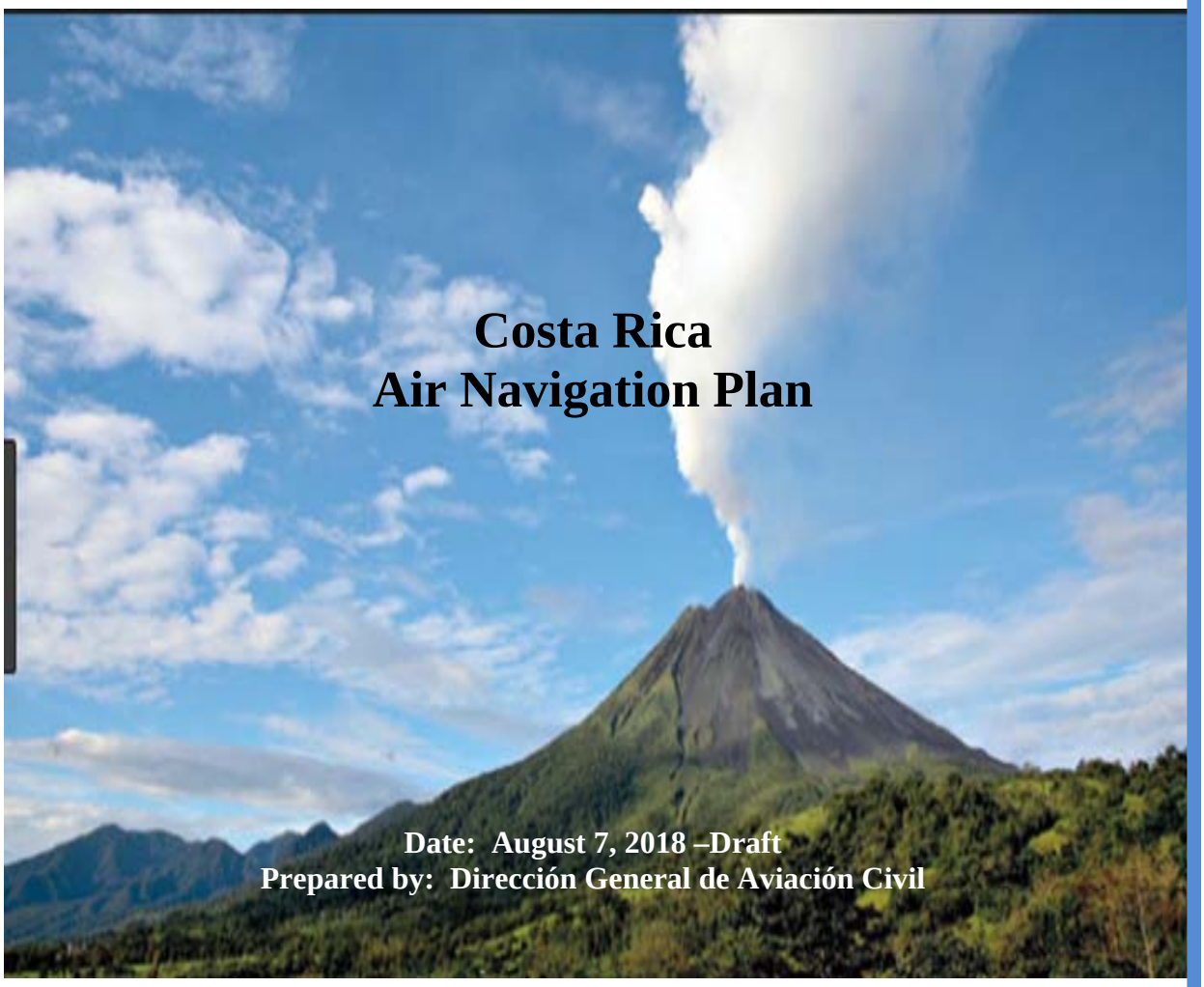

Costa Rica
Air Navigation Plan

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1. Introduction

This document is Costa Rica's State Air Navigation Plan (ANP) describing the plan and status of aviation technology implementation. The background of the State ANP and the environment of our air navigation system are presented along with the method and process to evaluate and monitor aviation technology implementation.

1.1 Background

The ICAO Global Air Navigation Plan (Doc 9750, GANP) provides ICAO's vision to achieve sustainable growth of the global civil aviation system. It also presents all States with a comprehensive planning tool supporting a harmonized global air navigation system. The GANP is an overarching framework that includes key civil aviation policy principles to assist ICAO Regions and States with the preparation of their Regional and State Air Navigation Plans (ANPs).

Planning and Implementation Regional Groups (PIRGs) are expected to develop the regional ANPs reflecting the regional requirements. GANP obligates States to map their individual or regional programmes against the harmonized GANP, but provides them with far greater certainty of investment. GANP requires active collaboration among States through the PIRGs in order to coordinate initiatives within applicable regional ANPs.

The GANP introduces the Aviation System Block Upgrades (ASBU) methodology. The ASBU methodology and its description of future aviation capabilities define programmatic and flexible global systems engineering approaches allowing all States to advance their air navigation capacities based on their specific operational requirements.

To this extent, the North American, Central American and Caribbean (NACC) Regional Office (RO), has published the NAM/CAR Regional Performance-Based Air Navigation Implementation Plan (RPBANIP, v3.1 in April 2014) aligning the activities and strategies with the ICAO ASBU methodology.

This document is the ANP for Costa Rica aligning activities and strategies to the GANP and RPBANIP. The information contained in the Costa Rica ANP is related mainly to:

- Planning: objectives set, priorities and targets planned at the state level
- Implementation monitoring and reporting: monitoring the progress of implementation towards targets planned. This information should be used for reporting purposes (i.e.: global and regional air navigation reports and performance dashboards); and/or
- Guidance: providing state guidance material for the implementation of specific system/procedures in a harmonized manner.

The Costa Rica ANP would be used as a tool for planning, monitoring, and reporting the status of implementation of the aviation capabilities.

1.2 Environment

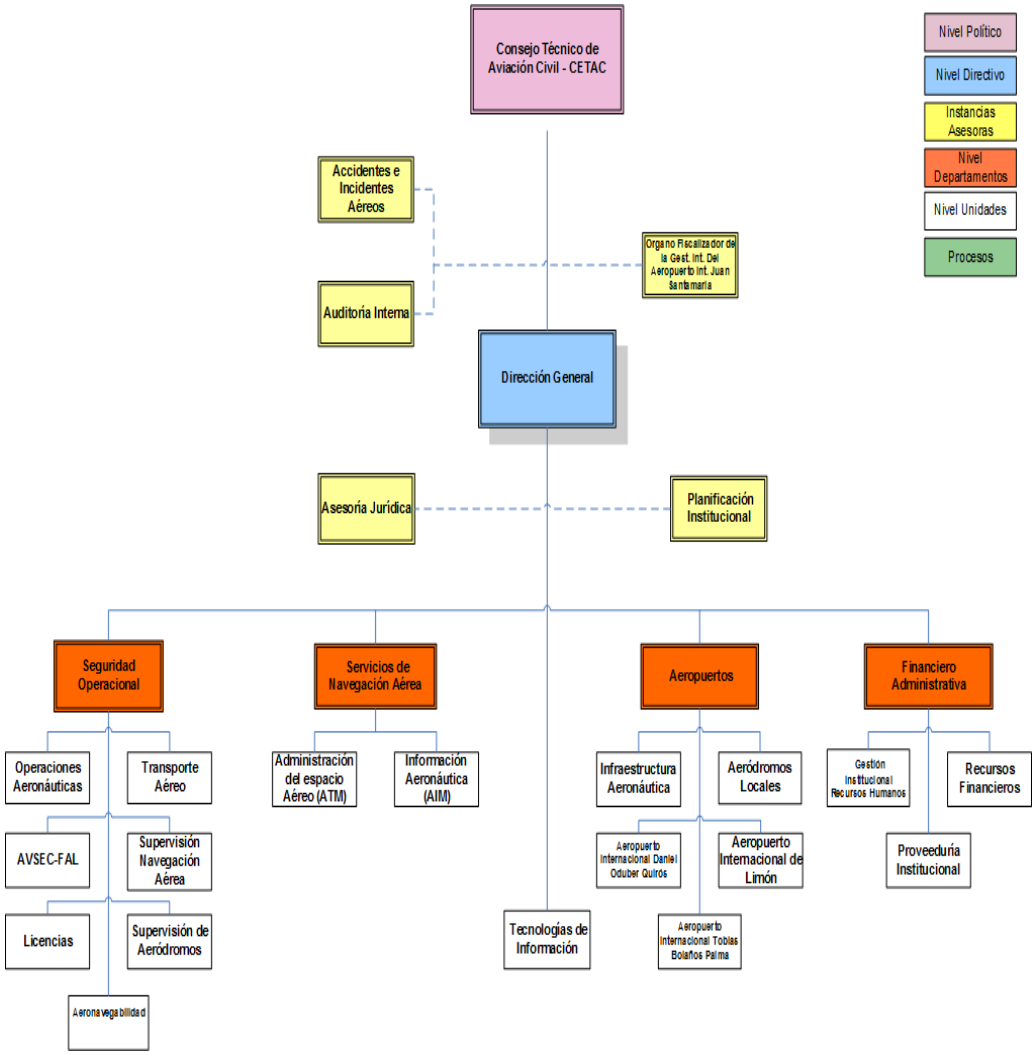
The environments of Air Navigation of Costa Rica, such as authority, airspace and airports, and air traffic are described in this section.

1.2.1 **Dirección General de Aviación Civil**

The Dirección General de Aviación Civil (DGAC) was established by the Ley General de Aviación Civil in 1973 and updated in 2013. Its mission is to plan, regulate and provide civil aviation services in Costa Rica to guarantee and promote a high quality and safe aeronautical activity centered in customer satisfaction and at the service of the best interest of society, that is efficient, ordered and respectful of the environment, defined as the provision of coordinated and integrated systems of airports and seaports.

The Dirección General de Aviación Civil is responsible for managing local aerodromes and providing air navigations services. It is tasked to provide the framework that permits the development of aviation in Costa Rica. The organization is organized as shown in Figure 1.2.1. Its operation is performed by a highly motivated work force contributing to the sustainable, social and economic development of Costa Rica.

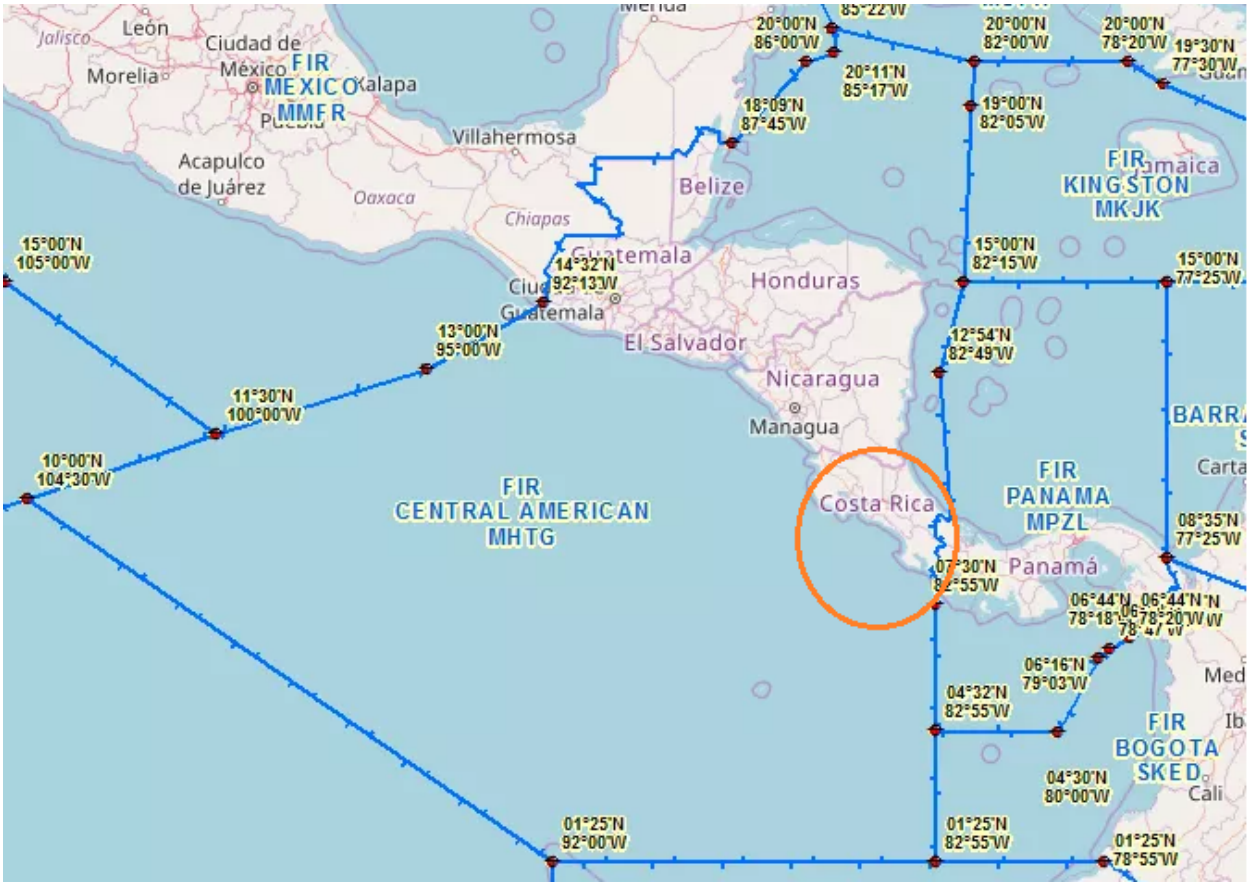
Figure 1.2.1 DGAC Structure



1.2.2 Airspace

Costa Rica is located within the Central American Flight Information Region (FIR) that is managed by Dirección General de Aviación Civil in the lower airspace and by COCESNA in the Upper Air Space. The Costa Rican Air Space is a Class C airspace regarding ICAO airspace classification. Refer to Figure 1.2.2

Figure 1.2.2 1 Central American FIR and Costa Rica



1.2.3 Aerodromes

The Costa Rican Air Navigation Plan takes into consideration its two main international airports, Aeropuerto Internacional Juan Santamaría (MROC) in Alajuela and Aeropuerto International Daniel Oduber Quirós (MRLB) in Guanacaste. These airports are of strategic value for the socio - economic development of the country since they are the port of entry for most of the tourists that visit Costa Rica, a key component of the Gross Domestic Product (GDP). These two aerodromes are listed in the ICAO's regional ANP titled, "Caribbean and South American Air Navigation Plan, Volume I (dated October 2015), Table AOP I-1, International Aerodromes Required in the CAR/SAM Regions". The MROC has the capacity of 30 to 31 air traffic movements per hour. The MRLB had in 2017 a daily average of 57 daily operations, the capacity of the airport has not been declared yet.

Table 1 Runway Information on Aeropuerto Internacional Juan Santamaría (MROC)

	Runway 07	Runway 25
Length x Width	3011m x 45 m	3011 m x 45 m
Surface Type	Asphalt	Asphalt
TDZ-Elev	903 m	923 m
Lighting	Edge, ALS and ABN	Edge, ALS and ABN
Displace Threshold	0 m	494 m

Table 2 Runway Information on Aeropuerto Internacional Daniel Oduber Quirós (MRLB)

	Runway 07	Runway 25
Length x Width	2750 m x 45 m	2750 m x 45 m
Surface Type	Asphalt	Asphalt
TDZ-Elev	76 m	82 m
Lighting	Edge and ABN	Edge and ABN
Displace Threshold	NIL	NIL

1.2.4 Traffic Forecast

Number of typical daily operation at Aeropuerto International Juan Santamaría and Aeropuerto Internacional Daniel Oduber Quirós (MRLB) are 233 and 57 average daily operations respectively. The RPBANIP forecasted that average annual growth of air traffic in the Caribbean region would increase 5.9% during 2011-2031. The Dirección General de Aviación Civil believes that this overall Caribbean regional forecast of annual increase of 5.9% is a little too optimistic for Dirección General de Aviación Civil and more moderate number of 5.0% annual increase might represent a more realistic anticipation. Estimated daily operations at MROC and MRLB are shown in Tables 1.2.4a and 1.2.4b applying the increase forecasts to each year from 2017 to 2031.

Table 3 Costa Rica Operations Forecast 2018 - 2032

Year	MROC	MRLB
2018	94.546	22.092
2019	99.273	23.197
2020	104.237	24.356
2021	109.449	25.574
2022	114.921	26.853
2023	120.667	28.196
2024	126.701	29.605
2025	133.036	31.086
2026	139.688	32.640
2027	146.672	34.272
2028	154.005	35.986
2029	161.706	37.785
2030	169.791	39.674
2031	178.281	41.658
2032	187.195	43.741

1.3 Planning Methodology

Guided by the GANP and RPBANIP, the state planning process starts by identifying the state responsible ATM areas, major traffic flows and international aerodromes. An analysis of this data leads to the identification of opportunities for performance improvement. Available technologies and ASBU Elements are evaluated to identify which Elements best provide the needed operational improvements. Depending on the complexity of the selected technology or Elements, additional planning steps may need to be undertaken including financing and training needs. Finally, state plans would be developed for the deployment of improvements and supporting requirements. This is an iterative planning process which may require repeating several steps until a final plan with specific regional targets is in place. This planning methodology requires full involvement of States, service providers, airspace users and other stakeholders, thus ensuring commitment by all for implementation.

Considering that some of the ASBU Modules contained in the GANP are specialized packages of implementable capabilities, called Elements that may be applied where specific operational requirements

or corresponding benefits exist, States will decide how each ASBU Element would fit into national and regional plans.

In establishing and updating the implementation priorities detailed in the Costa RicaANP, due consideration should be given to the safety priorities set out in the Global Aviation Safety Plan (GASP) and the NAM/CAR regional safety strategy. Costa Ricawould establish its own air navigation objectives, priorities and targets to meet its individual needs and circumstances in line with the global and regional air navigation objectives, priorities, and targets.

1.4 Air Navigation Planning Process

The air navigation planning process prescribes evaluation, implementation, reviewing, reporting, and monitoring activities. It is recommended to conduct the process on a cyclical, annual basis. An Air Navigation Reporting Form (ANRF) is a tool to monitor and report the implementation status of capabilities. The Costa Rica ANRF is a customized tool for the application of setting planning targets, monitoring implementation, and identifying challenges, measuring implementation/performance and reporting. The ANRF reflects selected key performance areas as defined in the Manual on Global Performance of the Air Navigation System (ICAO Doc 9883).

Many of the future capabilities are described in terms of ASBU Elements. Some capabilities are specific to the need of the Caribbean Region and/or the State needs. These specific needs are described as Regional Aviation System Improvements (RASI) and State Aviation System Improvements (SASI). Both Analysis and Work Flow and ANRF are useful to manage the implementation status of ASBU, RASI, and SASI capabilities.

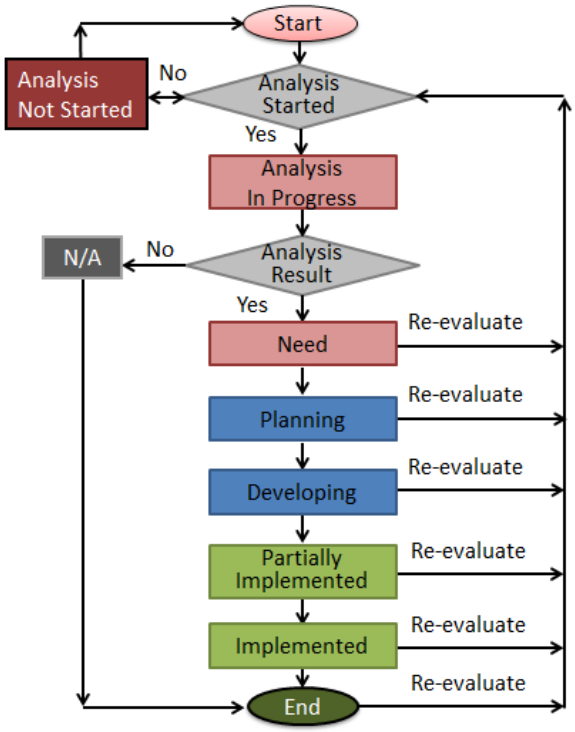
1.4.1 Analysis and Work Flow Process

Figure 1.4.1 depicts the workflow for analyzing and implementing ASBU Elements. This flow process should be applied to each of the ASBU Elements. If the Element is applicable to an airport, each airport needs to be evaluated through this flow process. This same flow process is applicable to RASI and SASI.

The significance of each step in the workflow as it pertains to regional planning is as follows:

- **Analysis Not Started** – The requirement to implement this ASBU Element has not yet been assessed
- **Analysis In Progress** – A Need Analysis as to whether or not this ASBU Element is required, is in progress
- **N/A** – The ASBU Element is not required
- **Need** - The Need Analysis concluded that the ASBU Element is required, but planning for the implementation has not yet begun
- **Planning** – Implementation of this ASBU Element is planned, but not yet started
- **Developing** – Implementation of this ASBU Element is in the development phase, but not yet operational
- **Partially Implemented** – Implementation of this ASBU Element is partially completed and/or operational but all planned implementations are not yet complete
- **Implemented** - Implementation of this ASBU Element has been completed and/or is fully operational everywhere the need was identified

Figure 1.4 1 Analysis and Work Flow



The Need Analysis of ASBU Elements will identify which ASBU Elements are required. In this context, "required" means that the benefits estimated from the implementation would justify the associated implementation costs, or, the potential safety benefits are deemed to justify the implementation costs. The implementation status of ASBU Elements which are not required should be indicated as "N/A", meaning "not applicable".

The analysis and implementation status determined in accordance with the above is reflected in the applicable ANRFs and in the ASBU Implementation Status Tables.

1.4.2 Monitoring and Reporting Results

Monitoring and reporting results will be analyzed by the Regions, States and the ICAO Secretariat to steer the air navigation improvements, take corrective actions and review the allocated objectives, priorities and targets if needed. The results will also be used by ICAO and aviation partner stakeholders to develop the annual Global Air Navigation Report. The report results will provide an opportunity for the international civil aviation community to compare progress across different ICAO regions in the establishment of air navigation infrastructure and performance-based procedures. The reports will also provide the ICAO Council with detailed annual results on the basis of which tactical adjustments will be made to the performance framework work programme, as well as triennial policy adjustments.

The information provided in the Costa Rica ANRFs should be periodically reviewed and updated if subsequent analysis results in a change to the applicability of any ASBU Elements, whether or not they were selected. The explanation of ANRF is provided in Appendix A. The customized Costa Rica ASBU Air Navigation Reporting Form Template is provided in Appendix B. The Costa Rica RASI and SASI Air Navigation Reporting Form Templates are provided in Appendix C.

1.5 Problem Identification

To provide and promote safe and efficient aviation services to the customers, it is important to resolve ongoing challenges that hindering the mission. It is also important to anticipate and address the potential problems in the future.

1.5.1 Existing Problems

The demands for MROC and MRLB are only expected to increase in the future.). Although the Dirección General de Aviación Civil developed and implemented Standard Instrument Departure procedures (SIDs) with the goal to increase the safety, efficiency and management of airspace capacity, the current infrastructure at both airports, does not adequately meet peak capacity demand. The solution requires a huge investment in airport infrastructure. The growth in traffic operations has not been paired with a growth in investment in airport infrastructure. Airport terminal development, runway and turning bay reconstruction and rehabilitation, total drainage redevelopment, new control towers and technical blocks, and continuous modernization of communication, navigation, and surveillance are a must to reap the most benefits from the Performance Based Navigation procedures.

In addition, airport operations need to be improved by introducing capabilities such as Airport Collaborative Decision Making (ACDM). To support airport operations, having accurate and timely weather and aeronautical information is essential. Information such as wind shear warnings/alerts will increase safety of operations. Securing quality data should also be accomplished by introducing the Quality Management System (QMS) to weather data.

A fundamental component which is critical concern, is the availability of human resource to meet the wide-ranging needs of airport operations. The provision of relevant training for that human resource is paramount.

1.5.2 Future Problems

Anticipating heavier demand at the MROC and MRLB airports, the human resource issues, if not addressed in tandem with the infrastructure and procedure development, could result in deficient service provision and delivery. Human resource acquisition and development must coincide with the infrastructure and procedure development.

The human resource issue is expected to get worse since the new hire rate is lower than the pension rate, meaning that at the current pace of hiring in the next decade we will have less air traffic controllers than we have today.

A major problem for the development of aviation in Costa Rica and it's air navigation services is that the main current airport is not suited to attend the expected future demand. A new airport must be build in the next decades with the abilities to handle more operations in quantity and type.

2. Costa Rican Aviation System Block Upgrade (ASBU) Implementation Status

The status of ASBU implementation is provided in this section. Though there are Block 0 to Block 4 (B0, B1, B2, and B3), only B0 capacities are ready to be implemented with supporting documents such as standards, procedures, specifications, and training materials. ICAO will provide supporting documents for B1 in 2019, B2 in 2025, and B3 in 2031.

2.1 ASBU Block 0 Implementation Metrics, Targets, and Status

ASBU B0 Implementation Targets and Status are presented in this section. Dirección General de Aviación Civil considers two airports, Aeropuerto Internacional Juan Santamaría (MROC) and Aeropuerto Internacional Daniel Oduber Quirós (MRLB) for airport oriented Elements.

2.1.1 ASBU B0 Implementation Metrics and Targets

Table 2.1 1 provides the ASBU B0 Implementation Metrics, Targets, and Progress for each B0 Element.

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
Performance Improvement Area 1: Airport Operations				
ACDM	**1.** Interconnection between aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-1 Target 1:** Assessed in August 2018 **a.** Yes **b.** 1 (MROC) **B0-ACDM-1 Target 2:** Implement by Dec 2019 **c.** None	Status – Planning Only MROC needs this capability.
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-2 Target 1:** Assessed in August 2018 **a.** Yes **b.** 1 (MROC) **B0-ACDM-1 Target 2:** Implement by Dec 2019 **c.** None	Status – Need Only MROC needs this capability.
	3. Interconnection between airport operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-3 Target 1:** Assessed in August 2018 **a.** Yes **b.** 1 (MROC) **B0-ACDM-3 Target 2:** Implement by Dec 2019 **c.** None	Status – Planning Only MROC needs this capability.
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-4 Target 1:** Assessed in August 2018 **a.** Yes **b.** 1 (MROC) **B0-ACDM-4 Target 2:** Implement by Dec 2019 **c.** None	Status – Need Only MROC needs this capability.
	5. Collaborative departure queue management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-5 Target 1:** Assessed in August 2018 **a.** Yes **b.** 1 (MROC) **B0-ACDM-5 Target 2:** Implement by Dec 2019 **c.** None	Status – Need Only MROC needs this capability.

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
APTA	**1.** PBN approach procedures with vertical guidance to LNAV/VNAV minima	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-1 Target 1:** Assessed in August 2018 **a.** Yes **b.** 2 MROC AND MRLB **B0-APTA-1 Target 2:** Implemented by Dec 2019 **c.** None	Status – Developing Both MROC and MRLB need this capability.
	2. PBN approach procedures with vertical guidance to LPV minima	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-2 Target 1:** Assessed in August 2018 **a.** Yes **b.** None **B0-APTA-2 Target 2:** **c.** N/A	Status – N/A
	3. PBN Approach Procedures without vertical guidance (LP, LNAV minima; using SBAS)	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-APTA-3 Target 2:** **c.** N/A	Status – N/A
	4. GBAS Landing System (GLS) Approach procedures	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-APTA-4. Target 2:** **c.** N/A	Status – N/A
RSEQ	**1.** AMAN via controlled time of arrival to a reference fix	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0- RSEQ-1 Target 2:** **c.** N/A	Status – N/A
	2. Departure management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-RSEQ-2. Target 2:** **c.** N/A	Status – N/A
	3. Departure flow management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-RSEQ-3. Target 2:** **c.** N/A	Status – N/A
	4. Point merge	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-RSEQ-4. Target 2:** **c.** N/A	Status – N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
SURF	**1.** A-SMGCS with at least one cooperative surface surveillance system	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-SURF-1. Target 2:** **c.** N/A	Status – N/A
	2. Including ADS-B APT as an element of A-SMGCS	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-SURF-2. Target 2:** **c.** N/A	Status – N/A
	3. A-SMGCS alerting with flight identification information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-SURF-3. Target 2:** **c.** N/A	Status – N/A
	4. EVS for taxi operations	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-SURF-4. Target 2:** **c.** N/A	Status – N/A
	5. Airport vehicles equipped with transponders	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-5. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-SURF-5. Target 2:** **c.** N/A	Status – N/A
WAKE	**1.** New PANS-ATM wake turbulence categories and separation minima	*ICAO has not developed new minima.*	N/A	Status – N/A
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-WAKE-2. Target 2:** **c.** N/A	Status – N/A
	3. Wake independent departure and arrival procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-WAKE-3. Target 2:** **c.** N/A	Status – N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	4. Wake turbulence mitigation for departures procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-WAKE-4. Target 2:** **c.** N/A	Status – N/A
	5. 6 wake turbulence categories and separation minima	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-5. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** TBD **B0-WAKE-5. Target 2:** **c.** TBD	Status – Analysis not started
Performance Improvement Area 2: Globally Interoperable Systems and Data				
AMET (Organization centric)	**1.** WAFS	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-1.Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-AMET-1.Target 2:** Implemented in Dec 2014 **c.** Yes	Status – Implemented
	2. IAVW	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-AMET-2. Target 2:** **c.** Implemented in Dec 2014	Status – Implemented
	3. TCAC forecasts	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-AMET-3.Target 2:** Implemented in Jan 2014 **c.** Yes	Status – Implemented
	4. Aerodrome warnings	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 (MROC , MRLB) **B0-AMET-4.Target 2:** Implement by Dec 2019 **c.** 2	Status – Implemented
	5. Wind shear warnings and alerts	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-5. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 (MROC , MRLB) **B0-AMET-5.Target 2:** Implement by Dec 2020 **c.** 2	Status – Need The need to acquire equipment to accurately inform pilots and air traffic controllers about windshear has been identified. The purchase of the equipment has not been started yes.
	6. SIGMET	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-6. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-AMET-6. Target 2:** **c.** Implemented Jan 2015	Status – Implemented Implemented thorough the Oficina de Vigilancia Meteorológica (OVM) in Honduras.

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	7. Other OPMET information (METAR, SPECI and/or TAF)	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-7. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 **B0-AMET-7.Target 2:** Implemented in Jan 2000 **c.** 2	Status – Implemented At both MROC and MRLB Implemented through the Instituto Meteorológico Nacional (IMN) in San José, Costa Rica.
	8. QMS for MET	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-8. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-AMET-8.Target 2:** Implement by Dec 2019 **c.** No	Status – Developing In the process of preparing documents and trainings.
DATM	**1.** Aeronautical Information Exchange Model (AIXM)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-DATM-1. Target 1:** Assessed in Aug 2018 **a.** yes **b.** yes **B0-DATM-1. Target 2:** Implemented by 2016 **c.** No	Status - Implemented
	2. eAIP	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-DATM-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-DATM-2. Target 2:** Implemented in Jan 2020 **c.** Yes	Status – Developing
	3. Digital NOTAM	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-DATM-3. Target 1:** Assessed by August 2018 **a.** Yes **b.** Yes **B0-DATM-3. Target 2:** Implemented in 2016 **c.** Yes	Status – Implemented
	4. eTOD	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-DATM-4. Target 1:** Assess by August 2018 **a.** Yes **b.** 1 **B0-DATM-4. Target 2:** Implemented by Dec 2021 **c.** No	Status – Planning
	5. WGS-84	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-DATM-5. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-DATM-5. Target 2:** Implemented in Jan 1993 **c.** Yes	Status – Implemented
	6. QMS for AIM	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-DATM-6. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-DATM-6. Target 2:** Implement by Dec 2016 **a.** No	Status – Implemented

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
FICE	**1.** AIDC to provide initial flight data to adjacent ATSUs	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FICE-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-FICE-1. Target 2: Implemented by Dec 2020** **c.** No	Status – Developing AIDC managed by COCESNA regional service provider, with the implementation of the new Radar Control Center, AIDC will be implemented with CENAMER, Nicaragua among other FIR's.
	2. AIDC to update previously coordinated flight data	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FICE-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-FICE-2. Target 2: Implemented by Dec 2020** **c.** No	Status – Developing AIDC managed by COCESNA regional service provider, with the implementation of the new Radar Control Center, AIDC will be implemented with CENAMER, Nicaragua among other FIR's.
	3. AIDC for control transfer	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FICE-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-FICE-3. Target 2: Implemented by 2020** **c.** No	Status – Developing AIDC managed by COCESNA regional service provider, with the implementation of the new Radar Control Center, AIDC will be implemented with CENAMER, Nicaragua among other FIR's.
	4. AIDC to transfer CPDLC logon information to the Next Data Authority	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FICE-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-FICE-4. Target 2: Implemented by 2020** **c.** No	Status – Developing CPDLC and AIDC are managed by COCESNA regional service provider, with the implementation of the new Radar Control Center, AIDC will be implemented with CENAMER, Nicaragua among other FIR's.
Performance Improvement Area 3: Optimum Capacity and Flexible Flights				
ACAS	**1.** ACAS II (TCAS version 7.1)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-ACAS-1. Target 2:** Implement by TBD **c.** No	Status – Need
	2. Auto Pilot/Flight Director (AP/FD) TCAS	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-ACAS-2. Target 2: Implement by TBD** **c.** N/A	Status – Need

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	3. TCAS Alert Prevention (TCAP)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-ACAS-3. Target 2:** **Implemented by TBD** **c.** No	Status – Need
ASEP	**1.** ATSA-AIRB	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ASEP-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-ASEP-1. Target 2:** **c.** N/A	Status - N/A
	2. ATSA-VSA	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ASEP-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-ASEP-2. Target 2:** **c.** N/A	Status - N/A
ASUR	**1.** ADS-B	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ASUR-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-ASUR-1. Target 2:** Implement by May 2018 **c.** Yes	Status – Implemented Costa Rica has implemented ADS – B with the new radar system installed in 2018.
	2. Multilateration (MLAT)	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ASUR-2. Target 1** Assessed in Aug 2018**:** **a.** Yes **b.** No **B0-ASUR-2. Target 2:** **c.** N/A	Status - N/A
FRTO	**1.** CDM incorporated into airspace planning	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FRTO-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-FRTO-1. Target 2:** **c.** N/A	Status - N/A
	2. Flexible Use of Airspace (FUA)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FRTO-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-FRTO-2. Target 2:** **c.** N/A	Status - N/A
	3. Flexible route systems	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FRTO-3. Target 1** Assessed in Aug 2018**:** **a.** Yes **b.** No **B0-FRTO-3. Target 2:** **c.** N/A	Status - N/A
	4. CPDLC used to request and receive re-route clearances	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FRTO-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-FRTO-4. Target 2:** **c.** N/A	Status - N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
NOPS	**1.** Sharing prediction of traffic load for next day	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-NOPS-1. Target 1:** Assessed in Sep 2017 **a.** Yes **b.** Yes **B0-NOPS-1. Target 2:** Implement by TBD **c.** No	Status – Developing The DGAC and COCESNA are working together to develop ATFM solutions. COCESNA has already developed a traffic predictive application.
	2. Proposing alternative routings to avoid or minimize ATFM delays	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-NOPS-2. Target 1:** Assessed in Sep 2017 **a.** Yes **b.** Yes **B0-NOPS-2. Target 2:** Implement by TBD **c.** No	Status – Developing The DGAC and COCESNA are working together to develop ATFM solutions.
OPFL	**1.** ITP using ADS-B	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-OFTL-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** No **B0-OFTL-1. Target 2:** **c.** N/A	Status - N/A
SNET	**1.** Short Term Conflict Alert (STCA)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-SNET-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-SNET-1. Target 2:** Implemented by April 2018 **c.** Yes	Status – Implemented Implemented with the upgrade of the Radar Control Center.
	2. Area Proximity Warning (APW)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-SNET-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-SNET-2. Target 2:** Implemented by April 2018 **c.** Yes	Status – Implemented Implemented with the upgrade of the Radar Control Center.
	3. Minimum Safe Altitude Warning (MSAW)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-SNET-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-SNET-3. Target 2:** Implemented by April 2018 **c.** Yes	Status – Implemented Implemented with the upgrade of the Radar Control Center.
	4. Medium Term Conflict Alert (MTCA)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-SNET-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-SNET-4. Target 2:** Implemented by April 2018 **c.** Yes	Status – Implemented Implemented with the upgrade of the Radar Control Center.
Performance Improvement Area 4: Efficient Flight Paths				
CCO	**1.** Procedure changes to facilitate CCO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-CCO-1. Target 2:** **Implemented by TBD** **c.** None	Status - Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	2. Route changes to facilitate CCO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-CCO-2. Target 2:** **Implemented by TBD** **c.** None	Status - Developing
	3. PBN SIDs	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 (MROC, MRLB) **B0-CCO-3. Target 2:** Implement by Dec 2019 **c.** 1	Status – Implemented. Both MROC and MRLB need the element. They have been only implemented in MROC. MRLB implementation is expected to be completed in Dec 2019.
CDO	**1.** Procedure changes to facilitate CDO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CDO-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 **B0-CDO-1. Target 2:** **Implemented TBD** **c.** None	Status – Developing
	2. Route changes to facilitate CDO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** Have we implemented the capability? *None, 1, or 2*	**B0-CDO-2. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 (MROC and MRLB) **B0-CDO-2. Target 2:** **Implemented TBD** **c.** None	Status – Developing
	3. PBN STARs	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CDO-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** 2 (MROC , MRLB) **B0-CDO-3. Target 2:** Implemented in Aug 2019 **c.** 1	Status – Implemented Both MROC and MRLB need the element. They have been only implemented in MROC. MRLB implementation is expected to be completed in Dec 2019.
TBO	**1.** ADS-C over oceanic and remote areas	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-TBO-1. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** Yes **B0-TBO-1. Target 2:** **Implemented TBD** **c.** No	Status – Need

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	2. CPDLC over continental areas	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-TBO-2. Target 1:** Assessed in Sep 2018 **a.** Yes **b.** None **B0-TBO-2. Target 2:** **Implemented by TBD** **c.** No	Status – Need
	3. CPDLC over oceanic and remote areas	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-TBO-3. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** None **B0-TBO-3. Target 2:** **Implemented by TBD** **c.** No	Status – Need
	4. SATVOICE direct controller-pilot communication (DCPC)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-TBO-4. Target 1:** Assessed in Aug 2018 **a.** Yes **b.** TBD **B0-TBO-4. Target 2:** **Implemented by TBD** **c.** No	Status – Analysis in progress

2.1.2 ASBU B0 Implementation Status Summary

The summary of ASBU B0 implementation status is provided in the Table 2.1. The details of ASBU B0 implementation status is recorded using ANRFs and provided in Appendix D.

Table 2.1.2 1 ASBU B0 Implementation Status Summary

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
Performance Improvement Area 1: Airport Operations									
ACDM	1. Interconnection between aircraft operator & ANSP systems to share surface operations information				1	1			
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information			1	1				
	3. Interconnection between airport operator & ANSP systems to share surface operations information				1	1			
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information			1	1				
	5. Collaborative departure queue management			1	1				
APTA	1. PBN approach procedures with vertical guidance to LNAV/VNAV minima						2		
	2. PBN approach procedures with vertical guidance to LPV minima				2				
	3. PBN approach procedures without vertical guidance to LNAV minima				2				
	4. GBAS Landing System (GLS) procedures to CAT I minima				2				
RSEQ	1. AMAN via controlled time of arrival to a reference fix				2				
	2. Departure management				2				
	3. Departure flow management				2				
	4. Point merge				2				
SURF	1. A-SMGCS with at least one cooperative surface surveillance system				2				
	2. Including ADS-B APT as an element of A-SMGCS				2				
	3. A-SMGCS alerting with flight identification information				2				

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	4. EVS for taxi operations				2				
	5. Airport vehicles equipped with transponders				2				
WAKE	1. New PANS-ATM wake turbulence categories and separation minima				2				
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				2				
	3. Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				2				
	4. Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds				2				
	5. 6 wake turbulence categories and separation minima	1			1				
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET*	1. WAFS								√
	2. IAVW								√
	3. TCAC forecasts								√
	4. Aerodrome warnings								√
	5. Wind shear warnings and alerts			2					
	6. SIGMET								√
	7. Other OPMET information (METAR, SPECI and/or TAF)								2
	8. QMS for MET						√		
DATM	1. Standardized Aeronautical Information Exchange Model (AIXM)								√
	2. eAIP						√		
	3. Digital NOTAM								√
	4. eTOD					√			
	5. WGS-84								√
	6. QMS for AIM								√
FICE	1. AIDC to provide initial flight data to adjacent ATSUs						√		
	2. AIDC to update previously coordinated flight data						√		
	3. AIDC for control transfer						√		
	4. AIDC to transfer CPDLC logon information to the Next Data Authority						√		
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. ACAS II (TCAS version 7.1)			√					
	2. AP.FD function			√					
	3. TCAP function			√					
ASEP	1. ATSA-AIRB				√				
	2. ATSA-VSA								
ASUR	1. ADS-B								√
	2. Multilateration (MLAT)				√				
FRTO	1. CDM incorporated into airspace planning				√				
	2. Flexible Use of Airspace (FUA)				√				
	3. Flexible routing				√				
	4: CPDLC used to request and receive re-route clearances				√				
NOPS	1. Sharing prediction of traffic load for next day						√		
	2. Proposing alternative routings to avoid or minimize ATFM delays						√		
OPFL	1. ITP using ADS-B						√		
SNET	1. Short Term Conflict Alert implementation (STCA)								√
	2. Area Proximity Warning (APW)								√
	3. Minimum Safe Altitude Warning (MSAW)								√
	4. Medium Term Conflict Alert (MTCA)								√
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. Procedure changes to facilitate CCO						2		

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	2. Airspace changes to facilitate CCO						2		
	3. PBN SIDs						1		1
CDO	1. Procedure changes to facilitate CDO						2		
	2. Airspace changes to facilitate CDO						2		
	3. PBN STARs						1		1
TBO	1. ADS-C over oceanic and remote areas			√					
	2. CPDLC over continental areas			√					
	3. CPDLC over oceanic and remote areas			√					
	3. SATVOICE direct controller-pilot communication (DCPC)	√							

*Service is contracted out to external providers, check table 2.1.1 for reference.

2.2 ASBU Block 1 Implementation Targets and Status

This section will be written after 2019. Appendix E is reserved for ASBU B1 ANRFs.

2.3 ASBU Block 2 Implementation Targets and Status

This section will be written after 2025. Appendix F is reserved for ASBU B2 ANRFs.

2.4 ASBU Block 3 Implementation Targets and Status

This section will be written after 2031. Appendix G is reserved for ASBU B3 ANRFs.

3. ICAO NACC Regional Aviation System Improvements (RASI) Status

The RPBANIP is aligned with GANP and provides guidance to States in the NACC region. The ICAO NACC RO also provides guidance to implement certain capabilities outside the ASBU scope, yet regionally important improvements. Currently 4 aerodrome associated NACC region specific improvements are identified and shown below. RASI ANRF for ICAO NACC Regional Initiatives is prepared and provided in Appendix H.

- Aerodrome certification – Status: Developing (at both MROCand MRLB)
- Heliport operational approval – Status: Implemented
- Visual aids for navigation – Status: Implemented
- Aerodrome Bird/Wildlife Organization and Control Programme – Status: Developing

4. Costa Rica State Aviation System Improvements (SASI) Status

Beyond ASBU's

Costa Rica Aviation System Improvements (SASI) are broken into three categories; (1) Equipment upgrades; (2) Procedure upgrades; and (3) Infrastructure upgrades. The details of upgrades were recorded using SASI ANRFs and provided in Appendix I.

4.1 Equipment Upgrades

Projects to the update the radio communications network are in development. ILS equipment replacement

4.2 Procedure Upgrades

A project to redesign the Costa Rican airspace is under analysis.

4.3 Infrastructure Upgrades

There are currently no infrastructure upgrades identified.

5. Costa Rica State ANP Next Review Schedule

The next review and revision of this document is scheduled in September 2019.

Appendix A: ANRF Explained

An ASBU ANRF should be completed for each applicable ASBU Module as follows:

PIA The Performance Improvement Area (1, 2, 3 or 4) for the ASBU Module, as per the *NAM ASBU Handbook*.

Block - Module The Module Designation for the ASBU Module, as per the *NAM ASBU Handbook*.

Date The date when the form was completed or updated.

Module Description The Summary Description for the ASBU Module, as per the *NAM ASBU Handbook*.

Element The descriptive text for each Element, as per the *NAM ASBU Handbook*. It is not necessary to include the Defined, Derived from or Identified By information. Insert additional rows, if necessary, to accommodate all of the Elements listed for the ASBU Module.

Date Planned or Implemented The month and year when the Element was fully implemented or the year when it is planned for the Element to be fully implemented by all applicable States or at all applicable aerodromes. This field should be left blank if the Status for the Element is "Analysis Not Started" or "Not Applicable" for all States or aerodromes in the Region.

Status The Need Analysis or Implementation status for the Element, in accordance with Table NAM ASBU III-1, III-2, III-3 or III-4. Indicate the status as follows:

Not Started: if the Need Analysis has not been started for any of the States or aerodromes

In Progress: if at least one Need Analysis has been started but none have yet been completed

Need: if at least on Need Analysis has determined a requirement for the Element, but no implementation planning has yet been initiated

Not Applicable: 1) if all of the Need Analyses completed to date have concluded the Element is not required, or 2) if the Element is not an aerodrome-related improvement and the Region has not adopted the improvement for region-wide implementation.

Planning: if at least one implementation is in the Planning phase and no implementations have yet been completed.

Developing: if at least one implementation is in the Developing phase but no implementations have yet been completed.

Partially Implemented: if at least one, but not all, implementations have been completed.

Implemented: if all of Needed implementations have been completed.

Status Details Further information to support or explain the reported status. The reason(s) an Element was found to be "Not Applicable" for all the aerodromes (or States) in the Region. The reason(s) why the Need Analysis has not been completed for all or some of the aerodromes (or States) in the Region. Information on where implementation has or has not been completed (as appropriate) if the reported status is "Partially Implemented".

Achieved Benefits Describe the achieved benefits for the entire Module or particular Elements. The benefits can be quantitative or qualitative. The benefits should be described for the following 5 of the 11 Key Performance Areas (KPAs) defined the *Manual on Global Performance of the Air Navigation System* (Doc 9883):

Access & Equity: Improving the operating environment so as to ensure all airspace users have the right of access to ATM resources needed to meet their specific operational requirements; and ensuring that the shared use of the airspace for different airspace users can be achieved safely. Providing equity for all airspace users that have access to a given airspace or service. Generally, the first aircraft ready to use the ATM resources will receive priority, except where significant overall safety or system operational efficiency would accrue or national defence considerations or interests dictate by providing priority on a different basis.

Capacity: Improving the ability to meet airspace user demand at peak times and locations while minimizing restrictions on traffic flow. Responding to future growth by increasing capacity, efficiency, flexibility, and predictability while ensuring that there are no adverse impacts to safety and giving due consideration to the environment. Increasing resiliency to service disruption and minimising resulting temporary loss of capacity.

Efficiency: Improving the operational and economic cost effectiveness of gate-to-gate flight operations from the airspace users' perspective. Increasing the ability for airspace users to depart and arrive at the times they select and fly the trajectory they determine to be optimum in all phases of flight.

Environment: Contributing to the protection of the environment by minimizing or reducing noise, gaseous emissions, and other negative environmental effects in the implementation and operation of the air navigation system.

Safety: Reducing the likelihood or severity of operational safety risks associated with the provision or use of air navigation services.

Implementation Challenges A description of any circumstances that have been encountered or are foreseen that might prevent or delay implementation. Challenges should be categorized and described under the applicable subject area.

Notes Any further information as deemed appropriate.

Appendix B: ASBU ANRF Template

State Name ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CDO	**Date**	April 17, 2017

Module Description: To use performance-based airspace and arrival procedures allowing an aircraft to fly its optimum profile using continuous descent operations. This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas. The application of PBN enhances CDO.

Element Implementation Status			
1	**Element Description:** Procedure changes to facilitate CDO	**Date Planned/Implemented** Dec 15, 2013	**Status** Implemented
	Status Details Describe status.		
2	**Element Description** Route changes to facilitate CDO	**Date Planned/Implemented** Dec 15, 2013	**Status** Planning
	Status Details Describe status.		
3	**Element Description** PBN STARs	**Date Planned/Implemented** Dec 15, 2013	**Status** Developing
	Status Details Describe status.		

Achieved Benefits
Access and Equity **Element 1:** Describe if you can, else leave it blank. **Element 3:** Describe if you can, else leave it blank.
Capacity
Efficiency
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals
Notes Provide notes if applicable.

Appendix C: RASI and SASI ANRF Templates

RASI and SASI ANRF templates are the same with ASBU ANRF template with exception of the header as shown in this Appendix. The first header is for the ICAO NACC Regional Office specific improvements while the second header is for the State specific improvements.

Section C.1: Regional Aviation System Improvements (RASI) ANRF Header

Enter appropriate State Name and Date. Describe the Module (i.e., improvement group description.)

Costa Rica RASI Air Navigation Reporting Form (ANRF)		
ICAO NACC Regional Initiatives	**Date**	August 8, 2018
Module Description: ICAO NACC RO has identified airport improvements.		
Refer to the ASBU ANRF for the remaining sections (i.e., Element Implementation Status, Achieved Benefits, Implementation Challenges, and Notes)		

Section C.2: State Aviation System Improvements (RASI) ANRF Header

Enter appropriate State Name, Upgrades category (i.e., Equipment, Procedure, Infrastructure, etc.), Date. Describe the Module (i.e., Upgrades category description.)

Costa Rica SASI Air Navigation Reporting Form (ANRF)		
Infrastructure Upgrades	**Date**	August 8, 2018
Module Description: Describe module.		
Refer to the ASBU ANRF for the remaining sections (i.e., Element Implementation Status, Achieved Benefits, Implementation Challenges, and Notes)		

Appendix D: Dirección General de Aviación Civil ASBU Block 0 ANRFs

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - ACDM	**Date**	August 7th , 2018
Module Description: To implement collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.					
Element Implementation Status					
1	**Element Description:** Interconnection between aircraft operator and ANSP systems to share surface operations information		**Date Planned/Implemented** Dec 2019		**Status** **Planning**
	Status Details Planning is needed to				
2	**Element Description:** Interconnection between aircraft operator and airport operator systems to share surface operations information		**Date Planned/Implemented** Dec 2019		**Status** Need
	Status Details Project is developed between the airport operator and the airlines.				
3	**Element Description:** Interconnection between airport operator and ANSP systems to share surface operations information		**Date Planned/Implemented** Dec 2019		**Status** Planning
	Status Details Project is developed by COCESNA				
4	**Element Description:** Interconnection between airport operator, aircraft operator and ANSP systems to share surface operations information		**Date Planned/Implemented** Dec 2019		**Status** Need
	Status Details Only MROC needs the capability				
5	**Element Description:** Collaborative departure queue management		**Date Planned/Implemented** Enter date if applicable		**Status** Need
	Status Details Only MROC needs the capability				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					

Notes

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - APTA	**Date**	August 7th , 2018

Module Description: The use of Performance-based Navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures will enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of basic global navigation satellite system (GNSS), Baro-vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

Element Implementation Status

1	**Element Description:** PBN approach procedures with vertical guidance to LNAV/VNAV minima	**Date Planned/Implemented** Dec 2019	**Status** Developing
	Status Details Both MROC and MRLB need this capability.		
2	**Element Description:** PBN approach procedures with vertical guidance to LPV minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
3	**Element Description:** PBN approach procedures without vertical guidance to LNAV minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
4	**Element Description:** GBAS Landing System (GLS) procedures to CAT I minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - RSEQ	**Date**	August 7th , 2018

Module Description: To manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes, to efficiently utilize the inherent runway capacity.

Element Implementation Status

1	**Element Description:** AMAN via controlled time of arrival to a reference fix	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
2	**Element Description:** Departure management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
3	**Element Description:** Departure flow management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
4	**Element Description:** Point merge	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - SURF	**Date**	August 7th , 2018

Module Description: First levels of advanced-surface movement guidance and control systems (A-SMGCS) provides surveillance and alerting of movements of both aircraft and vehicles at the aerodrome, thus improving runway/aerodrome safety.
Automatic dependent surveillance-broadcast (ADS-B) information is used when available (ADS-B APT).
Enhanced vision systems (EVS) is used for low-visibility operations.

Element Implementation Status

1	**Element Description:** A-SMGCS with at least one cooperative surface surveillance system	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
2	**Element Description:** ADS-B APT	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
3	**Element Description:** A-SMGCS alerting with flight identification information	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
4	**Element Description:** EVS for taxi operations	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
5	**Element Description:** Airport vehicles equipped with transponders	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - WAKE	**Date**	August 7th , 2018

Module Description: Improved throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.

Element Implementation Status

1	**Element Description:** New PANS-ATM wake turbulence categories and separation minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
2	**Element Description:** Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
3	**Element Description:** Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
4	**Element Description:** Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		
5	**Element Description:** 6 wake turbulence categories and separation minima	**Date Planned/Implemented** N/A	**Status** Analysis not started
	Status Details Costa Rica uses PANS - ATM instead of FAA regulations, but analysis would be conducted to determine the possibility to implement FAA wake turbulence categories and separations.		

Achieved Benefits
Access and Equity
Capacity
Efficiency
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals

Notes

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - AMET	**Date**	March 2018

Module Description: Global, regional and local meteorological information:

a) forecasts provided by world area forecast centres (WAFC), volcanic ash advisory centres (VAAC) and tropical cyclone advisory centres (TCAC);

b) aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome including wind shear; and

c) SIGMETs to provide information on occurrence or expected occurrence of specific en-route weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This information supports flexible airspace management, improved situational awareness and collaborative decision making, and dynamically optimized flight trajectory planning.

This module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety.

Element Implementation Status

1	**Element Description:** WAFS	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The US Washington World Area Forecast Center (WAFC), a component of WAFS, is operational and continues as one of two ICAO designated WAFCs providing aeronautical meteorological en-route forecasts as prescribed in ICAO Annex 3. The US also continues as a provider State for the WAFC Internet File Service (WIFS). Through WIFS, authorized users are able to access the WAFC products as well as: advisories for volcanic ash (Element 2) and tropical cyclones (Element 3); and SIGMETs and other operational meteorological (OPMET) information (Element 6). The US WIFS also provides backup to the companion Satellite Distribution System (SADIS) provided by the United Kingdom.		
2	**Element Description:** IAVW	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The IAVW procedures are handled through the "Oficina de Vigilancia Meteorológica" in Honduras. International Volcano Watch.		
3	**Element Description:** TCAC forecasts	**Date Planned/Implemented** December 2013	**Status** Implemented
	Costa Rica through it's National Weather Institute (IMN in Spanish) has implemented watch procedures with the Tropical Cyclone Advisory Centre in Miami, USA.		
4	**Element Description:** Aerodrome warnings	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details Costa Rica has implemented aerodrome warnings with the purchase of AWOS system for Juan Santamaría Intenrnational Airport. Aerodrome warnings are available for Tobias Bolaños Palma and Daniel Oduber International Airports.		

5	**Element Description:** Wind shear warnings and alerts	**Date Planned/Implemented** December 2018	**Status** Need
	Status Details There are no aerodromes with wind shear warnings and alerts yet. Equipment is expected to be bought in the medium term to provide the service.		
6	**Element Description:** SIGMET	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The "Oficina de Vigilancia Meteorológica" in Honduras handles the SIGMET reports.		
7	**Element Description:** Other OPMET information (METAR, SPECI and/or TAF)	**Date Planned/Implemented** December 2013	**Status** Implemented
	Status Details The IMN issues TAFS, METAR and SPECI for the four international airports (MROC, MRLB, MRPV, and MRLM) in compliance with ICAO Annex 3.		
8	**Element Description:** QMS for MET	**Date Planned/Implemented** March 2010	**Status** Developing
	Status Details The Instituto Meteorológico Nacional is developing a QMS to comply with ICAO's Annex 3 requirements.		

Achieved Benefits
Access and Equity No report.
Capacity No report.
Efficiency No report.
Environment No report.
Safety No report.
Implementation Challenges
Ground system Implementation High cost of weather monitoring equipment, which limits the State's investment capacity.
Avionics Implementation None
Procedures Availability None
Operational Approvals None
Notes None

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - DATM	**Date**	July 15, 2015

Module Description: The initial introduction of digital processing and management of information through, aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical exchange model (AIXM), migration to electronic aeronautical information publication (AIP) and better quality and availability of data.

Element Implementation Status

1	**Element Description:** Aeronautical Information Exchange Model (AIXM)	**Date Planned/Implemented** December 2016	**Status*** Implemented
	Status Details AIXM platforms are operative, must be reviewed.		
2	**Element Description:** eAIP	**Date Planned/Implemented** Jan 2020	**Status** Developing
	Status Details Implementation of eAIP has been initiated, but is not operative yet. The effort is ongoing.		
3	**Element Description:** Digital NOTAM	**Date Planned/Implemented** December 2016	**Status** Implemented
	Status Details Costa Rica is compliant with the Digital Notam through COCESNA.		
4	**Element Description:** eTOD	**Date Planned/Implemented** December 2021	**Status** Planning
	Status Details Costa Rica has completed some data collection tasks for the e-TOD.		
5	**Element Description:** WGS-84	**Date Planned/Implemented** Jan 1993	**Status** Implemented
	Status Details Currently a subset of Aeronautical Information and specific aeronautical products are disseminated in WGS-84. Plans in place to disseminate all aeronautical information in AIXM 5.1 WGS-84.		
6	**Element Description:** QMS for AIM	**Date Planned/Implemented** December 2016	**Status** Implemented
	Status Details Costa Rica has a certified QMS for its AIM.		

Achieved Benefits

Access and Equity
No report.

Capacity No report.
Efficiency No report.
Environment No report.
Safety No report.
Implementation Challenges
Ground system Implementation None
Avionics Implementation None
Procedures Availability None
Operational Approvals None
Notes None

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - FICE	**Date**	March 2018

Module Description: Improves coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process, particularly for oceanic ATSUs.

Element Implementation Status

1	**Element Description:** AIDC to provide initial flight data to adjacent ATSUs	**Date Planned/Implemented** December 2020	**Status** Developing
	Status Details AIDC is managed by COCESNA the regional service provider. The new Radar Control Center, has AIDC capabilities and it is expected to be implemented in the medium to the short term with CENAMER, Nicaragua among other FIR's.		
2	**Element Description:** AIDC to update previously coordinated flight data	**Date Planned/Implemented** December 2020	**Status** Developing
	Status Details AIDC is managed by COCESNA the regional service provider. The new Radar Control Center, has AIDC capabilities and will be implemented in the short term with CENAMER, Nicaragua among other FIR's. The implementation depends on the upgrade of the CENAMER Control Center.		
3	**Element Description:** AIDC for control transfer	**Date Planned/Implemented** December 2020	**Status** Developing
	Status Details AIDC is managed by COCESNA the regional service provider. The new Radar Control Center, has AIDC capabilities and will be implemented in the short term with CENAMER, Nicaragua among other FIR's.		
4	**Element Description:** AIDC to transfer CPDLC logon information to the Next Data Authority	**Date Planned/Implemented** December 2020	**Status** Developing
	Status Details AIDC is managed by COCESNA the regional service provider. The new Radar Control Center, has AIDC capabilities and will be implemented in the short term with CENAMER, Nicaragua among other FIR's.*		

Achieved Benefits

Access and Equity
No report.

Capacity
No report.

Efficiency
No report.

Environment
No report.

Safety No report.
Implementation Challenges
Ground system Implementation None
Avionics Implementation None
Procedures Availability None
Operational Approvals None
Notes The ICAO NACC office recommends that the first AIDC should take place with Panama, since they use the ASIA – PAC version and the lessons learned from the implementation can be used to expedite the process with CENAMER and Managua.

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ACAS	**Date**	August 7th , 2018

Module Description: To provide short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

Element Implementation Status

1	**Element Description:** ACAS II (TCAS version 7.1)	**Date** **Planned/Implemented** TBD	**Status** Need
	Status Details ICAO NACC office requests the implementation of TCAS 7.1, it has not yet been adopted.		
2	**Element Description:** AP/FD function	**Date** **Planned/Implemented** TBD	**Status** Need
	Status Details Enter status details It has not yet been adopted		
3	**Element Description:** TCAP function	**Date** **Planned/Implemented** TBD	**Status** Need
	Status Details It has not yet been adopted		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

- Before implementation the information must be shared with IATA. Other mitigation measures have been implemented in lieu of TCAS 7.1 from the United States to the Patagonia.
- Expectations for ANSP are to request aircrafts to be equipped with TCAS 7.1 and to design procedures to mitigate risks for aircrafts not equipped with TCAS 7.1
- Study paper regarding the
- Implementation means to publish the requirement within the country's normative.
- Use the Mexican experience as a reference.
- Standarize publishings with the rest of Central America.
- Affects safety net configuration.

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASEP	**Date**	February 26, 2014

Module Description: Two air traffic situational awareness (ATSA) applications which will enhance safety and efficiency by providing pilots with the means to enhance traffic situational awareness and achieve quicker visual acquisition of targets:
a) AIRB (basic airborne situational awareness during flight operations).
b) VSA (visual separation on approach).

Element Implementation Status

1	**Element Description:** ATSA-AIRB	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No plans to implement ATSA-AIRB		
2	**Element Description:** ATSA-VSA	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No plans to implement ATSA-VSA		

Achieved Benefits

Access and Equity
No report.

Capacity
No report.

Efficiency
No report.

Environment
No report.

Safety
No report.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation
None

Procedures Availability
None

Operational Approvals
None

Notes
None

United States ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASUR	**Date**	February 26, 2014

Module Description: Provides initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.

Element Implementation Status

1	**Element Description:** ADS-B	**Date Planned/Implemented** 2018	**Status** Implemented
	Status Details Costa Rica has implemented ADS – B with the new radar system installed last year.		
2	**Element Description:** MLAT	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details N/A		

Achieved Benefits

Access and Equity
No report.

Capacity
No report.

Efficiency
No report.

Environment
No report.

Safety
No report.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation
None

Procedures Availability
None

Operational Approvals
None

Notes
None

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block – Module**	B0 - FRTO	**Date**	August 7th , 2018
Module Description: To allow the use of airspace which would otherwise be segregated (i.e. special use airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.					
Element Implementation Status					
1	**Element Description:** CDM incorporated into airspace planning		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
2	**Element Description:** Flexible Use of Airspace (FUA)		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
3	**Element Description:** Flexible routing		**Date Planned/Implemented** **N/A**		**Status** N/A
	Status Details N/A.				
4	**Element Description:** CPDLC used to request and receive re-route clearances		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - NOPS	**Date**	August 7th , 2018

Module Description: Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. Collaborative ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and re-route traffic to avoid saturated areas. ATFM may also be used to address system disruptions including a crisis caused by human or natural phenomena.

Element Implementation Status

1	**Element Description:** Sharing prediction of traffic load for next day	**Date Planned/Implemented** TBD	**Status** Developing
	Status Details The DGAC and COCESNA are working together to develop ATFM solutions. COCESNA has already developed a traffic predictive application.		
2	**Element Description:** Proposing alternative routings to avoid or minimize ATFM delays	**Date Planned/Implemented** TBD	**Status** Developing
	Status Details The DGAC and COCESNA are working together to develop ATFM solutions		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

<table>
<tr><th colspan="6">Costa RicaASBU Air Navigation Reporting Form (ANRF)</th></tr>
<tr><td>PIA</td><td>3</td><td>Block - Module</td><td>B0 - OPFL</td><td>Date</td><td>August 7th , 2018</td></tr>
<tr><td colspan="6">Module Description: To enable aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is fuel/emissions savings and the uplift of greater payloads.</td></tr>
<tr><td colspan="6">Element Implementation Status</td></tr>
<tr><td rowspan="2">1</td><td colspan="2">Element Description:
ITP using ADS-B</td><td colspan="2">Date Planned/Implemented
N/A</td><td>Status
N/A</td></tr>
<tr><td colspan="5">Status Details
COCESNA is responsible to implement the element.</td></tr>
<tr><td colspan="6">Achieved Benefits</td></tr>
<tr><td colspan="6">Access and Equity</td></tr>
<tr><td colspan="6">Capacity</td></tr>
<tr><td colspan="6">Efficiency</td></tr>
<tr><td colspan="6">Environment</td></tr>
<tr><td colspan="6">Safety</td></tr>
<tr><td colspan="6">Implementation Challenges</td></tr>
<tr><td colspan="6">Ground system Implementation</td></tr>
<tr><td colspan="6">Avionics Implementation</td></tr>
<tr><td colspan="6">Procedures Availability</td></tr>
<tr><td colspan="6">Operational Approvals</td></tr>
<tr><td colspan="6">Notes</td></tr>
</table>

Costa Rica ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - SNET	**Date**	March 2018

Module Description: Monitors the operational environment during airborne phases of flight to provide timely alerts on the ground of an increased risk to flight safety. In this case, short-term conflict alert, area proximity warnings and minimum safe altitude warnings are proposed. Ground-based safety nets make an essential contribution to safety and remain required as long as the operational concept remains human centred.

Element Implementation Status

1	**Element Description:** Short Term Conflict Alert (STCA)	**Date Planned/Implemented** April 2018	**Status** Implemented
	Status Details Implemented with the upgrade of the Radar Control Center		
2	**Element Description:** Area Proximity Warning (APW)	**Date Planned/Implemented** April 2018	**Status** Implemented
	Status Details Implemented with the upgrade of the Radar Control Center		
3	**Element Description:** Minimum Safe Altitude Warning (MSAW)	**Date Planned/Implemented** April 2018	**Status** Implemented
	Status Details Implemented with the upgrade of the Radar Control Center		
4	**Element Description:** Medium Term Conflict Alert (MTCA)	**Date Planned/Implemented** April 2018	**Status** Implemented
	Status Details Implemented with the upgrade of the Radar Control Center		

Achieved Benefits

Access and Equity
No report.

Capacity
No report.

Efficiency
No report.

Environment
No report.

Safety
No report.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation None
Procedures Availability None
Operational Approvals None
Notes None

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block – Module**	B0 - CCO	**Date**	August 7th , 2018
Module Description: To implement continuous climb operations in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles, and increase capacity at congested terminal areas. The application of PBN enhances CCO.					
Element Implementation Status					
1	**Element Description:** Procedure changes to facilitate CCO		**Date Planned/Implemented** TBD		**Status** Developing
	Status Details Enter status details.				
2	**Element Description:** Airspace changes to facilitate CCO		**Date Planned/Implemented** TBD		**Status** Developing
	Status Details Enter status details				
3	**Element Description:** PBN SIDs		**Date Planned/Implemented** February 2018		**Status** Implemented
	Status Details Enter status details				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CDO	**Date**	August 7th , 2018
Module Description: To use performance-based airspace and arrival procedures allowing an aircraft to fly its optimum profile using continuous descent operations. This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas. The application of PBN enhances CDO.					
Element Implementation Status					
1	**Element Description:** Procedure changes to facilitate CDO		**Date Planned/Implemented** TBD		**Status** Developing
	Status Details Enter status details				
2	**Element Description:** Airspace changes to facilitate CDO		**Date Planned/Implemented** TBD		**Status** Developing
	Status Details Enter status details				
3	**Element Description:** PBN STARs		**Date Planned/Implemented** February 2018		**Status** Implemented
	Status Details Enter status details				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

Costa RicaASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - TBO	**Date**	August 7th , 2018
Module Description: To implement a set of data link applications supporting surveillance and communications in air traffic services, which will lead to flexible routing, reduced separation and improved safety.					
Element Implementation Status					
1	**Element Description:** ADS-C over oceanic and remote areas		**Date Planned/Implemented** TBD		**Status** Need
	Status Details The element is needed but planning has not yet begun.				
2	**Element Description:** CPDLC over continental areas		**Date Planned/Implemented** TBD		**Status** Need
	Status Details The element is needed but planning has not yet begun.				
3	**Element Description:** CPDLC over oceanic and remote areas		**Date Planned/Implemented** TBD		**Status** Need
	Status Details The element is needed but planning has not yet begun.				
4	**Element Description:** SATVOICE direct controller-pilot communication (DCPC)		**Date Planned/Implemented** TBD		**Status** Analysis in progress
	Status Details Analysis for this element is in progress.				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

Appendix E: Dirección General de Aviación Civil ASBU Block 1 ANRFs

Insert ASBU B1 ANRFs in the future.

Appendix F: Dirección General de Aviación Civil SBU Block 2 ANRFs

Insert ASBU B2 ANRFs in the future.

Appendix G: Dirección General de Aviación Civil ASBU Block 3 ANRFs

Insert ASBU B3 ANRFs in the future.

Appendix H: Dirección General de Aviación Civil RASI ANRFs

Dirección General de Aviación Civil RASI Air Navigation Reporting Form (ANRF)			
ICAO NACC Regional Initiatives		**Date**	August 7, 2018
Module Description: ICAO NACC RO has identified airport improvements.			
Element Implementation Status			
1	**Element Description:** Aerodrome certification	**Date Planned/Implemented** Dec 2020	**Status** Partially Implemented
	Status Details ICAO NACC region has a goal to have CAR aerodromes in its regional ANP Table AOP I-1 be certified. Dirección General de Aviación Civil's two airports, MROC and MRLB. MROC is currently certified, MRLB is in the process.		
2	**Element Description:** Heliport operational approval	**Date Planned/Implemented** Dec 2020	**Status** Need
	Status Details ICAO NACC region has a goal to have CAR heliports in its regional ANP Table AOP I-1 certified. Currently the heliports of Costa Rica are not certified.		
3	**Element Description:** Visual aids for navigation	**Date Planned/Implemented** Dec 2020	**Status** Developing
	Status Details ICAO NACC region has a goal to have CAR airports in its ANP Table AOP I-1 compliant with Annex 14 requirements. MROC and MRLB are in the process.		
4	**Element Description:** Aerodrome Bird/Wildlife Organization and Control Programme	**Date Planned/Implemented** Dec 2016	**Status** Implemented
	Status Details ICAO NACC region has a goal to have CAR airports in its ANP Table AOP I-1 have an aerodrome bird/wildlife organization and control programme. MRLB has a wildlife committee and the SMS of MROC includes a bird/wildlife control programme.		
Achieved Benefits			
Access and Equity Element 1 - Aerodrome certification: International operators may not be permitted to operate to aerodromes that are not certified Element 2. Heliport operational approval: International operators may not be permitted to operate to heliports that are not approved Element 3. Visual aids for navigation: International operators may not be permitted to operate to aerodromes that are not compliant with Annex 14			
Capacity: No report			
Efficiency Element 3. Visual aids for navigation: Annex 14 compliant visual aids for navigation assist flights to more efficiently complete ground movements			
Environment: No report			

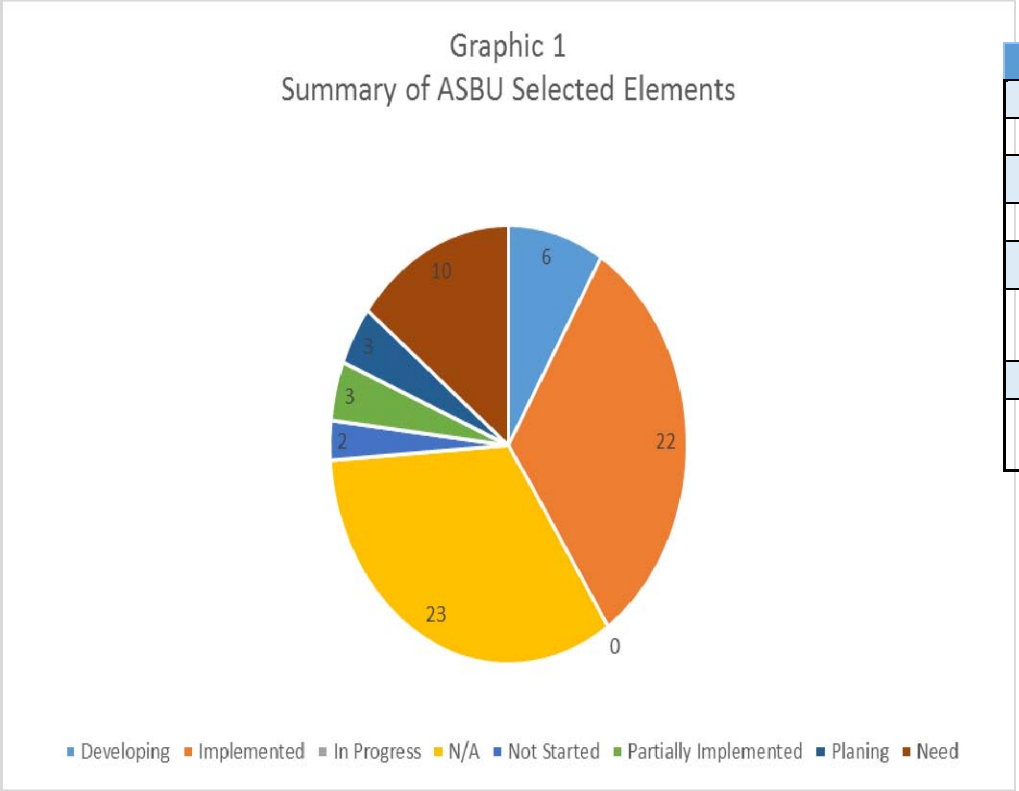
Safety Element 1 - Aerodrome certification: Certification should be contingent upon the airport complying with applicable ICAO SARPs. Certification and the associated regulatory oversight should increase the effectiveness of SSP and SMS processes to identify and correct safety issues at certified aerodromes. Element 2. Heliport operational approval: Certification should be contingent upon the heliport complying with applicable ICAO SARPs. Approval and the associated regulatory oversight should increase the effectiveness of SSP and SMS processes to identify and correct safety issues at approved heliports. Element 3. Visual aids for navigation: Annex 14 compliant visual aids for navigation reduce flight crew confusion and assist in avoiding runway incursions or other ground movement errors. Element 4. Aerodrome Bird/Wildlife Organization and Control Programme: An effective organization and control programme reduces the potential for aircraft to strike wildlife or ingest wildlife into engines or propellers.
Implementation Challenges
Ground system Implementation: No report: No report
Avionics Implementation: No report
Procedures Availability: No report
Operational Approvals: No report
Notes Element 1: Airport Terminal Development will also address the airport terminal security issues.

Appendix I: Dirección General de Aviación Civil SASI ANRFs

Costa Rica SASI Air Navigation Reporting Form (ANRF)			
Equipment Upgrades		**Date**	August 8 , 2017
Module Description: Current CNS equipments will be upgraded or replaced to enhance the communications network, surveillance coverage, and nav aids.			
Element Implementation Status			
1	**Element Description:** Radio communications network upgrade	**Date Planned/Implemented** Dec 2020	**Status** Planning
	Status Details Current radio receivers and transceivers are obsolete and must be replaced to avoid a catastrophic failure that might render the CNS network useless. The current radio network has deficient redundancy capabilities and the equipment must be upgraded to mitigate the risk of bottlenecks in the case of natural disasters.		
2	**Element Description:** MLAT for Paso de la Palma	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details Surveillance coverage ranges from deficient to unavailable in a very congested VFR route, called Paso de la Palma, installation of MLAT will allow surveillance in that route at a low cost.		
3	**Element Description:** ILS equipment replacement	**Date Planned/Implemented** Mar 2019	**Status** Developing
	Status Details The ILS equipment in MROC will be replaced to upgrade current nav aids to the newest version available. The process will begin in 2020 for MRLB		
Achieved Benefits			
Access and Equity			
Capacity *No reports*			
Efficiency Element 1: Radio communications network will improve the efficiency of the air traffic services. Element 3: ILS equipment replacement will enhance the approach procedures.			
Environment			
Safety Element 2 MLAT : Improve operational safety of aircraft.			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			

Costa Rica SASI Air Navigation Reporting Form (ANRF)			
Procedure Upgrades		**Date**	August 8 , 2017
Module Description: Current design of the airspace is not dynamic enough to support the growth in operations and CCO and CDO operations.			
Element Implementation Status			
1	**Element Description:** Redesign of Costa Rican airspace	**Date Planned/Implemented** TBD	**Status** Need
	Status Details A conceptual design of a new airspace for Costa Rican is required.		
Achieved Benefits			
Access and Equity			
Capacity A new airspace will be able to hold more operations per hour.			
Efficiency CDO and CCO operations improve efficiency			
Environment			
Safety			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			

Appendix J: Summary of ASBU Selected Elements



Status	Number
Developing	6
Implemented	22
In Progress	0
N/A	23
Not Started	2
Partially Implemented	3
Planing	3
Need	10

DIRECCIÓN GENERAL DE
AVIACIÓN CIVIL
COSTA RICA