New Barbados
State Air Navigation Plan

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GRANTLEY ADAMS INTERNATIONAL AIR

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Introduction

This document is Barbados Civil Aviation Department 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 Barbados aligning activities and strategies to the GANP and RPBANIP. The information contained in the Barbados Civil Aviation Department 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 Barbados Civil Aviation Department 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 Barbados Civil Aviation Department, such as authority, airspace and airports, and air traffic are described in this section.

The Barbados Civil Aviation Department (BCAD) was established on 10th March 1913 and amended in 2007, not until Good Friday March 29th 1929 that the first international flight made our shores.

MISSION

To provide a safe, efficient, reliable and economical air navigation service and to promote quality and excellence in Barbados' Aviation industry through professional and cost effective safety regulation.

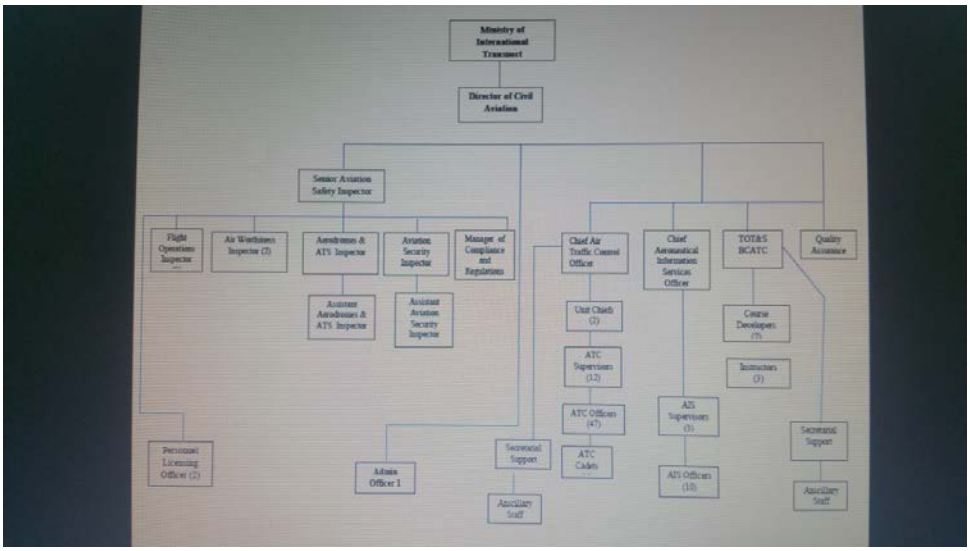
1.2.1 Authority of **Barbados Civil Aviation Department**

VISION

Excellence and the highest standards of civil aviation that are second to none in the region.

The BCAD comprises of two sections operations and regulatory. The regulatory section is responsible for regulating all civil aviation matters, responsible for updating Barbados ANP and overseeing that the airport operates smoothly in accordance to the Annexes ICAO Standard Procedures. The operations section is responsible for managing the aerodrome, airspace usage, provides air traffic services and flight information service. The Department is headed by Director of Civil Aviation who is supported by one Technical Officer, five inspectors, a Chief Aeronautical Information Service Officer (CAISO), Chief Air Traffic Control Officer (CATCO) and other supported staff. The BCAD organization is outlined in Figure 1.2.1, the positions labelled in black implemented, purple not implemented and the post highlighted for two positions in the regulatory only one position filled except for the Aviation Security Inspector and the assistant.

Figure 1.2.1: Organizational Structure of the Barbados Civil Aviation Department



1.2.2 Airspace

The airspace of Barbados territory including adjacent international waters comprises a TMA (Barbados TMA) which is located within the Piarco Flight Information Region (FIR) that is managed by Piarco. Our airspace is designed in a horse shoe shape which begins from 3000ft and extend to F245. Air Traffic Control is exercised in TMA and CTR at Grantley Adams International Airport which is a controlled

aerodrome equipped with approach and landing aids. Flight information service, alerting service and air traffic control service are provided by Adams. Radar services is an integral part of Air Traffic Service system. Refer to Figure 1.2.2 for the airspace around Barbados (TBPB) or Piarco FIR.

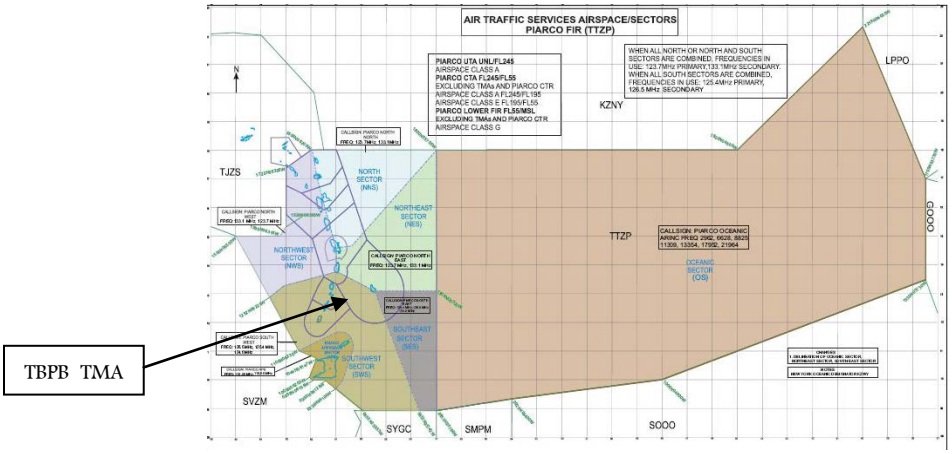


Figure 1.2.2: TTZP FIR and TBPB TMA

Barbados

1.2.3 Aerodromes

The airspace of Barbados territory including adjacent international waters comprises a TMA (Barbados TMA) which is located within the Piarco CTA/FIR. Air traffic control is exercised in the TMA and CTR at the Grantley Adams Airport which is a controlled aerodrome equipped with approach and landing aids. Flight information service, alerting service and air traffic control service are provided by Adams Approach within the Barbados TMA/CTR.

Radar service is an integral part of the ATS system. The major aerodrome in Barbados is the Grantley Adams International Airport TBPB. This aerodrome is 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 TBPB has the capacity of 20 air traffic movements per hour.

Runway Information on Grantley Adams International (TBPB)

	Runway 09	Runway 27
Length x Width	11017ft x 148 ft	11017ft x 148 ft
Surface Type	Asphalt	asphalt
TDZ-Elev	169ft	160ft
Lighting	Edge, centreline, end, approach	edge
Displace Threshold	394ft	N/A

1.2.4 Traffic Forecast

The number of typical daily operation (arrivals/departures) for Grantley Adams International Airport are 50/50 (total of 100 movements). The RPBANIP forecasted that average annual growth of air traffic in the Caribbean region would increase 5.9% during 2011-2031. The Grantley Adams International Airport believes that this overall Caribbean regional forecast of annual increase of 5.9% is too optimistic and a more moderate number of 3.0% annual increase might be a realistic anticipation. The estimated daily operations at TBPB are shown in Tables 1.2.4a and 1.2.4b applying the increase forecasts to each year from 2017 to 2031.

ICAO Annual Increase	Your Annual Increase	Used Annual Increase
0.059	0.03	0.059

	0.059	0.03
Year	5.9% annual increase	3% Annual Increase
2017	100	100
2018	106	103
2019	112	106
2020	119	109
2021	126	113
2022	133	116
2023	141	119
2024	149	123
2025	158	127
2026	168	130
2027	177	134
2028	188	138
2029	199	143
2030	211	147
2031	223	151

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 Grantley Adams International Civil Aviation Department ANP, 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. Grantley Adams International would 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 Grantley Adams International Civil Aviation Department 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 Grantley Adams International Civil Aviation Department 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 Grantley Adams International Civil Aviation Department ASBU Air Navigation Reporting Form Template is provided in Appendix B. The Grantley Adams International Civil Aviation Department 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 current infrastructure at the TBPB airport, notwithstanding upgrades and expansions over the years, does not adequately meet peak capacity demand. In addition aged buildings, obsolete equipment and procedures need to be upgraded; These include new Air Traffic Services Building, Jet bridges, runway, taxiway and apron restructuring and resurfacing to accommodate A380 heavy aircraft.

New communication, navigation, and surveillance equipment to accommodate Performance Based Navigation procedures (PBN); as well as the establishment of Standard Instrument Departure procedures (SIDs) and Standard arrival routes (STARS) are presently being constructed to improve on the safety, efficiency and management of airspace capacity.

While Airport Collaborative Decision Making (ACDM) is currently done there needs to be improvements in this area
Weather and aeronautical information can be improved with the implementation of a Certified Quality Management System . In addition equipment to provide information such as aerodrome warnings and wind shear warnings/alerts will increase safety of operations.
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**

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.

2. The Barbados Civil Aviation Department S 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. Barbados Civil Aviation Department considers one airport, Grantley Adams International Airport.

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: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? None or *1* **c.** How many aerodromes implemented the capability? None, or *1*	**B0-ACDM-1 Target 1:** Assessed in Sep 1990 **a.** Yes **b.** 1 (TBPB) **B0-ACDM-1 Target 2:** Implemented in Dec 2000 **c.** 1	Status – Implemented
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? None or *1*	**B0-ACDM-2 Target 1:** Assessed in Sep 1990 **a.** Yes **b.** 1 (TBPB) **B0-ACDM-2 Target 2:** Implemented in Dec 2000 **c.** 1	Status – Implemented
	3. Interconnection between airport operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1,* **c.** How many aerodromes implemented the capability? *None or 1,*	**B0-ACDM-3 Target 1:** Assessed in Sep 2010 **a.** Yes **b.** 1 (TBPB) **B0-ACDM-3 Target 2:** Implemented in Dec 2012 **c.** 1	Status – Implemented
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-ACDM-4 Target 1:** Assessed in Sep 2010 **a.** Yes **b.** 1 (TBPB) **B0-ACDM-4 Target 2:** Implemented in Dec 2012 **c.** 1	Status – Implemented
	5. Collaborative departure queue management	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-ACDM-5 Target 1:** Assessed in Dec 1990 **a.** Yes **b.** None **B0-ACDM-5 Target 2:** Implemented in Dec 2000 **c. None**	Status – N/A
APTA	**1.** PBN approach procedures with vertical guidance to LNAV/VNAV minima	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-APTA-1 Target 1:** Assessed in Sep 2016 **a.** Yes **b.** 1 (TBPB) **B0-APTA-1 Target 2:** Implement by Aug 2019 **c.** None	Status – Developing
	2. PBN approach procedures with vertical guidance to LPV minima	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-APTA-2 Target 1:** Assessed in Sep 2016 **a.** Yes **b.** 1 (TBPB) **B0-APTA-2 Target 2:** Implement by Aug 2019 **c:** None	Status- N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	3. PBN Approach Procedures without vertical guidance (LP, LNAV minima; using SBAS)	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-APTA-3. Target 1:** Assessed in Sep 2016 **a.** Yes **b.** None **B0-APTA-3 Target 2:** Implement by Aug 2019 **c.** None	Status – N/A
	4. GBAS Landing System (GLS) Approach procedures	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-APTA-4. Target 1:** Assessed in Sep 2016 **a.** Yes **b.** 1 (TBPB) **B0-APTA-4. Target 2:** Implement by Dec 2019 **c.** None	Status – Developing
RSEQ	**1.** AMAN via controlled time of arrival to a reference fix	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-RSEQ-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0- RSEQ-1 Target 2:** Implement by Dec 2019 **c.** None	Status – N/A
	2. Departure management	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-RSEQ-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-RSEQ-2. Target 2:** **c.** None	Status – N/A
	3. Departure flow management	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-RSEQ-3. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-RSEQ-3. Target 2:** **c.** None	Status – N/A
	4. Point merge	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-RSEQ-4. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-RSEQ-4. Target 2:** **c.** None	Status – N/A
SURF	**1.** A-SMGCS with at least one cooperative surface surveillance system	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-SURF-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-SURF-1. Target 2** Implement by March 2019 **c.** None	Status – Developing
	2. Including ADS-B APT as an element of A-SMGCS	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-SURF-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-SURF-2. Target 2:** Implement by March 2019 **c.** None	Status – Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	3. A-SMGCS alerting with flight identification information	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-SURF-3. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-SURF-3. Target 2:** Implement by March 2019 **c.** None	Status – Developing
	4. EVS for taxi operations	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-SURF-4. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-SURF-4. Target 2:** Implement by March 2019 **c.** None	Status – Developing
	5. Airport vehicles equipped with transponders	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-SURF-5. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-SURF-5. Target 2:** Implement by March 2019 **c.** None	Status – Developing
WAKE	**1.** New PANS-ATM wake turbulence categories and separation minima	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-WAKE-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-WAKE-1. Target 2:** Implemented in Jan 2017 **c.** None	Status – Implemented
	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: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-WAKE-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-WAKE-2. Target 2:** **c.** None	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: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-WAKE-3. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-WAKE-3. Target 2:** **c.** None	Status – N/A
	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: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-WAKE-4. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-WAKE-4. Target 2:** **c.** None	Status – N/A
	5. 6 wake turbulence categories and separation minima	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-WAKE-5. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-WAKE-5. Target 2:** **c.** None	Status – N/A
Performance Improvement Area 2: Globally Interoperable Systems and Data				

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
AMET	**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:** **a.** No **b.** TBD **B0-AMET-1. Target 2:** Implement in TBD **c.** No	Status – Analysis in progress
	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:** **a.** No **b.** TBD **B0-AMET-2. Target 2:** Implement in TBD **c.** No	Status – Analysis in progress
	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:** **a.** No **b.** Implement in TBD **B0-AMET-3.Target 2:** TBD **c.** No	Status – Analysis in progress
	4. Aerodrome warnings	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-AMET-4. Target 1:** **a.** No **b.** TBD **B0-AMET-4. Target 2:** Implement in TBD **c.** No	Status – Analysis in progress
	5. Wind shear warnings and alerts	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-AMET-5. Target 1:** **a.** No **b.** TBD **B0-AMET-5. Target 2:** Implement in TBD **c.** No	Status - Analysis in progress
	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 Dec 2016 **a.** Yes **b.** Yes **B0-AMET-6. Target 2:** Implemented in Dec 2017 **c.** Yes	Status – Implemented
	7. Other OPMET information (METAR, SPECI and/or TAF)	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-AMET-7. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 TBPB **B0-AMET-7.Target 2:** Implemented in Jan 2017 **c.** 1	Status – Implemented
	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 Dec 2016 **a.** Yes **b.** Yes **B0-AMET-8.Target 2:** Implement by Dec 2019 **c.** No	Status - Developing
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 Dec 2017 **a.** yes **b.** yes **B0-DATM-1. Target 2:** Implement by Dec 2019 **c.** No	Status - Planning

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	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 Dec 2016 **a.** Yes **b.** Yes **B0-DATM-2. Target 2:** Implemented in Jan 2017 **c.** Yes	Status –Partially Implemented
	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:** Assess by Dec 2017 **a.** yes **b.** yes **B0-DATM-3. Target 2:** Implement by Dec 2019 **c.** No	Status - Planning
	4. eTOD	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None or 1*	**B0-DATM-4. Target 1:** Assessed in Dec 2017 **a.** Yes **b.** 1 **B0-DATM-4. Target 2:** Implement by Dec 2019 **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 Dec 1992 **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 Dec 2016 **a.** Yes **b.** Yes **B0-DATM-6. Target 2:** Implement by Dec 2019 **a.** No	Status – Developing
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 Dec 2016 **a.** Yes **b.** Yes **B0-FICE-1. Target 2:** Implement by Dec 2019 **c.** No	Status – Developing
	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 Dec 2016 **a.** Yes **b.** Yes **B0-FICE-2. Target 2:** Implement by Dec 2019 **c.** No	Status – Developing
	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 Dec 2016 **a.** Yes **b.** Yes **B0-FICE-3. Target 2:** Implement by Dec 2019 **c.** No	Status – Developing
	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 Dec 2016 **a.** Yes **b.** Yes **B0-FICE-4. Target 2:** Implement by Dec 2019 **c.** No	Status – Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-ACAS-1. Target 2:** Implement by TBD **c.** No	Status - Analysis Not Started
	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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-ACAS-2. Target 2:** Implement by TBD **c.** No	Status - Analysis Not Started
	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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-ACAS-3. Target 2:** Implement by TBD **c.** No	Status - Analysis Not Started
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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-ASEP-1. Target 2:** Implement by TBD **c.** No	Status - Analysis Not Started
	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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-ASEP-2. Target 2:** Implement by TBD **c.** No	Status - Analysis Not Started
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 Dec 2016 **a.** Yes **b.** Yes **B0-ASUR-1. Target 2:** Implement by Dec 2019 **c.** No	Status – Partially Implemented
	2. Multilateration (MLAT)	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-ASUR-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** Yes **B0-ASUR-2. Target 2:** Implement by Dec 2019 **c.** No	Status – Partially Implemented
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 Dec 2016 **a.** Yes **b.** Yes **B0-FRTO-1. Target 2:** Implemented in Dec 2019 **c.** Yes	Status – Partially Implemented
	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 Dec 2016 **a.** Yes **b.** Yes **B0-FRTO-2. Target 2:** **Implement by TBD** **c.** No	Status - Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	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 Dec 2016**:** **a.** Yes **b.** Yes **B0-FRTO-3. Target 2: Implement by TBD** **c.** No	Status - Developing
	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:** Assess by Dec 2019 **a.** No **b.** TBD **B0-FRTO-4. Target 2: Implement by TBD** **c.** No	Status – analysis not started
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:** Implemented in Jan 2018 **c.** Yes	Status – Partially Implemented
	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:** Implemented in Jan 2018 **c.** Yes	Status - Implemented
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 Dec 2016 **a.** Yes **b.** No **B0-OFTL-1. Target 2:** **c.** No	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 Dec 2016 **a.** Yes **b.** Yes **B0-SNET-1. Target 2:** Implement by Dec 2019 **c.** No	Status - Developing
	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 Dec 2016 **a.** Yes **b.** Yes **B0-SNET-2. Target 2:** Implement by Dec 2019 **c.** No	Status - Developing
	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 Dec 2016 **a.** Yes **b.** Yes **B0-SNET-3. Target 2:** Implement by Dec 2019 **c.** No	Status - Developing
	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 Dec 2016 **a.** Yes **b.** No **B0-SNET-4. Target 2:** **c.** No	Status - N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
Performance Improvement Area 4: Efficient Flight Paths				
CCO	**1.** Procedure changes to facilitate CCO	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CCO-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CCO-1. Target 2:** Implement by Dec 2019 **c.** None	Status - Developing
	2. Route changes to facilitate CCO	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CCO-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CCO-2. Target 2:** Implement by Dec 2019 **c.** None	Status - Developing
	3. PBN SIDs	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CCO-3. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CCO-3. Target 2:** Implement by Dec 2019 **c.** None	Status – Developing
CDO	**1.** Procedure changes to facilitate CDO	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CDO-1. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CDO-1. Target 2:** Implement by Dec 2019 **c.** None	Status - Developing
	2. Route changes to facilitate CDO	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CDO-2. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CDO-2. Target 2:** Implement by Dec 2019 **c.** None	Status - Developing
	3. PBN STARs	Number of aerodromes to be considered: 1 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, or 1* **c.** How many aerodromes implemented the capability? *None, or 1*	**B0-CDO-3. Target 1:** Assessed in Dec 2016 **a.** Yes **b.** 1 **B0-CDO-3. Target 2:** Implement by Dec 2019 **c.** None	Status – Developing
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 Dec 2016 **a.** Yes **b.** None **B0-TBO-1. Target 2:** **c.** No	Status - N/A
	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 2017 **a.** Yes **b.** None **B0-TBO-2. Target 2:** **c.** No	Status - N/A
	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 Dec 2016 **a.** Yes **b.** None **B0-TBO-3. Target 2:** **c.** No	Status - N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	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 Dec 2016 **a.** Yes **b.** None **B0-TBO-4. Target 2:** **c.** No	Status - N/A

Table 2.1.1: ASBU B0 Implementation Metrics and Targets

2.1.2 ASBU B0 Implementation Status Summary

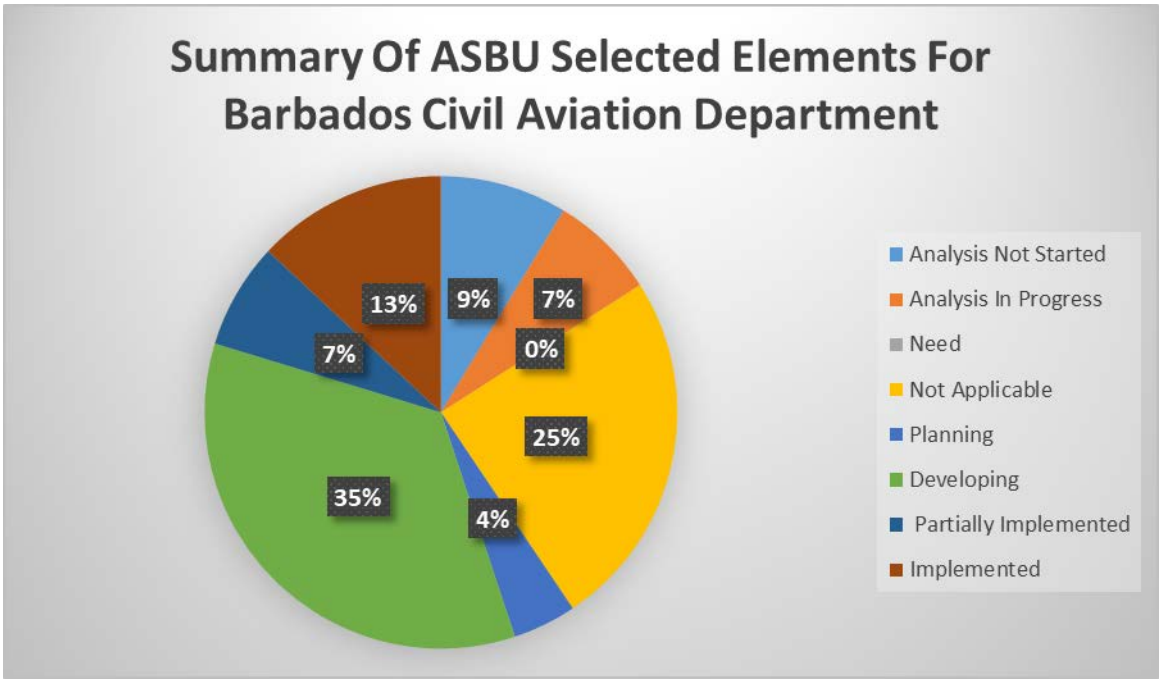
The summary of ASBU B0 implementation status is provided in the Table 2.1. The details of ASBU B0 implementation status is recorded using ANRFs and provided in Appendix D.

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
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information								1
	3. Interconnection between airport operator & ANSP systems to share surface operations information								1
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information								1
	5. Collaborative departure queue management				1				
APTA	1. PBN approach procedures with vertical guidance to LNAV/VNAV minima						1		
	2. PBN approach procedures with vertical guidance to LPV minima				1				
	3. PBN approach procedures without vertical guidance to LNAV minima				1				
	4. GBAS Landing System (GLS) procedures to CAT I minima						1		
RSEQ	1. AMAN via controlled time of arrival to a reference fix				1				
	2. Departure management				1				
	3. Departure flow management				1				
	4. Point merge				1				
SURF	1. A-SMGCS with at least one cooperative surface surveillance system						1		
	2. Including ADS-B APT as an element of A-SMGCS						1		
	3. A-SMGCS alerting with flight identification information						1		
	4. EVS for taxi operations						1		
	5. Airport vehicles equipped with transponders						1		
WAKE	1. New PANS-ATM wake turbulence categories and separation minima								1
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				1				
	3. Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				1				
	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				1				
	5. 6 wake turbulence categories and separation minima				1				
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. WAFS		√						
	2. IAVW		√						
	3. TCAC forecasts		√						

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	4. Aerodrome warnings		1						
	5. Wind shear warnings and alerts		1						
	6. SIGMET								√
	7. Other OPMET information (METAR, SPECI and/or TAF)								1
	8. QMS for MET						√		
DATM	1. Standardized Aeronautical Information Exchange Model (AIXM)					√			
	2. eAIP							√	
	3. Digital NOTAM					√			
	4. eTOD					1			
	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						√		
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)							1	
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						1		
	2. Airspace changes to facilitate CCO						1		
	3. PBN SIDs						1		
CDO	1. Procedure changes to facilitate CDO						1		
	2. Airspace changes to facilitate CDO						1		
	3. PBN STARs						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)				√				

Table 2.1.2 ASBU B0 Implementation Status Summary

PIE CHART 1


Summary Of ASBU Selected Elements For Barbados Civil Aviation Department
9%
7%
0%
25%
4%
35%
7%
13%
Analysis Not Started
Analysis In Progress
Need
Not Applicable
Planning
Developing
Partially Implemented
Implemented

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. RASI ANRF for ICAO NACC Regional Initiatives is prepared and provided in Appendix H.

- Aerodrome certification – Status: Implemented at TBPB
- Heliport operational approval – There is no approved or certified heliport currently. Individual request for operations are dealt with individually.
- Visual aids for navigation – Status: Implemented
- Aerodrome Bird/Wildlife Organization and Control Programme – Status: Implemented

4. Barbados Civil Aviation Department ’s System Improvements (SASI) Status

Barbados Civil 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

4.2 Procedure Upgrades

4.3 Infrastructure Upgrades

5. Barbados Civil Aviation Department ’s ANP Next Review Schedule

The next review and revision of this document is scheduled in November 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.)

State Name RASI Air Navigation Reporting Form (ANRF)		
ICAO NACC Regional Initiatives	**Date**	September 1, 2017
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.)

State Name SASI Air Navigation Reporting Form (ANRF)		
Infrastructure Upgrades	**Date**	September 1, 2017
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: Barbados Civil Aviation Department ASBU Block 0 ANRFs

[Barbados] ASBU Air Navigation Reporting Form (ANRF)				
Block - Module	B0 - ACDM	**Date**	November 6th 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				
Element Description: Interconnection between aircraft operator and ANSP systems to share surface operations information.		**Date Planned/Implemented** 2000		**Status** Implemented
Status Details There is a system in place to share operation information. ATC provides gate information to certain airlines directly. Information such as schedules of arrivals with dates and parking positions assignments.				
Element Description: Interconnection between aircraft operator and airport operator systems to share surface operations information		**Date Planned/Implemented** November 2018		**Status** Implemented
Status Details The Duty Manager is the interface between the aircraft operator and the airport operation. Oil spills, Foreign Object Debris e.g can be communicated				
Element Description: Interconnection between airport operator and ANSP systems to share surface operations information 3&1		**Date Planned/Implemented** November 2018		**Status** Implemented
Status Details Emergency and Incident Information communicated between the two parties. List of parking positions sent to the tower any reassignments done by the Duty Manager. Surface inspections conducted daily by GAIA Inc. and information communicated to the tower.				
Element Description: Interconnection between airport operator, aircraft operator and ANSP systems to share surface operations information		**Date Planned/Implemented** November 2018		**Status** Implemented
Status Details Push back procedures and flow control measures have been established and communicated with all parties. Any delays and emergencies are communicated.				
Element Description: Collaborative departure queue management		**Date Planned/Implemented** November 2018		**Status** N/A
Status Details Manual Internal procedures airlines advise of delays and coordination procedures are in place with FIR				
Achieved Benefits				
Access and Equity All stakeholders have means where problems can be communicated through the Duty Manager				
Capacity All stakeholders have access to the airport facilities				
Efficiency Using one focal point allows the process to work effectively				
Environment				
Safety				
Implementation Challenges				
Ground system Implementation				
Avionics Implementation				
Procedures Availability				
Operational Approvals				
Notes				

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - APTA	**Date**	November 6th 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	**Implement by** November 6th, 2020	**Status** Developing
	Status Details All the SIDS and STARS are not completed. Technical Officer Training and Systems in collaboration with Cartographer		
2	**Element Description:** PBN approach procedures with vertical guidance to LPV minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Not Report		
3	**Element Description:** PBN approach procedures without vertical guidance to LNAV minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No Report		
4	**Element Description:** GBAS Landing System (GLS) procedures to CAT I minima	**Date Planned/Implemented** **Implement by** November 6th, 2019	**Status** Developing
	Status Details Technicians are currently sourcing equipment		

Achieved Benefits

Access and Equity

Capacity :Will accommodate more aircraft in the airspace

Efficiency :Less Fuel Burn

Environment :Fewer Greenhouse emissions

Safety : Safety will increase over all

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - RSEQ	**Date**	November 6, 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 No Report		
2	**Element Description:** Departure management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No Report		
3	**Element Description:** Departure flow management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No Report		
4	**Element Description:** Point merge	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No Report		

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

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - SURF	**Date**	November 6th 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	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment is being installed training and procedures to be implemented		
2	**Element Description:** ADS-B APT	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment is being installed training and procedures to be implemented		
3	**Element Description:** A-SMGCS alerting with flight identification information	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment is being installed training and procedures be implemented		
4	**Element Description:** EVS for taxi operations	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment currently being tested		
5	**Element Description:** Airport vehicles equipped with transponders	**Implemented by** January 2019	**Status** Developing
	Status Details Some vehicles equipped with transponders awaiting the new system to be operational		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety: Will enhance surveillance and safety during night and low visibility conditions

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	B0 - WAKE	**Date**	November 6 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** November 6, 2000	**Status** Implemented
	Status Details Procedures currently in place		
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 This is not applicable to our airport		
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 This is not applicable to our airport		
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 This is not applicable to our airport		
5	**Element Description:** 6 wake turbulence categories and separation minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Provisions have just been made for three categories but provision must be made for super heavy aircraft		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - AMET	**Date**	November 6 , 2017

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 enroute 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** TBD	**Status** Analysis in Progress
	Status Details No Report		
2	**Element Description:** IAVW	**Date Planned/Implemented** TBD	**Status** Analysis in progress
	Status Details No Report		
3	**Element Description:** TCAC forecasts	**Date Planned/Implemented** TBD	**Status** Analysis in progress
	Status Details No Report		
4	**Element Description:** Aerodrome warnings	**Date Planned/Implemented** TBD	**Status** Analysis in Progress
	Status Details Met personnel uses the meteorological information to determine applicable Aerodrome Warnings		
5	**Element Description:** Wind shear warnings and alerts	**Date Planned/Implemented** TBD	**Status** Analysis in Progress
	Status Details Currently as pilots report the Wind shear information to the tower the tower passes the information to the MET and the Met info is updated		
6	**Element Description:** SIGMET	**Date Planned/Implemented** Dec 2000	**Status** Implemented
	Status Details Information is updated in the ATIS and made available to ATCO and Pilots		
7	**Element Description:** Other OPMET information (METAR, SPECI and/or TAF)	**Date Planned/Implemented** Dec 2000	**Status** Implemented
	Status Details **Hourly weather reports received from Met Office**		
8	**Element Description:** QMS for MET	**Date Planned/Implemented** TBD	**Status** Developing

	Status Details No Report
Achieved Benefits	
Access and Equity	
Capacity	
Efficiency	
Environment	
Safety	
Implementation Challenges	
Ground system Implementation	
Avionics Implementation	
Procedures Availability	
Operational Approvals	
Notes	

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - DATM	**Date**	November 6, 2018

Module Description: The initial introduction of digital processing and management of information, from origination to publication, 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:** Standardized Aeronautical Information Exchange Model (AIXM)	**Date Planned/Implemented** August 2016	**Status** Planning
	Status Details Analysis has been done and this is required		
2	**Element Description:** eAIP	**Implemented by** February 2019	**Status** Partially Implemented
	Status Details The information is not in HDML format as is required		
3	**Element Description:** Digital NOTAM	**Implemented by** **Feb 2019**	**Status** Planning
	Status Details Piarco sourcing the appropriate with AIXM will enable the use of digital notams with their adjacent station		
4	**Element Description:** eTOD	**Date Planned/Implemented** November 2016	**Status** Planning
	Status Details Equipment to be sourced based on the availability of funds		
5	**Element Description:** WGS-84	**Date Planned/Implemented** November 6, 2000	**Status** Implemented
	Status Details All the chart information is currently derived using this systems		
6	**Element Description:** QMS for AIM	**Date Planned/Implemented** TBD	**Status** Developing
	Status Details The ISO Certification is required		

Achieved Benefits

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	B0 - FICE	**Date**	November 6 2018

Module Description: To improve coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by ICAO's Manual of Air Traffic Services Data Link Applications (Doc 9694). An additional benefit is the improved efficiency of the transfer of communication in a data link environment.

Element Implementation Status

1	**Element Description:** AIDC to provide initial flight data to adjacent ATSUs	**Date Planned/Implemented** November 6 2018	**Status** Developing
	Status Details Equipment is installed and awaiting the fully implementation of Piarco's equipment		
2	**Element Description:** AIDC to update previously coordinated flight data	**Date Planned/Implemented** November 6 2018	**Status** Developing
	Status Details Equipment is installed and awaiting the fully implementation of Piarco's equipment		
3	**Element Description:** AIDC for control transfer	**Date Planned/Implemented** November 6 2018	**Status** Developing
	Status Details Equipment is installed and awaiting the fully implementation of Piarco's equipment		
4	**Element Description:** AIDC to transfer CPDLC logon information to the Next Data Authority	**Date Planned/Implemented** November 6 2018	**Status** Developing
	Status Details Equipment is installed and awaiting the fully implementation of Piarco's equipment		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ACAS	**Date**	November 6 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** Analysis Not Started
	Status Details No Report		
2	**Element Description:** AP/FD function	**Date Planned/Implemented** TBD	**Status** Analysis Not Started
	Status Details No Report		
3	**Element Description:** TCAP function	**Date Planned/Implemented** TBD	**Status** Analysis Not Started
	Status Details No Report		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASEP	**Date**	November 6 2018

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** TBD	**Status** Analysis Not Started
	Status Details No Report		
2	**Element Description:** ATSA-VSA	**Date Planned/Implemented** TBD	**Status** Analysis Not Started
	Status Details No Report		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - ASUR	**Date**	November 6, 2018

Module Description: To provide 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	**Implemented by** January 2019	**Status** Partially Implemented
	Status Details Equipment Provided currently being tested training to commence		
2	**Element Description:** MLAT	**Implemented by** January 2019	**Status** Partially Implemented
	Status Details Equipment Provided currently being tested training to commence		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - FRTO	**Date**	November 6 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	**Implemented by** Feb 2019	**Status** Partially Implemented
	Status Details Flexible routes are not in place by Piarco as yet		
2	**Element Description:** Flexible Use of Airspace (FUA)	**Date Planned/Implemented** November 2017	**Status** Developing
	Status Details Airspace now being redesigned		
3	**Element Description:** Flexible routing	**Date Planned/Implemented** November 2017	**Status** Developing
	Status Details Routes are now being established by ACC		
4	**Element Description:** CPDLC used to request and receive re-route clearances	**Date Planned/Implemented** TBD	**Status** Analysis Not Started
	Status Details No Report		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - NOPS	**Date**	November 6 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** Jan 2013	**Status** Partially Implemented
	Status Details Piarco indicates that states are no longer inputting the information as required new equipment being tested to facilitate more effective collaboration		
2	**Element Description:** Proposing alternative routings to avoid or minimize ATFM delays	**Date Planned/Implemented** Jan 2012	**Status** Implemented
	Status Details Routes are already activated and being utilized		

Achieved Benefits

Access and Equity

Capacity

Efficiency : Assist in preventing delays and assist with traffic flows

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - OPFL	**Date**	November 6, 2018
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.					
Element Implementation Status					
1	**Element Description:** ITP using ADS-B			**Date Planned/Implemented** N/A	**Status** N/A
	Status Details No Report				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	B0 - SNET	**Date**	November 6, 2018

Module Description: To enable monitoring of flights while airborne to provide timely alerts to air traffic controllers of potential risks to flight safety. Alerts from short-term conflict alert (STCA), area proximity warnings (APW) and minimum safe altitude warnings (MSAW) 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)	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment installed, under testing		
2	**Element Description:** Area Proximity Warning (APW)	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment installed, under testing		
3	**Element Description:** Minimum Safe Altitude Warning (MSAW)	**Implemented by** January 2019	**Status** Developing
	Status Details Equipment installed, under testing		
4	**Element Description:** Medium Term Conflict Alert (MTCA)	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details This is not applicable for our jurisdiction		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety: When equipment is commissioned safety will be enhanced.

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

BARBADOS ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CCO	**Date**	November 6, 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** November 6, 2018	**Status** Developing
	Status Details Draft of the airspace redesign has been developed and communicated with Piarco but procedures are still unavailable		
2	**Element Description:** Airspace changes to facilitate CCO	**Implemented by** Dec 2020	**Status** Developing
	Status Details Draft of the airspace redesign has been developed and communicated with Piarco		
3	**Element Description:** PBN SIDs	**Implemented by** Dec 2020	**Status** Developing
	Status Details They have been developed but feedback is required from different aircraft types		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment :when tested and implemented less fuel emission

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

Barbados ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - CDO	**Date**	November 6th 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** November 6, 2017	**Status** Developing
	Status Details Draft of the airspace redesign have been developed and communicated with Piarco procedures not completed		
2	**Element Description:** Airspace changes to facilitate CDO	**Date Planned/Implemented** November 6, 2017	**Status** Developing
	Status Details Draft of the airspace redesign have been developed and communicated with Piarco		
3	**Element Description:** PBN STARs	**Date Planned/Implemented** November 6, 2017	**Status** Developing
	Status Details They have been developed but feedback is required from different airlines with respect to usage		

Achieved Benefits

Access and Equity Will be available for the benefit for all of the airlines

Capacity

Efficiency

Environment: When the airspace is redesign, to facilitate the CDO it will allow less fuel emissions for aircraft

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

[Barbados] ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	B0 - TBO	**Date**	November 6th 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** N/A	**Status** N/A
	Status Details This is not required for our jurisdiction		
2	**Element Description:** CPDLC over continental areas This is not required for our jurisdiction	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details This is not required for our jurisdiction		
3	**Element Description:** CPDLC over oceanic and remote areas	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details This is not required for our jurisdiction		
4	**Element Description:** SATVOICE direct controller-pilot communication (DCPC)	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details This is not required for our jurisdiction		

Achieved Benefits
Access and Equity
Capacity
Efficiency
Environment
Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals
Notes :Due to our location and geographical layout and the composition of our airspace this system is not needed.

Appendix E: Barbados Civil Aviation Department ASBU Block 1 ANRFs

Insert ASBU B1 ANRFs in the future.

Appendix F: Barbados Civil Aviation Department SBU Block 2 ANRFs

Insert ASBU B2 ANRFs in the future.

Appendix G: Barbados Civil Aviation Department ASBU Block 3 ANRFs

Insert ASBU B3 ANRFs in the future.

Appendix H: Barbados Civil Aviation Department RASI ANRFs

Barbados RASI Air Navigation Reporting Form (ANRF)			
ICAO NACC Regional Initiatives		**Date**	November 8th 2018
Module Description: ICAO NACC RO has identified airport improvements.			
Element Implementation Status			
1	**Element Description:** Aerodrome certification	**Date Planned/Implemented** 1st August 2011	**Status** Implemented
	Status Details ICAO NACC region has a goal to have CAR aerodromes in its regional ANP Table AOP I-1 be certified. airport TBPB is Certified.		
2	**Element Description:** Heliport operational approval	**Date Planned/Implemented** Sep 2012	**Status** Implemented
	Status Details ICAO NACC region has a goal to have CAR heliports in its regional ANP Table AOP I-1 certified. Currently in Barbados, there are no certified or approved heliports but there are several helipads located through out the island and request for helicopter operations are done on an individual basis.		
3	**Element Description:** Visual aids for navigation	**Date Planned/Implemented** Sep 2012	**Status** Implemented
	Status Details ICAO NACC region has a goal to have CAR airports in its ANP Table AOP I-1 compliant with Annex 14 requirements. This capability is implemented at TBPB however improvements are currently ongoing.		
4	**Element Description:** Aerodrome Bird/Wildlife Organization and Control Programme	**Date Planned/Implemented** Dec 2012	**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.		
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

Appendix I: Barbados Civil Aviation Department SASI ANRFs

Barbados SASI Air Navigation Reporting Form (ANRF)			
Equipment Upgrades		**Date**	November 8th 2018
Module Description Projects to replace current radar system and provide a GBAS. This will enhance the surveillance coverage and nav aids .			
Element Implementation Status			
1	**Element Description:** ADS-B	**Date Planned/Implemented** Dec 2018	**Status** Partially Implemented
	Status Details Current radar system is obsolete/outdated and must be replaced to avoid catastrophic failure that might render the network useless. The current network has no redundancy capability and works intermittently at times. The equipment must therefore be replaced by ADS-B to permit redundancy and enhance the service to airlines and allow for a more safe, efficient and expeditious service. Training of staff and site testing to be completed.		
2	**Element Description:** MLAT	**Date Planned/Implemented** Dec2018	**Status** Developing
	Status Details The Sensors at the airport are in place but training of staff and site testing of the yet to be completed		
3	**Element Description:** Flight Data Processor	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details Equipment necessary to allow Notam capacity and information relating to met		
Achieved Benefits			
Access and Equity			
Capacity			
Efficiency			
Environment			
Safety *Element 1- ADS-B* - allows for redundancy and functionality in the event of unserviceability of the radar system and facilitates safety. Element 2 – MLAT- allows for redundancy and functionality in the event of unserviceability of the radar system and facilitates safety.			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes Element 3 -			

Barbados SASI Air Navigation Reporting Form (ANRF)			
Procedures Upgrades		**Date**	November 8th 2018
Module Description: Procedures need to be established to consider changes in operational practices with the implementation of the new equipment to facilitate ADS-B and MLAT usage. Current design of the airspace is not dynamic to support CCO and CDO operations			
Element Implementation Status			
1	**Element Description:** Co-ordination Procedures reference MLAT and ADS-B	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details Procedures should be in place prior to the usage of the equipment		
2	**Element Description:** Procedures for CCO Operations	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details Airspace redesign is due to be completed by Dec 2020. Procedures should be in place prior to the new airspace design being utilized.		
3	**Element Description:** Procedures for CDO Operations	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details Airspace redesign is due to be completed by Dec 2020. Procedures should be in place prior to the new airspace design being utilized.		
Achieved Benefits			
Access and Equity			
Capacity Element 1 -			
Efficiency			
Environment			
Safety *Element 1-Procedures will ensure standardization in the new coordination procedures and therefore ensure safety* Element 2 – Procedures will ensure that CCO is handled in a standardized manner and therefore ensure safety. Element 3 - Procedures will ensure that CDO is handled in a standardized manner and therefore ensure safety.			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes Element 1,2 &3 Address documented procedures which will ensure standardization and contribute to safety			

Barbados SASI Air Navigation Reporting Form (ANRF)			
Infrastructure Upgrades		**Date**	November 8th 2018
Module Description: To facilitate continuous growth in the Aviation industry in Barbados while ensuring safety and effective operations it is necessary for the rehabilitation of the runway, taxiways and shoulders. The resurfacing of the apron is an ongoing process. In addition, Jet bridges will be constructed to allow the free movement of passengers from the aircraft to the Terminal building without exposure to the elements and to improve security between arriving and departing passengers. This will reduce delays due to inability of passengers to board for weather related reasons. A New Control Tower is required since the current facility is over forty eight years old and they are environmental concerns. The benefits of such infrastructure upgrades will increase an overall traffic management traffic and enhance safety.			
Element Implementation Status			
1	**Element Description:** Airport Terminal Development	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details The current terminal building does not meet passenger demands efficiently and effectively during peak periods. With the current airport terminal situation, there is the potential for security to be compromised.		
2	**Element Description:** Airport Runway , Taxiway, Shoulders and Rehabilitation	**Date Planned/Implemented** Implemented November 2018	**Status** Implemented
	Status Details The taxiway shoulders and the runway edges are currently being resurfaced. The apron is undergoing continuous rehabilitation. The entire runway is being (rebuilt) resurface and widened to accommodate larger aircraft.		
3	**Element Description:** Control Tower and Technical Building Upgrades	**Date Planned/Implemented** TBD	**Status** Planning
	Status Details **A** New Control Tower is required since the current facility is over forty eight years old and there are environmental concerns.		
Achieved Benefits			
Access and Equity			
Capacity Element 1 - Airport Terminal Development: Increase the security and safety of arriving and departing passengers especially during the peak periods.			
Efficiency			
Environment			
Safety Element 2 - Airport Runway Rehabilitation and Extension: Improve operational safety of aircraft. Element 3 - Control Tower : Improve work environment for ATCO and external customers.			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes Element 1 - Airport Terminal Development: Address the airport terminal security issues.			


CIVIL AVIATION DEPARTMENT
BARBADOS