data

6. AIM TRANSITION GUIDANCE

6.1 During the last meeting of the AIM Task Force (AIM/TF 02, Miami, United States, August 2018), The AIM/TF recognized that the lack of AIM transition guidance plan material was a matter of significant concern to State Administrations. There had been delays in the production of global ICAO guidance documents, those of most immediate significance being the Doc 10066 - *PANS AIM*, Doc 8126 - *AIS Manual* (four Volumes), the new Doc 9839 - Quality Manual (unedited)draft? and Doc 9991 - *AIS Training Manual* (unedited). That Meeting agreed to continue to work on Regional AIM transition guidance material for key AIM transition steps from the ICAO Roadmap for Transition from AIS to AIM.

6.2 The AIM/TF will contributed to update the Status for Aeronautical Information Management (AIM) in the NACC Region by adding a new information on an AIM Tracking website, Interim example is the AIM Transition Guidance from EUROCONTROL, which emphasizes four priority steps from AIM transition roadmap, they are:

a) P-17 – Quality
b) P-16 – Training
c) P-18 – Agreements with data originators
d) P-11 – Electronic AIP

7. EMPHASIS ON THE FOUR AIM TRANSITION STEPS PRIORITIES

7.1 The transition **Step P-17** – Quality is one of the four steps in AIM Transition Phase 1 – Consolidation. Along with the other Phase 1 transition steps, P-17 – Quality is a prerequisite for commencement of the transition from AIS to AIM. In this phase, States were expected to enhance the quality of their existing AIS/AIM products.

7.2 The transition **Step P-16** – Training is one of the eight steps in AIM Transition Phase 3 – Information Management. The training of personnel will be adapted to the new requirements on skill and competencies introduced by the transition to AIM; the successful Quality Management System (QMS) also deeply relies on the motivation of personnel. Training Needs Analysis (TNA) and TNA developing process

are important. For transition from AIS to AIM, both tailored training based on each Contracting States and systematic and collaborative training among Contracting States in NACC region are all necessary.

7.3 The transition **Step P-18** – Agreements with Data Originators is one of the eight steps in AIM Transition Phase 3 – Information Management. While the NACC Region's current focus is on implementation of Phases 1 and 2, it is recognized that formal agreements between stakeholders in the aeronautical information chain are a critical component of robust end-to-end quality management. Step P-18 is one of four complementary Roadmap steps related to the quality management of aeronautical data: P-17 – Quality, P-01 – Data Quality Monitoring, P-02 – Data Integrity Monitoring and P-18 – Agreements with Data Originators. Data of high quality can only be maintained if the source material is of good quality. States will be required to better control relationships along the whole data chain from the producer to the distributor. This may take the form of template service level agreements with data originators, neighboring States, information service providers or others.

7.4 The transition **Step P-11** – eAIP is one of the nine steps in AIM Transition Phase 2 - Going Digital. The electronic version of the AIP is defined in two forms: a printable document and one that can be viewed by web browsers.

8. REPORTS OF AIM TASK FORCE (AIM/TF)

AIM Transition Information Sharing Website

8.1 In discussing Regional AIM transition progress, during the ANI WG 05 Meeting it was important to consider the need to design an AIM implementation tracking website. While the AIM Transition Table provides information on progress within the Phases, it does provide information on the current status and challenges being faced by States, and the proposal for an AIM tracking website will share experience among States.

8.2 That, AIM/TF agrees to facilitate a project by ICAO NACC to develop a website for the sharing of information related to the implementation of Aeronautical Information Management steps defined in the ICAO Roadmap for Transition from AIS to AIM. Facilitation includes:

a) States require providing punctually all information and data to AIM/TF that is needed in order to be reflected in the AIM TRACKING WEBSITE about the States Status
b) Providing a coordination point for the contact details of the **AIM TRACKING WEBSITE** administrator. Assisting in the development of a list of items for inclusion in the AIM TRACKING WEBSITE
c) Promoting the AIM TRACKING WEBSITE as a valuable resource for NACC States Administrations undertaking or planning to undertake AIM transition and implementation projects
d) Encouraging discussion of issues raised in the AIM TRACKING WEBSITE and lessons learned at AIM/TF meetings
e) Providing a summary of information shared through the AIM TRACKING website, and providing hyperlink(s) to the AIM TRACKING website, in AIM/TF meeting reports

Cooperation on AIM Training

8.3 Information was provided by a group of States to AIM/TF highlighting the need for cooperation among Contracting States in NACC Region regarding AIM implementation, in particular training for static and dynamic data management in AIXM environment, eAIP and Quality Management System.

8.4 Some States and International Organizations informed that they were developing a Standard AIS Training Package, and was open to opportunities for collaboration and technical assistance in AIM transition, and they had provided assistance to other States in AIS training, and AIM automation system and Quality Management System implementation, in cooperative activities through the other organizations including industry partners, and the International Federation of Aeronautical Information Management Associations (**IFAIMA)**.

8.5 Regional cooperation in AIM training will be important to ensure harmonized implementation throughout the Region.

Establishment of a separate AIS unit or department

8.6 AIM/TF reported that based on observations from visits to different States' AIS services and AIM meetings, it appeared that in some States the AIS was not established as a separate unit but as part of Air Traffic Services or Communication, Navigation and Surveillance organizations. In many cases ATC staff worked as AIS officers, working for both AIS and ATS. The view of the AIM/TF was that it was more appropriate that AIS should be established as a separate unit or department within its organization, with its personnel and management focused wholly on AIS/AIM as mentioned on Annex 15 and Doc 8126.

Delayed delivery of ICAO guidance documents

8.7 The following guidance material supporting the ICAO Roadmap for Transition from AIS to AIM was being developed by the ICAO AIS-AIM Study Group (AIS-AIM/SG):

- Annex 15
- Annex 4
- PANS AIM – Doc 10066 (new)
- PANS OPS – Doc 8168 (3 Volumes)
- Doc 8126 – AIS Manual (updated on four volumes);
- Doc 9839 – Quality Manual (unedited);
- Doc 9991 – AIM Training Development Manual (unedited);
- Doc 9881 – eTOD/AMDB Manual (require final validation and editing);
- Doc 9674 – WGS-84 Manual (require update);
- Doc 8697 – Charting Manual (require update);
- Doc 9855 – Guidelines on the use of the Public Internet for Aeronautical Applications (require update);
- Doc 8400 – ICAO Abbreviations and Codes (PANS-ABC – update) and
- AIM Concept (unedited)
- Plus others …

8.8 Delivery of the above documents had been further delayed beyond the latest advised time frame. The latest information from ICAO Headquarters was that most of these documents were undergoing final drafting and/or editing, but publication dates had not yet been finalized.

8.9 Other documents that were updated or released Annex 15 – Aeronautical Information Services, and the new Procedures for Air Navigation Services – Aeronautical Information Management (PANS-AIM).

9. CURRENT SITUATION

Implementation analysis for States' transition from AIS to AIM

~~This information should be updated.~~

9.1 The performance objectives of the NACC Seamless ATM Plan included the expectation that Phases 1 and 2 of the Roadmap for Transition from AIS – AIM would ~~be~~ have been completed by November 2015. As on 01 January 2016, regional implementation of Phase 1- Consolidation of the Roadmap ~~is~~ was summarized and status of implementation of each State was reviewed, whereby the results indicated that not all the States within the NACC have completed this phase, deadlines became a new point of discussion. Especially when taking No Country Left Behind into consideration.

The current results, as per February 2020 indicate the following status for each of the 3 phases within the AIS to AIM transistion for the NAMCCAR region: ~~as follows: xx Administrations (xx %) had completed implementation, xx Administrations (xx %) had partly implemented, xx Administrations (xx %) had not implemented any Phase 1 step, overall regional implementation of Phase 1 xx %. Regional implementation of Phase 1 and 2 were summarized as follows:~~

- ~~Under development~~

AIS to AIM Transition Sate Completion Status

Antigua and Barbuda	Bahamas	Barbados	Belize	Canada	Costa Rica	Cuba	Dominican Republic	Dutch Caribbean: Curacao, BES, Aruba, Saint Martin	El Salvador	Grenada	Guatemala	Haiti	Honduras	Jamaica	México	Nicaragua	St kitts and Nevis	St Lucia	St Vincent and the Grenadines	Trinidad and Tobago	United States	COCESNA
39 %	42 %	51 %	0%	66 %	48 %	69 %	79 %	78 %	0 %	0 %	0%	0%	0 %	52 %	49 %	0 %	0 %	0 %	0 %	64 %	85 %	0%
DEVLP	DEVLP	ADV	NO START/NO INFO PROVIDED	ADV	DEVLP	ADV	FINAL	FINAL	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	ADV	DEVLP	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	NO START/NO INFO PROVIDED	ADV	FINAL	NO START/NO INFO PROVIDED

Legend:

1	**Not Started** (leave empty)	**0%**
2	**Initial Stage**	**1 - 25 %**
3	**Developing Stage**	**26 - 50 %**
4	**Advanced Stage**	**51 – 75 %**
5	**Finalizing Stage**	**76 – 99 %**
6	**Fully Implemented**	**100%**
7	**Implemented through a third party**	**100%**
8	**Scheduled to be completed and/or fully implemented by this date / period**	**Provide more information**
9	**Will not implement this step** (Fill all years grey)	**Provide reason**

9.2 **Figure 2** below indicates with the following charts in which wy ~~that~~ many States are lagging in their implementation for transition from AIS to AIM. (Date last amended in ~~May 2019~~FEB 2020)

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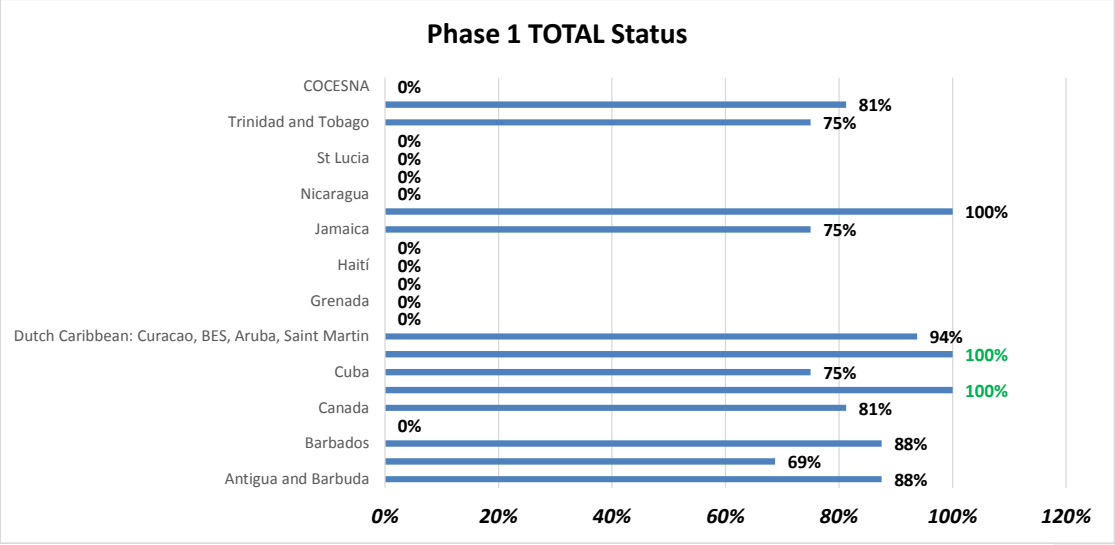
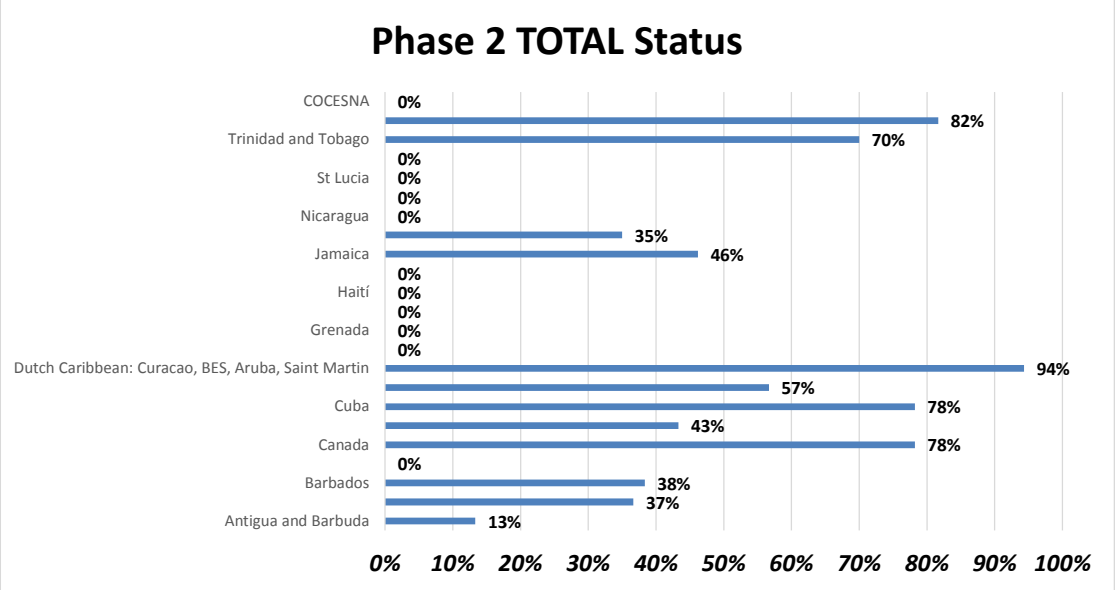
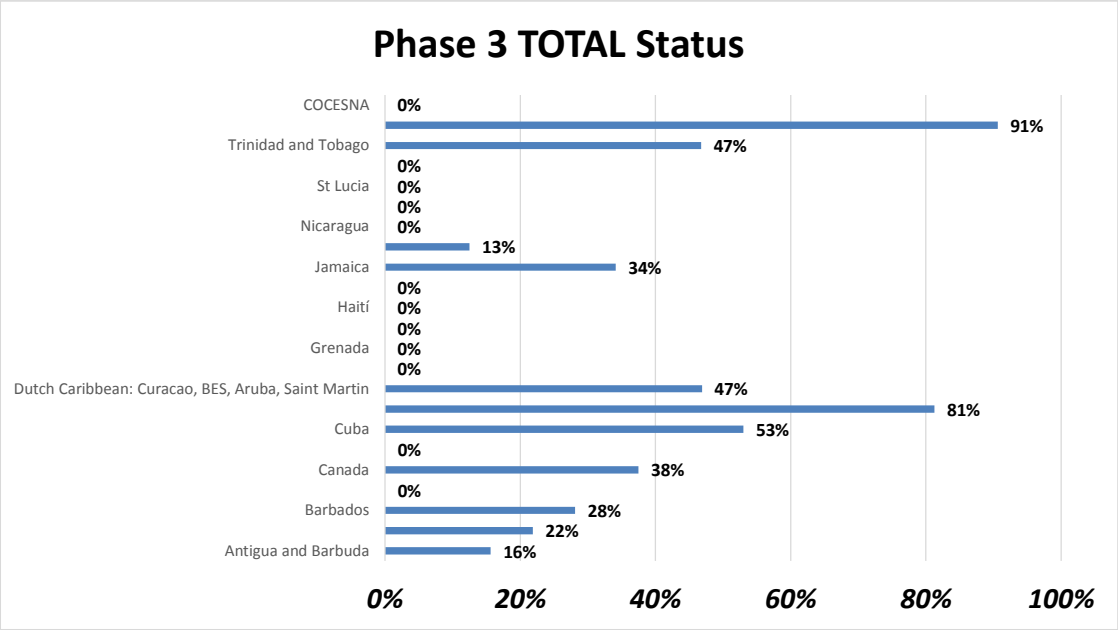






- ~~Under development~~

Figure 2: Regional AIM Implementation Status - Phase 1~~ and,~~ 2 and 3 Implementation in Progress

10. A FRAMEWORK FOR AIM QUALITY MANAGEMENT SYSTEM (QMS).

10.1 Annex 15 provides that States must establish a quality system and put in place quality management procedures at all stages (receiving and/or originating, collating or assembling, editing, formatting, publishing, storing and distributing) of the aeronautical information and data process. The quality system must be documented and demonstrable for each function stage, ensuring that the organizational structure, procedures, processes and resources are in place in order to detect and remedy any information and data anomalies during the phases of production, maintenance and operational use. Explicit in such a quality management regime is the ability to trace all information and data from any point, back through the proceeding processes, to its origin.

10.2 The transition step P-17 – Quality is one of the four steps in AIM Transition Phase 1 – Consolidation. Along with the other transition steps, P-17 – Quality is a prerequisite for commencement of the transition from AIS to AIM. In this phase, States were expected to enhance the quality of their existing AIS products.

10.3 However, there had been delays in the production of new global ICAO Doc 9839 *Quality Manual*. AIM/TF noted that any independently developed Quality Manual could risk encouraging States to implement AIM in ways that may be divergent from anticipated global guidance.

10.4 The Plan provides a Sample Quality Manual in the NACC Region. Framework of AIM Quality Management of CAR Region (Sample) is shown in this document.

11. KNOWLEDGE AND SKILLS NEED TO BE TRAINED AIM STAFF.

11.1 There are many new kinds of knowledge concerned with AIM transition process, inter alia, AICM/AIXM, data quality/originators, DNOTAM, eAIP, eTOD, Aeronautical Mapping Database (AMDM), Weather eXchange Model (WXXM) Aeronautical Information (AI) briefing, eCharts. Besides, skills and competencies also need to be improved for AIS staff members.

11.2 States have finished many tasks during the transition process from. However, AIS staff training is to some extent lagging.

12. PERFORMANCE IMPROVEMENT PLAN PHASE I

12.1 ICAO's No Country Left Behind (NCLB) Initiatives determined that ICAO itself should provide more direct assistance to developing countries by playing a more active coordination role between States and by helping to generate the political will needed for States to pool resources, participate in regional efforts, earmark voluntary funds and build capacity. The NCLB campaign was endorsed to help coordinate and publicize any Organization wide activities consistent with these priorities. Now it was changed by the new NACC Systemic Assistance Programme (SAP)

12.2 Sharing of information on ATM system resources and constraints across regions on a real time basis is a long term requirement. In the process of AIS-AIM transition, communication, collaboration, and co-operation are very important. AIS – AIM shall work in partnership, even with its users, other AIM actors, regulators, etc.

Performance Improvement Plan

Note: prior to implementation, the applicability of Performance Based Improvement Plan (GANP) should be verified by analysis of safety, current and forecast traffic demand, efficiency, predictability, cost effectiveness and environment to meet expectations of stakeholders.

- Performance improvement Plan Phase I – expected implementation by November 2020
- Performance Improvement Plan Phase II – expected implementation by November 2025

Performance Based Improvement Plan Phase I

12.3 All States should make relevant regulations and specifications. The Plan is on the basis of Joint Acceptance Plan, each State should make regulations and specifications, which have close interfaces with ICAO global guidance material, especially on the following issues:

- data or raw material originators (Letters of Agreement – LoAs)
- quality management system (QMS)
- digital NOTAM filing and submitting (DNOTAM)

To improve human performance

12.4 The following should be established to support human performance in the delivery of Collaborative AIM.

- On the Human performance training is necessary including assessment and management of risk, the effective safety reporting culture, etc.
- Technical training, including AICM/AIXM, Data quality/originators, digital NOTAM, eAIP, eTOD,

AMDM, WXXM, FIXM, eCharts, etc.

- Qualification requirements, including personnel licenses, knowledge and capability, English proficiency requirement for staffs concerning FPL, to avoid sound-like pronunciation and/or visual confusion on FPL.

To establish a separate unit focused wholly on AIS/AIM.

12.5 Considering the following-up work of the transition to AIM, it should be appropriate to establish according with Section 8, Paragraph 8.6 in this Plan, with personnel and management focused totally on AIS-AIM.

12.6 To develop AIM Transition Information Sharing Website, to help States get access to ICAO Portal at NACC AIM Tracking Website.

12.7 In order to provide information on progress within the 3 Phases of AIS to AIM, encourage discussion of issues concerned with the transition and lessons learned at AIM/TF meetings, as well as the current status and challenges being faced by States, a regional AIM implementation tracking website is needed and is under development. Its scope would be limited to sharing of information on AIM transition activities and experiences. Registered users, being the nominated point-of-contact from each State or Administration, would have write-access permissions for sharing information, posting questions and providing answers or suggestions. The information shared in the website would be publicly available. After the fully construction of AIM transition information sharing website for States in NACC Region, States should be able to utilize the website.

12.8 Furthermore, in the process of transition from AIS to AIM, many documents are released by **ICAO**, CAR/SAM Air Navigation Planning and Implementation Regional Group (**GREPECAS**), AIM Task Force (**AIM/TF**), International Federation of AIM Associations (**IFAIMA**), etc. In order to have a convenient access to acquire all related documents concerned with AIS-AIM transition, designated point-of-contact (PoCs) of States should be registered and qualified to access ICAO Portal A1M Tracking Website.

To achieve Quality Management System (QMS) in CAR region

12.9 According to Annex 15, the information management resources and processes established by an aeronautical information service shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the ATM system.

12.10 Quality Management Systems shall be implemented and maintained encompassing all functions of an aeronautical information service. The established QMS shall provide users with the necessary assurance and confidence that distributed aeronautical data and aeronautical information satisfy the aeronautical data quality requirements for accuracy, resolution and integrity and that the data traceability requirements are met through the provision of appropriate metadata. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.

12.11 A Structure of Agreement on data provision will be important to provide guidance on Data Quality and Data Integrity Monitoring.

12.12 Moving to a data centric system, as distinct from product-centric, requires assurance of

quality and integrity of data before and when it gets to the end-users. A key part of the information management system might be to manage noncertified aeronautical information and data that can potentially affect the safety of air navigation. For each Contracting State, management review is more difficult than annual internal audit; it is also hard to locate training organizations qualified to train AIM staff in quality management.

12.13 Regional collaborative quality assurance is needed, main task should be to review and update the quality management guidance and sample quality manual provided in the Guidance Manual for AIS in the NACC Region, data protection, automation, human factors considerations, etc.

13. PERFORMANCE BASED MPROVEMENT PLAN PHASE II

13.1 Utilize Aeronautical Information Exchange Model version 5.1 or later, through implementation of Phase 1 and 2 of the AIS-AIM Roadmap in adherence with ICAO and regional AIM planning and guidance material (ASBU Priority 1) and the BBBs, support ATM operations by digitally-based AIM.

13.2 Meteorological information clearly has and will continue to have great operational impact and importance for the safety and efficiency of the air transportation system. The derived meteorological products and services directly support the operational aspects of all phases of flight (Doc 8168 Vol. I, 2 and 3). To implement appropriate meteorological information reporting systems, providing observations, forecasts, warnings and alerts, and also providing information to meteorological authorities or offices where required.

To implement collaborative training in CAR region regarding AIM implementation

13.3 For most States, AIS is still paper based, desktop publishing, with limited digital data and quality assurance. On the process of AIS to AIM, the provision of aeronautical information should be data centric, quality assured, with single data source. State policies, regulatory oversight mechanisms, service level agreements, roles and responsibilities, data management tools, knowledge and skills, etc., need to be modified. Evolution from paper-based systems to computerized data based systems will occur over an extended period, with present and future styles of operation proceeding in parallel. Changing the presentation and source of information will bring its own challenges, and will necessitate new skill development for all groups of users, from pilots to air traffic controllers to staff involved in producing the information.

13.4 The role of the human is especially important in delivering high quality and consistent services supporting collaborative AIM. Therefore, systematic and regional cooperation in AIM training will be highlighted among ICAO Contracting States in NACC Region to ensure harmonized AIM implementation. States in the Region should establish an AIM/TF working panel to analyses training demands for going to AIM collaboratively, design and develop training plans, courses and curriculum, implement training, evaluate staff competency, training courses, plans and programs, etc. Deliver collaborative training for part of AIS staffs, improve the skills and competence, this part of AIS staffs may in turn train other AIS staffs and contribute to AIM implementation.

13.5 Collaborative training should be delivered, in particular, on static and dynamic data management in AIXM environment, eAIP, Digital NOTAM and quality management system. Other knowledge, skills and competencies are suggest be delivered by each Contracting State.

Further implementation of eTOD

13.6 The eTOD is safe for air navigation, efficient for PBN and ATM operations, useful for airport planning, and supports automation.

13.7 It was essential for Sates to establish a system to provide data that was compliant with the ICAO SARPs for all areas, although it would take some time. Obstacles for Area 1 shall meet the accuracy requirement provided by ICAO SARPs. For the time being, the data for Area 2 (a, b, c and d) Area 3 and Area 4 would be provided by prioritizing airports, firstly for the airports that were regularly used for international civil aviation and then for other airports. Furthermore, in order to achieve global eTOD exchange, States should create national or regional database to produce existing products and services with better quality and availability.

13.8 Main challenges for eTOD are costs, no or few training or supporting material, no clear allocation of responsibilities. For the matter of costs, States in CAR region should apply incremental approach, split/share the costs between stakeholders per area of responsibility and adopt competitive procurement process and negotiation. For the problem of no or few training or supporting material, regional workshops are expected to be delivered, experts (including from other regions) make presentations on eTOD, participants exchange experience and data providers present their offers. For no clear allocation of responsibilities, States in NACC Region may provoke discussion; specific Task Force between regulators should address this point. Besides, qualification standards for data providers are necessary, national regulation may engage into its implementation.

14. RESEARCH AND FUTURE DEVELOPMENT

Co-operation on AIM Improvement

14.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake and co-operate on AIM Improvement. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future AIM challenges, so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between States, ANSPs, International Organizations, institutes of higher learning and specialized technical agencies. This concept is consistent with Seamless ATM Principle (Inter-regional cooperation ('clustering') for the research, development and implementation of ATM projects like UTM).

Consideration of future AIM development

14.2 The following are possible areas that should be considered for future AIM development, in order to continue pursuance of Seamless ATM or UTM beyond ASBU Block 0 and Block 1 implementations and global interoperability:

- While the migration of text-based AIP information, e-TOD and other static data into digital databases was relatively straightforward, the migration of conventional instrument approach and landing charts to a digital form presented a significant challenge. There was no current capability available for the automatic generation of conventional charts from digital data (eCharts).

- Due to technical limitations, SIGMETs and NOTAMs are transmitted in a format that is not considered, by some, to be user-friendly (CAPTIAL LETTERS, MISSING STRUCTURE, etc.). When the transmitted information includes long list of coordinates defining the affected area, it becomes a

nightmare for aircrews to gain situational awareness on the position of the hazard.

- SIGMETs, NOTAMs and ASHTAMs are traditionally transmitted via alpha-numeric communication means which do not allow user-friendly presentation. It is recognized that these systems will have to be maintained for years to allow information flow to the low-end users, including aircraft in flight that do not have reception capability for graphical information, although advanced airspace users (e.g. large airlines) require the information in data formats that can be used in automated systems.

- Human factors are of key importance for Seamless ATM implementation. AIS Certification/Rating, AIS training documentation & facilitations, all need to be established and standardize.

- In order to provide quality assured data, safe and quick AIS service, effectively reduce AIS cost, we need to have Collaborative AIM Services in NACC Region. Each Contracting State might be facing the same problems: cross-border AIS service lack consistency and compatibility, data quality is not consistent in NACC Region, different data model and data exchange methods lead to the lack of system interoperability, too much manpower and material resources increase AIS service costs, etc.

- The establishment of a CAR AIS Database (CAD) is under AIM/TF consideration. This aeronautical information database will base on SARPS, AICM/AIXM it may process "static and dynamic" data automatically, with system interoperation and in a centralized manner. The establishment of CAD may greatly enhance data availability, provide real time, quality assured AIS service, and improve the effectiveness of AIS operations towards SWIM.

15. MILESTONES, PRIORITIES AND ACTIONS

Milestones

15.1 In Section Performance Improvement Plan provides milestones and timelines for a number of elements in Performance Improvement Plan Phase I, being effective in December 2020.

15.2 States should commence planning for AIM specifications detailed in the Performance Improvement Plan at the earliest opportunity from 2020 to facilitate a smooth transition by the onset of Phase I.

15.3 Subject to future agreement by concerned parties, in Section Research and Future Development Possibilities, provides possible AIM improvements beyond 2020 until 2025.

Priorities

15.4 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

Actions

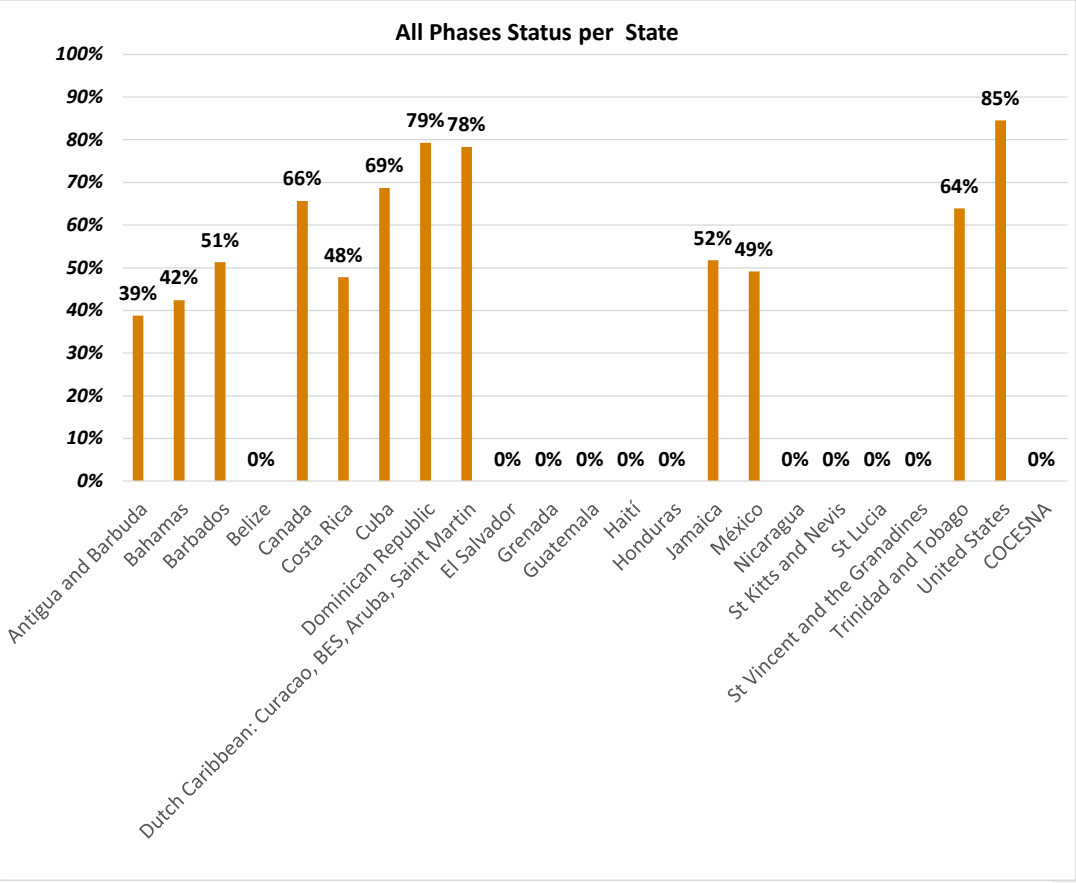
15.5 This Plan necessitates a number of implementation actions. It is expected that each NACC State and Special Territories develop AIM material as part of their Seamless ATM Implementation Planning based on applicable parts of the Implementation Guidance Material, and implementation progress be reported to GREPECAS.

15.6 GREPECAS and its contributory bodies, such as the ATM Programme and the CNS Programme are responsible for the oversight of air navigation issues within the NACC, so these bodies needed to be made aware of State implementation progress of Seamless ATM initiatives. GREPECAS and its contributory bodies need to manage the implementation of Seamless ATM through the ASBU framework and this Plan.

Appendix 1: AIS-AIM Transition Table and Graphics

Reference on WP 12 Appendixes C (ANI WG 05) or later

Under preparation by AIM/TF Rapporteur:



~~Electronic AIP generated from a digital database of aeronautical information~~

~~State Name:~~

~~= No reports since AIM/TF -- xxx~~

~~= progress reported~~

~~= amended progress reported~~

~~Appendix 2:~~ ~~e-AIP~~

~~Under preparation~~

Appendix ~~3~~2 : Structure of Agreement on data provision / SLA Template

~~**AGREEMENT ON DATA PROVISION**~~

~~**between**~~

~~***[The name of the entity receiving the aeronautical data and/or aeronautical information];***~~
~~**(hereinafter "The Data Receiver")**~~

~~**and**~~

~~***[The name of the entity providing the aeronautical data and/or aeronautical information]*** **(Hereinafter "The Data Provider")**

Table of Contents

Scope and Field of Application

The scope of this Agreement covers the provision of data by the DC- ANSP Aeronautical Information Service (AIS) and subsequent management thereof, which involves:

- ✈ entering;
- ✈ editing;
- ✈ formatting;
- ✈ publication;
- ✈ storage;
- ✈ distribution; and
- ✈ provision.

aeronautical information/data through:

- ✈ the eAIP, with the corresponding amendments;
- ✈ the eAIP supplements;
- ✈ NOTAMs and Trigger NOTAMs;
- ✈ PIBs;
- ✈ AIC;
- ✈ AIRAC amendments;
- ✈ Checklists of valid NOTAMs; and
- ✈ Lists of valid NOTAMs (Summary).

This agreement applies to both the **Aeronautical Information Service (AIS) as the "Data Receiver"** and **NAME as the "Data Provider / Data Orignator".**

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1. Introduction

1.1 Scope

1.2 Parties to the Agreement

1.3 Legal and Regulatory Basis

1.4 A number of documents specify the legal and regulatory requirements for the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and/or aeronautical information, they shall include but not exclusive the following Annexes:

a) Annex 4 – Aeronautical Charts

b) Annex 5 – Units of Measurement to be used in Air and Ground Operations.

c) Annex 11 – Air Traffic Services

d) Annex 15 – Aeronautical Information Services e.

e) Annex 14 – Aerodromes

2. Services and Service Levels Required by Data Receiver

3. Requirements for Data Provider

3.1 Data Changes Management

Data Provider should follow the recommendations laid down in Chapter 6 of ICAO Annex 15 concerning the advance notice of major changes to the Data.

3.2 Data Compliance Requirement

3.3 Data Errors and/or Inconsistencies

4. Coordination, Training, Data Compliance Checking

When require, the above should be implemented between Data Provider and Data Receiver.

5. Entry into Force and Termination

5.1 This Agreement is valid from [enter validity from date] to [enter term date]

5.2 This Agreement entries into force on the date of the later signature of the Parties and shall remain in force for an indefinite period unless explicitly terminated by a signed agreement between the Parties.

For the Data Receiver

Name

Title

Date

Signature

Name

Title

Date

Signature

For the Data Receiver

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Appendix – 43 Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

To facilitate readability, abbreviations have been largely omitted throughout the document. Most abbreviations were defined when introduced. The following provides an alphabetic listing of all abbreviations.

AIM/TF	AIM Task Force
A-CDM	Airport Collaborative Decision Making
ADS-B	Automatic Dependent Surveillance - Broadcast
AI	Aeronautical Information
AIC	Aeronautical Information Circular
AICM	Aeronautical Information Conceptual Model
AIM	Aeronautical Information Management
AIP	Aeronautical Information Publication
AIXM	Aeronautical Information eXchange Model
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AIM	Aeronautical Information Management
AFTN	Aeronautical Fixed Telecommunication Network
AIXM	Aeronautical Information eXchange Model
AIRAC	Aeronautical Information Regulation and Circular
AMDB	Aeronautical Mapping Database
ANSP	Air Navigation Service Provider
AOC	Airline Operations Centre
ASBU	Aviation system Block Upgrades
ASEAN	Association of Southeast Asian Nations
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service

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ATC	Air Traffic Control
ATM	Air Traffic Management
ATMRPP	Air Traffic Management Requirements and Performance Panel
ATSA-SURF	Enhanced Traffic Situational Awareness on the Airport Surface
BBBs	Basic Building Blocks
CAD	CAR AIS Database
CANSO	Civil Air Navigation Services Organization
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CNS	Communication, Navigation, Surveillance
CRC	Cyclic redundancy check
DBMS	Database Management System
DSS	Decision Support System
eAIP	Electronic Aeronautical Information Publication
EFF	Electronic Flight Folder
EFOD	Electronic Filing of Differences
EUROCAE	European Council of Aerospace Engineering
ERAM	En-Route Automation Modernization
eTOD	Electronic Terrain and Obstacle Data
FMS	Flight Management System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GREPECAS	Asia Pacific Air Navigation Planning and Implementation Regional Group
IATA	International Air Transportation Association
ICAO	International Civil Aviation Organization
IFATCA	International Federation of Air Traffic Control Association
IFAIMA	International Federation of AIM Associations

IFR	Instrument Flight Rules
IM	Information Management
IP	Internet Protocol
ISO	International Standards Organization
JAP	Joint Acceptance Plan
KPI	Key Performance Indicator
MET	Meteorological Services
METAR	Aerodrome Routine Meteorological Report
NAS	National Airspace System
NCLB	No Country Left Behind
NOTAM	Notice To Airmen
PAIMS	Preferred Aeronautical Information Management Specifications
PIB	Pre-flight Information Bulletin
QA	Quality Assurance
QMS	Quality Management System
SARP	Standards and Recommended Practices
SESAR	Single European Sky Air Traffic Management Research
SIGMET	Significant meteorological weather phenomena
SWIM	System Wide Information Management
TIS-B	Traffic Information Services – Broadcast
TBO	Trajectory Based Operations
UTM	UAS Traffic Management
WXXM	Weather eXchange Model
XML	eXtensible Markup Language
