Organización de Aviación Civil Internacional
Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS)

NOTA DE INFORMACIÓN

eCRPP/02 — NI/02
13/10/20

SEGUNDA REUNIÓN VIRTUAL DEL COMITÉ DE REVISIÓN DE PROGRAMAS Y PROYECTOS (CRPP) DEL GREPECAS (eCRPP/02)

30 de octubre de 2020

Cuestión 2 del Orden del Día: **Seguimiento de los Programas y Proyectos del GREPECAS**

2.3 Actualización de los Proyectos de Gestión de la Información Aeronáutica (AIM) a solo uno "Plan Colaborativo AIM"

TRANSFERENCIA DE LOS PROYECTOS AIM CAR G1 y G2 (QMS y e-TOD) AL PLAN COLABORATIVO AIM

(Presentada por la Secretaría)

RESUMEN EJECUTIVO

En esta Nota se informa la transferencia de los Proyectos AIM para la Región CAR (G1 y G2), QMS y e-TOD; formando ahora parte del "Plan colaborativo AIM" como iniciativa para mantener el desarrollo continuo y sostenible de la AIM en la Región CAR, con un cambio de paradigma que considera a la AIM como parte un todo y no como un proyecto o proyectos independientes o aislados. Esto ya se comprobó en la Región APAC de la OACI.

Objetivos Estratégicos:	• Capacidad y eficiencia de la navegación aérea • Seguridad Operacional
Referencias:	• Anexo 15 - *Servicios de Información Aeronáutica* • Doc 10066 - *PANS AIM* • Doc 8126 – *Manual de los Servicios de Información Aeronáutica* • Plan Colaborativo AIM

1. Introducción

1.1 Durante la Quinta Reunión del Grupo de Trabajo sobre implementación de Navegación Aérea para las Regiones NAM/CAR (ANI/WG/5), celebrada en la Ciudad de México, México, del 27 al 31 de mayo de 2019, se presentó la NE/20, en la cual se muestra y se revisa el Plan Colaborativo AIM Regional CAR.

1.2 Se requiere analizar los proyectos actuales considerando los cambios en el contexto bajo el cual fueron formulados con el fin de determinar si continúan vigentes, si se justifica su existencia ante las nuevas prioridades y necesidades actuales de los Estados. Para la revisión de los Proyectos G de AIM para la Región CAR se debe considerar la información de las siguientes tablas:

QMS							
Criterios de Evaluación	Propósitos de evaluación	Escala de evaluación en importancia					
		1 muy baja	2 baja	3 mediana	4 alta	5 muy alta	Comentario
Relevancia	Siguen vigentes las metas del proyecto	✓					Se avanzó en casi 100% en la implementación QMS
Nivel de impacto	Qué beneficios da a los Estados					✓	Los beneficios QA se han alcanzado gradualmente
Recursos	Se tienen recursos para alcanzar las metas del proyecto				✓		Se cuenta con los recursos para mantener el QMS
Viabilidad	Hasta qué punto los objetivos se han cumplido					✓	Se avanzó en casi 100% de objetivo en la implementación QMS

1.3 De la evaluación del Proyecto QMS se concluye que solo requiere mantenimiento continuo y la Certificación del Sistema de Calidad sería deseable. Por lo que el proyecto concluye, aun cuando el apoyo al proceso de Implementación del QMS en los Estados continuará.

e-TOD							
Criterios de Evaluación	Propósitos de evaluación	Escala de evaluación en importancia					
		1 muy baja	2 baja	3 mediana	4 alta	5 muy alta	Comentario
Relevancia	Siguen vigentes las metas del proyecto					✓	Mejora la Cartografía Aeronáutica y estudios PANS OPS
Nivel de impacto	Qué beneficios da a los Estados					✓	Los beneficios en toda la información y datos geo-referenciados
Recursos	Se tienen recursos para alcanzar las metas del proyecto	✓					No hay los recursos para iniciar en los Estados el eTOD
Viabilidad	Hasta qué punto los objetivos se han cumplido	✓					No se avanzó en el objetivo en la implementación eTOD

1.4 En lo que se refiere a la evaluación del Proyecto del e-TOD, se encontró tanto falta de recursos como de viabilidad, lo cual aunado a la situación actual se debe postergar o replantear este proyecto hasta que los Estados cuenten con los recursos financieros como técnicos para poder llevarlos a cabo y mejorar así la implementación efectiva en este campo.

1.5 La Gestión de Información Aeronáutica (AIM) implica la integración de datos e información en tiempo real, histórico y prospectivo, además del intercambio y distribución a los usuarios; se basa en los 21 pasos de la hoja de ruta para la Transición a la AIM con la provisión estratégica y táctica de datos operativos de calidad garantizada y oportuna en apoyo a las operaciones de ATM.

1.6 Por tal razón, este cambio de Proyecto con base en el Plan Colaborativo AIM se dirige a todas las partes interesadas dentro de un esquema en el contexto ATM que se debe desarrollar integralmente, como parte del conjunto de elementos ASBU relacionados al Plan de Navegación Aérea Mundial, por lo que no debe considerarse de forma aislada.

1.7 La gestión del tránsito aéreo (ATM) requiere la mejor calidad de datos e información en tiempo real, histórico y prospectivo, y la gestión, el intercambio y la distribución de esos datos a los usuarios. La gestión de la información (IM), se basa en la provisión electrónica de datos operativos de calidad en un entorno de Gestión de la Información de Todo el Sistema (SWIM), y se desarrolló como parte de un conjunto de planes de navegación aérea, por lo que no debe considerarse de forma aislada.

1.8 Se invita a la Reunión a revisar el Plan colaborativo AIM (**Apéndice**) por el momento disponible únicamente en inglés, al cual se han transferido y actualizado los proyectos AIM (QMS y e-TOD), se espera la versión en Español próximamente.

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APPENDIX / APÉNDICE

INTERNATIONAL CIVIL AVIATION ORGANIZATION

NACC REGIONAL PLAN FOR COLLABORATIVE AERONAUTICAL INFORMATION MANAGEMENT (AIM)

Version 1.6, March 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 the Global Air Navigation Plan (GANP 6th Edition, Doc 9750), the Global ATM Operational Concept (Doc 9854) 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 PANS AIM (Doc. 10066).

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 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.

3.2 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.

3.3 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.

3.4 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 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 NACC Region through the overall improvement in the availability, timeliness and quality of aeronautical information and shared aeronautical information databases, and collaborative efforts in AIM training.

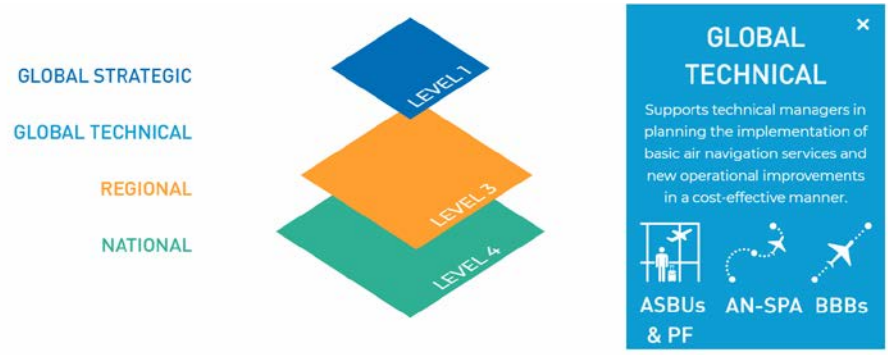
3.5 Based on safe, efficient air transport is the Aeronautical Information Management (AIM) of each State, which collates, maintains and publishes aeronautical data and information of lasting character essential to air navigation, including details of regulations, procedures and other data and information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

4. BACKGROUND INFORMATION

GANP Principles

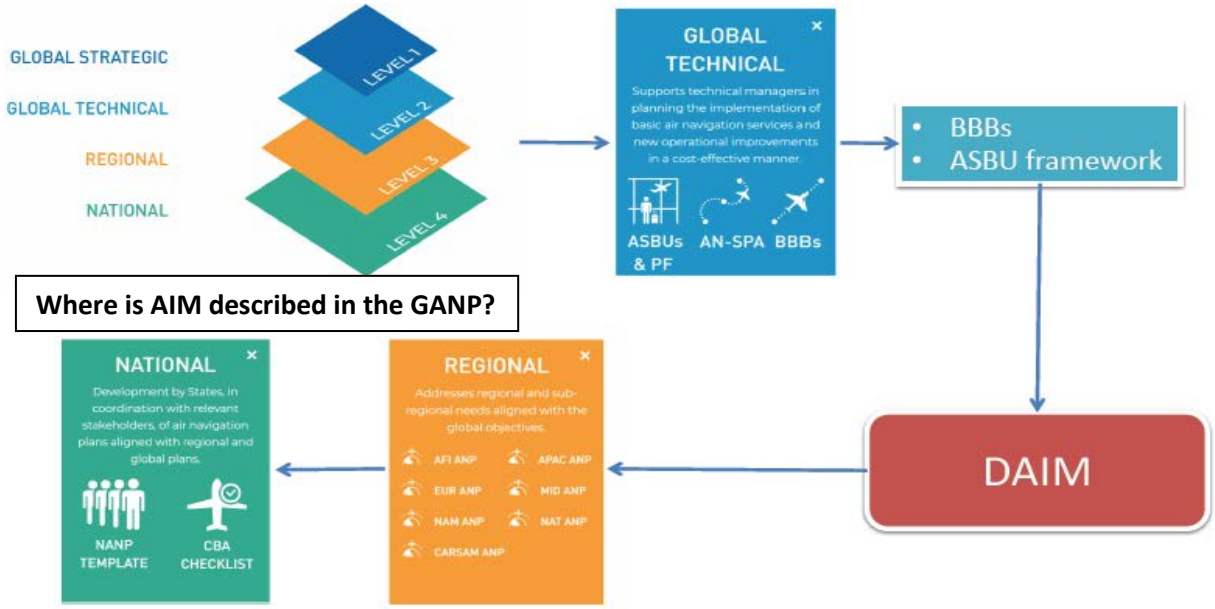
4.1 The content of the GANP 6th. Ed. is organized into a multilayer structure with each layer tailored to different audiences. This allows for better communication with both high-level and technical managers with the objective that no State or stakeholder is left behind. The four-layer structure is made 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.



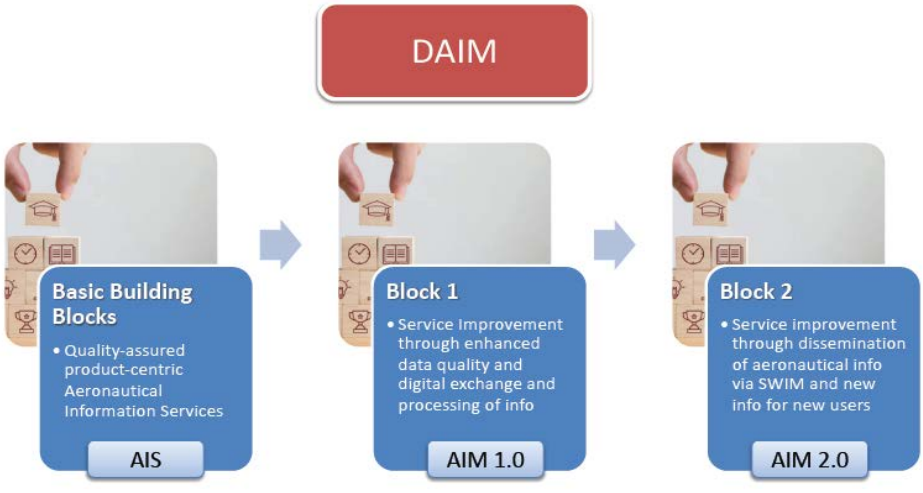
4.4 The aviation industry needs to ensure its position at the forefront of innovation by adopting an

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.

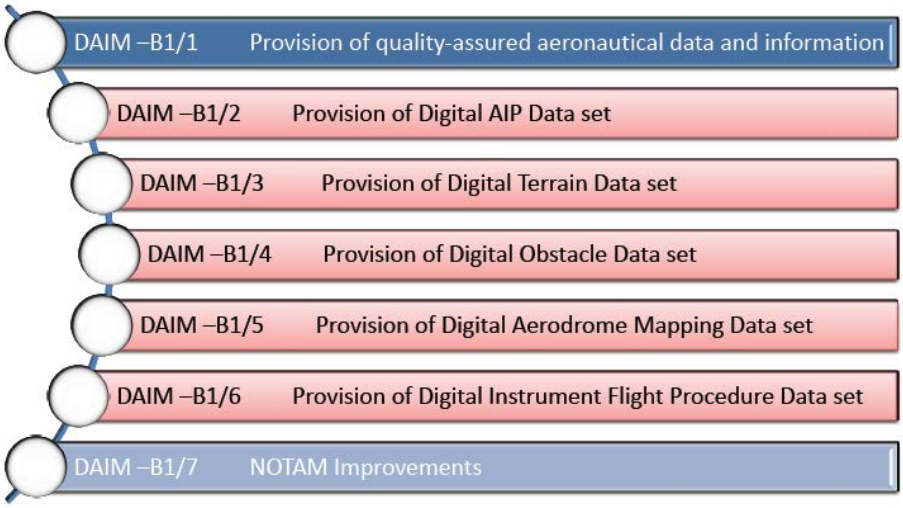


Aviation System Block Upgrades (ASBU)

4.5 At the Global level, ICAO started the ASBU initiative as a programme framework that developed 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.

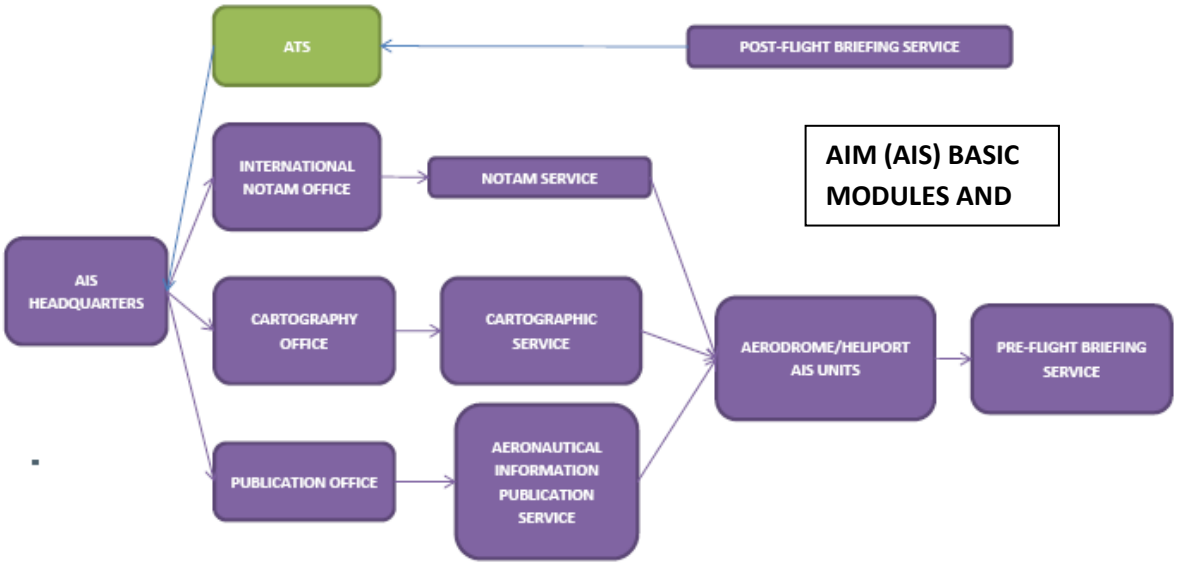
4.10 In order to ensure the provision of seamless air navigation services based on the deployment of interoperable systems and harmonized procedures, States need to leverage the implementation of the BBBs through their national air navigation plans as a strategic part of their national aviation planning 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.

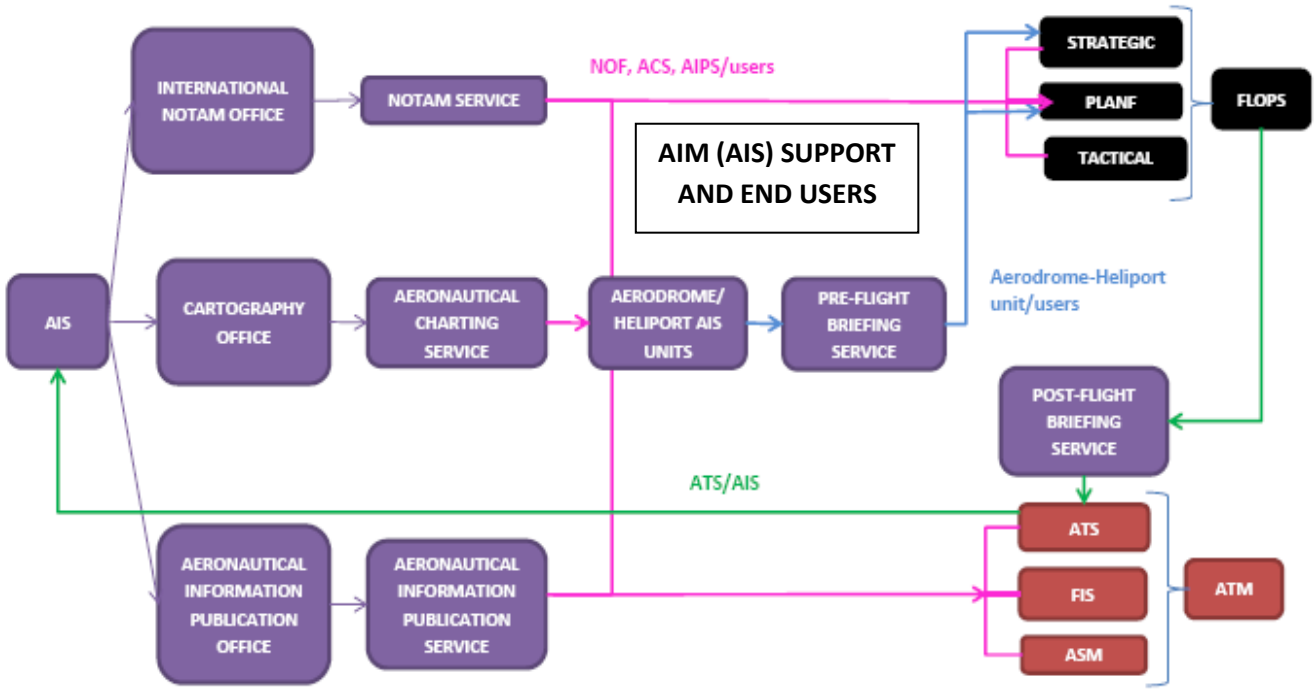
4.11 The Basic Building Block (BBB) framework outlines the foundation of any robust air navigation system. It is nothing new but the identification of the essential services (AGA, AIM, ATM, MET and SAR), to be provided for international civil aviation in accordance with ICAO Standards. In addition to 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 s being the most critical in the transition, and should be kept as short as possible.**

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 – AIS 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 The latest Meeting of the AIM Task Force (AIM TF 02, Miami, United States, August 2018), 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 PANS AIM (Doc. 10066), AIS Manual updated Doc. 8126 (four

Volumes), the new Doc. 9839 Quality Manual (unedited) 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 03 Meeting, 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
- Annex 5
- 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 10055 - Manual on Notification and Publication of Differences

- 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 completed in a new agreed date by AIM TF. The regional implementation of Phase 1- Consolidation of the Roadmap is summarized as follows:

- 100 % had completed AIRAC (P-03) implementation
- 95 % had completed Monitoring of Annex differences (P-04) implemented
- 100 % had completed WGS-84 (P-05) implemented
- 86 % had completed Quality (P-17) implemented

Regional implementation of Phase 1 and 2 were summarized as follows:

- Under development

9.2 **Figure 2** below indicates that many States are lagging in their implementation for transition from AIS to AIM. (Date last amended in May 2019)

- Under development

Figure 2: Regional AIM Implementation Status - Phase 1 and 2 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 (AIS/ARO) 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)

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.

Establish a unit focused only on AIS/AIM to:

12.5 Considering the follow-up work of the transition to AIM, in accordance with Section 8, Paragraph 8.6 of this Plan, it is convenient to promote that AIS/AIM trained personnel dedicate themselves exclusively to activities in their own area.

12.6 Develop the AIM transition information exchange website, to help States benefit from and obtain relevant information that supports the implementation of the 21 steps of the AIS to AIM roadmap.

12.7 In order to provide information on progress within the 3 phases of AIS to AIM, encourage discussion of transition-related issues and lessons learned at AIM/TF meetings, as well as current status and challenges faced by States and regional monitoring of AIM implementation. The website is necessary and under development, its scope is limited to sharing information about the activities and experiences of the transition to AIM.
Registered users will be the Points of Contact (PoCs) officially designated by each State/Administration, they will have writing privileges and thus share information, post questions and provide answers or suggestions. Information shared on the website will be available only to State-designated PoCs.

12.8 Furthermore, in the process of the transition from AIS to AIM, many documents are released by ICAO, the CAR/SAM Regional Group for Planning and Implementation of Air Navigation (GREPECAS), the AIM Working Group (AIM/TF), the International Federation of AIM Associations (IFAIMA), etc., in order to have access to acquire all the documents related to the AIS-AIM transition

To achieve Quality Management System (QMS) in CAR Region

12.9 According to Annex 15, the information management resources and processes established by the 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 the functions of an aeronautical information service. The established QMS will provide users with the necessary security and confidence that the distributed aeronautical data and information meet the quality requirements in terms of precision, resolution and integrity; and that the traceability and temporality requirements of the data are met through the provision of appropriate metadata. The system also ensures that the agreed distribution dates and the applicability period of the aeronautical data are met.

12.11 Based on Doc 10066 – *PANS-AIM* Chapter 3 *"Note 3 — Formal arrangements concerning data quality between the originator and the aeronautical information service (AIS) and between the AIS and the next intended user may be used to manage the aeronautical information data chain*."

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 required, 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 IMPROVEMENT PLAN PHASE II

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

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

To implement collaborative training in CAR region regarding AIM implementation

13.3 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. The evolution from paper-based systems to digital data-based systems has occurred as part of the development into the future, with present and future styles of operation proceeding in parallel. Changing the presentation and source of information bring its own challenges and requires the development of new skills for all user groups, such as pilots, air traffic controllers and personnel involved in the production of the information.

13.4 The role of the human is especially important in providing consistent, high-quality services that support collaborative AIM. Therefore, systematic and regional cooperation in AIM training among ICAO NACC Contracting States will be highlighted to ensure harmonized implementation of AIM. To work AIM collaboratively, an AIM/TF Ad hoc group was created to analyse instructional demands, design and develop instructional plans and competency-based training courses and curricula.

13.5 The objective is to provide collaborative instruction directed to AIM staff to improve skills and competence, more experienced AIM staff may in turn train new AIM staff and contribute to AIM implementation.

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

Further implementation of e-TOD

13.7 The e-TOD is essential for air navigation, efficient for PBN, PANS-OPS and ATM operations, useful for airport planning, and supports automation.

13.8 It is essential that States have a system which provides information that complies with ICAO SARPs for all areas. Obstacles for Area 1 must meet accuracy requirements provided by ICAO SARPs. For the time being, Area 2 (a, b, c and d) data from Area 3 and Area 4 would be provided prioritizing airports, first for international airports and then other airports. In addition, to achieve the global exchange of e-TOD, States must create a national or regional database to improve the quality and availability of existing products and services.

13.9 Main challenges for e-TOD are the costs, little or no training materials or support, and there is a clear allocation of responsibilities. In terms of costs, the States of the CAR region should consider dividing/sharing costs among stakeholders by area of responsibility and adopting competitive procurement and negotiation processes from which all beneficiaries (aviation, agriculture, communications etc.). To solve the lack of instruction or support material, regional workshops will continue to be delivered, with the participation of experts on the subject with the aim that the participants exchange experiences and the data providers present their proposals.

14. RESEARCH AND FUTURE DEVELOPMENT

Co-operation on AIM Improvement

14.1 To develop the tools and systems necessary to meet foreseeable long-term requirements, States need to undertake and cooperate to improve AIM. This includes extensive efforts to define new concepts (such as the AIM operational concept), enhance knowledge, and establish solutions for future AIM challenges, to be applied in a timely and appropriate manner. Joining efforts through collaborative partnerships between States, ANSPs, international organizations, higher education institutes and specialized technical organizations, this concept is consistent with the ATM Seamless Principle (interregional cooperation for research, development and implementation of ATM projects such as 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 requires 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 programmes, such as the ATM programme and the CNS programme are responsible for the oversight of air navigation issues within the CAR/SAM Regions, therefore, they should continuously monitoring the state of implementation of the seamless ATM States' initiatives. GREPECAS and its projects have to manage the application of ATM seamless through the ASBU framework and this Collaborative 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

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: Structure of Agreement on data provision

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")**

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) 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 necessary, 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	For the Data Receiver
Name	Name
Title	Title
Date	Date
Signature	Signature

Appendix – 4 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 Control
AMDB	Aerodrome Mapping Database
ANSP	Air Navigation Service Provider
AOC	Air Operator Certificate
ASBU	Aviation System Block Upgrades
ASEAN	Association of Southeast Asian Nations
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service

ATC	Air Traffic Control
ATM	Air Traffic Management
ATMRPP	Air Traffic Management Requirements and Performance Panel
APTA-SURF	Airport Accessibility – Surface Operations
BBBs	Basic Building Blocks
CAD	Centralized AIS/AIM Database
CANSO	Civil Air Navigation Services Organization
CCO	Continuous Climb Operations
CDM	Collaborative Decision Making
CDO	Continuous Descent Operations
CNS	Communications, Navigation, Surveillance
CRC	Cyclic redundancy check
DBMS	Database Management System
eAIP	Electronic Aeronautical Information Publication
EFOD	Electronic Filing of Differences System
eTOD	Electronic Terrain and Obstacle Data
FMS	Flight Management System
GANP	Global Air Navigation Plan
GASP	Global Aviation Safety Plan
GREPECAS	CAR/SAM 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
KPI	Key Performance Indicator
MET	Aeronautical Meteorology
METAR	Meteorological Aerodrome Report
NCLB	No Country Left Behind
NOTAM	Notice to Airmen
PIB	Pre-flight Information Bulletin
QA	Quality Assurance
QMS	Quality Management System
SARPs	Standards and Recommended Practices
SESAR	Single European Sky Air Traffic Management Research Programme
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
