Trinidad and Tobago
State Air Navigation Plan

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Prepared by: Trinidad and Tobago Civil Aviation Authority

Document History Record

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1. Introduction

This document is Trinidad and Tobago's Air Navigation Plan (ANP) describing the plan and status of aviation technology implementation. The background of the 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 Trinidad and Tobago aligning activities and strategies to the GANP and RPBANIP. The information contained in the Trinidad and Tobago 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 Trinidad and Tobago ANP would be used as a tool for planning, monitoring, and reporting the status of implementation of the aviation capabilities.

1.2 Environment

The environment of Air Navigation of Trinidad and Tobago such as authority, airspace and airports, and air traffic are described in this section.

1.2.1 Trinidad and Tobago Civil Aviation Authority (TTCAA)

The Trinidad and Tobago Civil Aviation Authority (TTCAA) was established by the Civil Aviation Act, 2001 (Act 11of 2001) of Parliament. The principal function of the Authority is to regulate and administer a safe, civil aviation system to ensure that Trinidad and Tobago properly discharges its obligations under international civil aviation agreements and treaties, in particular, the Chicago Convention.

The TTCAA provides a regulatory framework to facilitate a safe, secure and effective aviation Industry and air navigation services within the Piarco Flight Information Region. Its mission is to maximize air traffic and related services through safe and efficient operations.

The organization is organized as shown in Figure 1.2.1. Its operation is performed by a highly motivated work force contributing to the sustainable, social and economic development of Trinidad and Tobago.

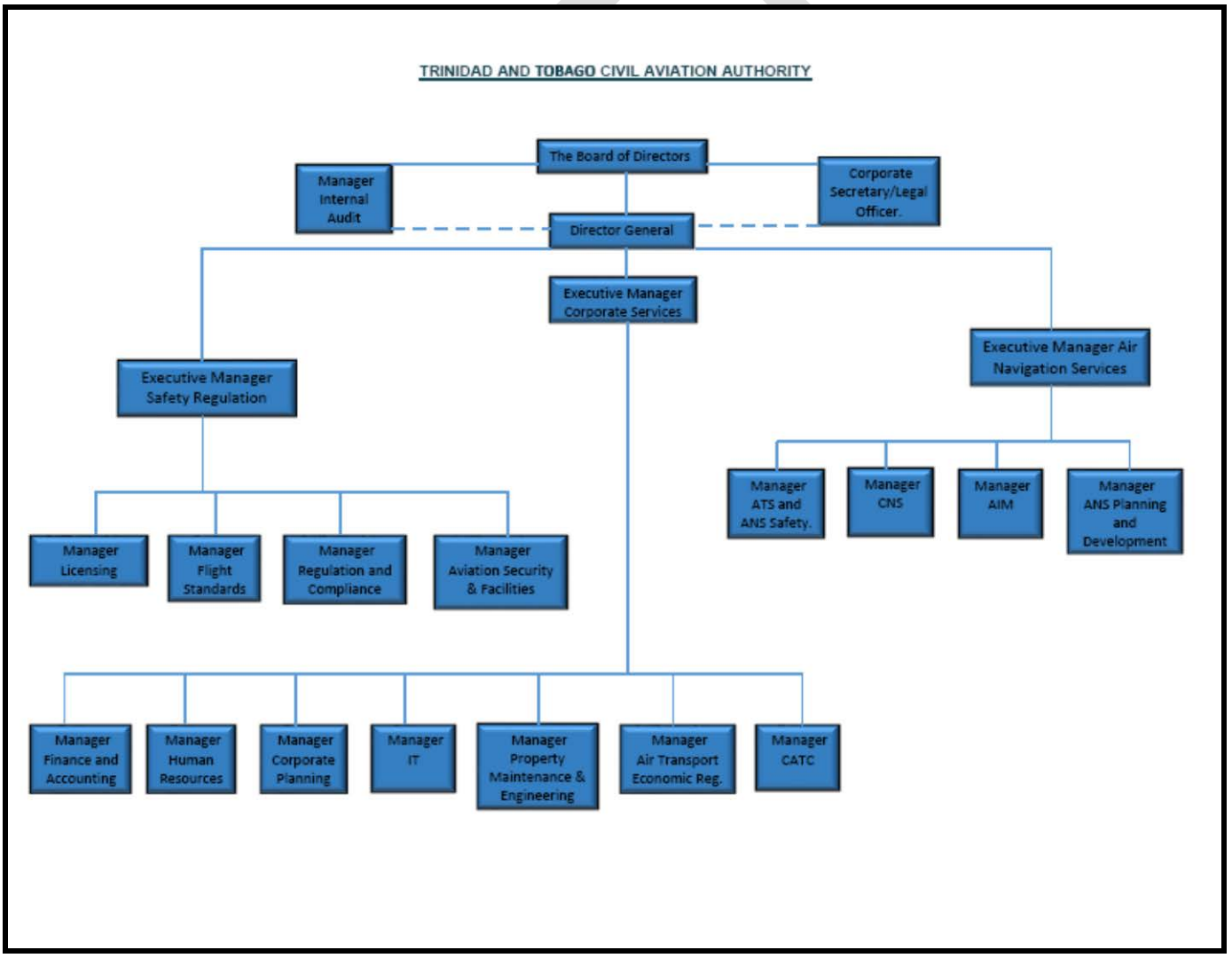

Figure 1.2.1: Organizational Structure of Trinidad and Tobago Civil Aviation Authority

1.2.2 The Trinidad and Tobago Civil Aviation Authority Operational Environment

I. Regulatory Services

The Regulatory Division is responsible for certification and surveillance or airmen, air operators, aviation maintenance and aviation training in accordance with ICAO's eight (8) Critical Elements of the state safety oversight system, related activities and the implementation of the various aspects of the national programmes relating to civil aviation security.

II. Air Navigation Services

The Air Navigation Services Division of the Authority has the responsibility of efficiently managing and operating air navigation services within the Piarco Flight Information Region (FIR).The Piarco FIR encompasses 750,000 square miles which is inclusive of the airspace over the Eastern Caribbean Islands. The FIR spans north to Antigua, bordering San Juan and the New York FIR to the south of Trinidad, bordering Guyana, Suriname and French Guiana. It also extends to mid-way across the Atlantic, bordering Dakar (Senegal) FIR, Sal (Cape Verde) FIR and Santa Maria (the Azores) FIR. Through the utilization of state-of-the-art technology and high levels of expertise, the TTCAA Air Navigation Service Provider strives to connect with its stakeholders to develop a collaborative approach to providing a safe and efficient service.

III. Corporate Services

The Corporate Services Division provides support services to the core functions of Air Navigation and Regulatory Services. The auxiliary services include Corporate Planning, Finance, Human Resources, Information Technology, Property Maintenance and Engineering, Air Transport Economic Regulation and the Civil Aviation Training Centre.

1.2.3 The Airports Authority of Trinidad and Tobago

The Airports Authority of Trinidad and Tobago is responsible for managing the two (2) international aerodromes.

1.2.4 Airspace

Trinidad and Tobago manages the Piarco Flight Information Region (FIR). Refer to Figure 1.2.2 for the Piarco Flight Information Region and adjacent airspaces around the Piarco FIR (TTZP). The TTZP FIR encompasses 750,000 square miles which is inclusive of the Terminal Control Airspaces (TMAs) over the Eastern Caribbean Islands from the island of Antigua in the north to Trinidad to the south. The TTZP FIR spans north to Antigua, bordering San Juan FIR (Puerto Rico) and the New York FIR to the south of Trinidad, bordering Georgetown (Guyana) FIR, Paramaribo(Suriname) and Rochambeau (French Guiana) FIR.It also extends to mid-way across the Atlantic, bordering Dakar (Senegal) FIR, Sal (Cape Verde) FIR and Santa Maria (the Azores) FIR.

There are seven (7) TMA's within the TTZP FIR:

- V.C Bird, Antigua (TAPA);
- Pointe-à-Pitre Guadeloupe (TFFR);
- Fort de France, Martinique (TFFF);

- Grantley Adams, Barbados (TBPB)
- Maurice Bishop, Grenada (TGPY);
- Argyle, St Vincent (TVSA)
- Piarco, Trinidad and Tobago (TTPP)

The TMAs of V.C Bird Antigua (TAPA), Pointe-à-Pitre, Guadeloupe (TFFR),Fort de France, Martinique (TFFF) and Grantley Adams Barbados (TBPB) provide Air Traffic Services within their respective TMA borders from surface up to and including Flight Level 245.

The TMAs of Maurice Bishop, Grenada (TGPY) and Argyle, St Vincent (TVSA) provide Air Traffic Services within their respective TMA borders from surface up to and including Flight Level 135.

The TMAs except Barbados are responsible for sub control zones within their boundaries.

The airspace over the territory of Trinidad and Tobago is a Control Zone (CTZ) up to Flight level F55 and there is the Piarco TMA Approach Sector from surface up to Flight Level 155.

Refer to Figure 1.2.3 for the TMAs within the Piarco FIR.

Proper co-ordination among all ATC units is a key aspect when controlling air traffic within the Piarco FIR.

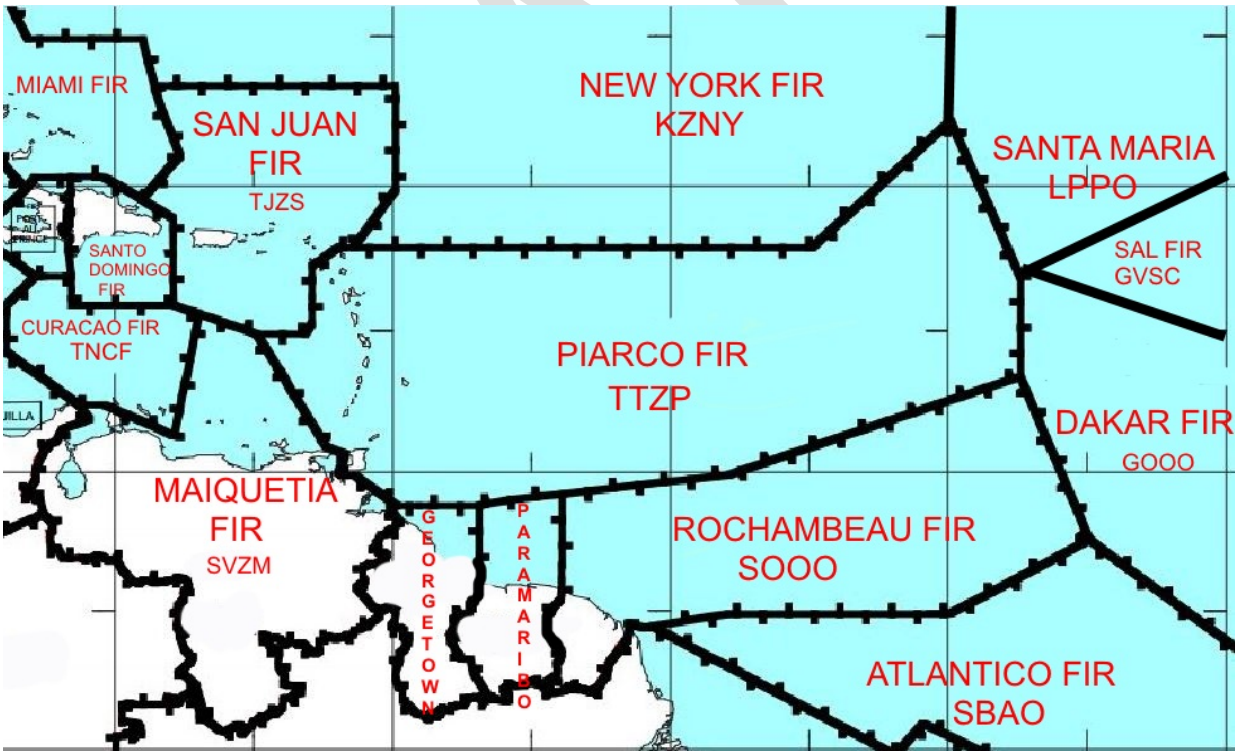

Figure 1.2.2: The Piarco FIR (TTZP)

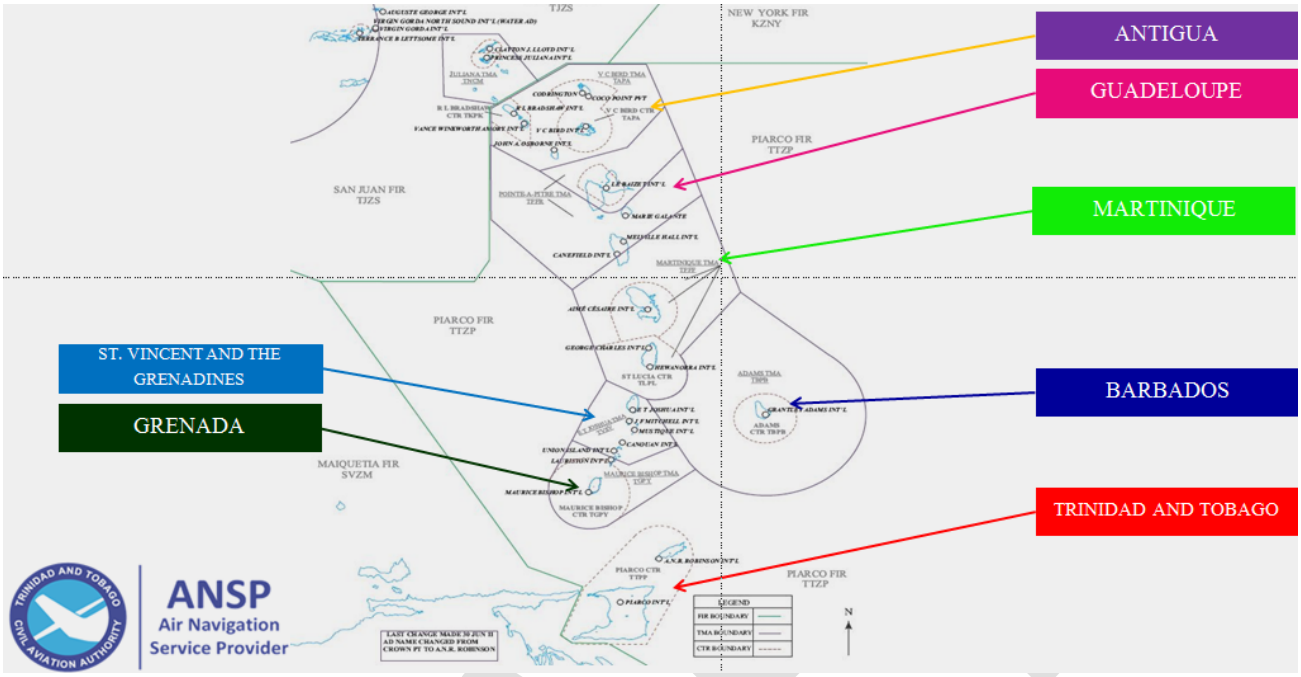

Figure 1.2.3: The TMAs within the Piarco FIR (TTZP)

1.2.5 Aerodromes

The two (2) major aerodromes in Trinidad and Tobago are the Piarco International Airport (TTPP) and ANR Robinson International Airport (TTCP). These two (2) aerodromes are listed in the ICAO 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 TTPP has the capacity of 10-15 air traffic movements per hour. The TTCP has the capacity of 2-4 air traffic movements per hour.

1.2.5.1 Runway Information for Piarco International Airport (TTPP)

	Runway 10	**Runway 28**
Length x Width	3199m x 45m	3199m x 45m
Surface Type	Asphalt	Asphalt
TDZ-Elev	30 ft	57.50 ft
Lighting	THR, TDZ, Edge, End, Guard lights at TWY intersection PAPIS	THR, Edge, End, Guard lights at TWY intersection
Displace Threshold	N/A	N/A

1.2.5.2 Runway Information for ANR Robinson International Airport (TTCP)

	Runway 11	Runway 29
Length x Width	9003 ft x 151 ft	9003 ft x 151 ft
Surface Type	Asphalt	Asphalt
TDZ-Elev	28 ft	19.50 ft
Lighting	Edge, THR, End, Turn Pads and Wing Bar (THR RWY11 only) and PAPIS	Edge, THR, End, Turn Pads
Displace Threshold	940ft	N/A

1.2.6 Traffic Forecast

Number of typical daily operation (arrivals/departures) at Piarco International Airport (TTPP) and ANR Robinson International Airport (TTCP) are 70/70 (total of 140 movements) and 15/15 (total of 30 movements), respectively.

The RPBANIP forecasted that average annual growth of air traffic in the Caribbean region would increase 5.9% during 2011-2031. For Trinidad and Tobago this 5.9% annual increase forecast seems optimistic and a more realistic anticipation may be 1.0%. However the Caribbean region has projected a 3% increase.

Estimated daily operations at TTPP and TTCP are shown in Tables 1.2.5 applying the increase forecasts to each year from 2017 to 2031.

AIRPORT **TTPP**			
Year	RBPANIP 5.9%	REGIONAL 3%	T&T 1%
2017	140	140	140
2018	148	144	141
2019	157	149	143
2020	166	153	144
2021	176	158	146
2022	186	162	147
2023	197	167	149
2024	209	172	150
2025	221	177	152
2026	235	183	153
2027	248	188	155
2028	263	194	156
2029	279	200	158
2030	295	206	159
2031	312	212	161

AIRPORT **TTCP**			
Year	RBPANIP 5.9%	REGIONAL 3%	T&T 1%
2017	30	30	30
2018	32	31	30
2019	34	32	31
2020	36	33	31
2021	38	34	31
2022	40	35	32
2023	42	36	32
2024	45	37	32
2025	47	38	32
2026	50	39	33
2027	53	40	33
2028	56	42	33
2029	60	43	34
2030	63	44	34
2031	67	45	34

Table 1.2.5: Air Traffic Forecasts at TTPP and TTCP (number of daily operations)

1.3 Planning Methodology

Guided by the GANP and the RPBANIP, the 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 Trinidad and Tobago 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. Trinidad and Tobago 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 Trinidad and Tobago 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 analysing 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

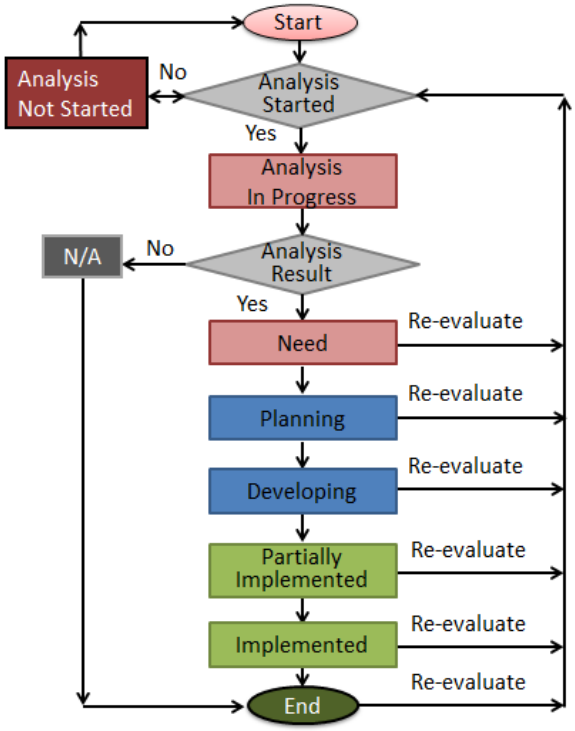

Figure 1.4.1: Analysis and Work Flow

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 Trinidad and Tobago 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 Trinidad and Tobago ASBU Air Navigation Reporting Form Template is provided in **Appendix B**. The Trinidad and Tobago RASI and SASI Air Navigation Reporting Form Templates are provided in **Appendix C.**

1.5 Problem Identification

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

1.5.1 Existing Problems

The demands for TTPP and TTCP are expected to increase in the future. The solution requires a significant investment in airport infrastructure. This includes airport terminal development, runway and turning bay reconstruction and rehabilitation, total drainage redevelopment and continuous modernization of communication, navigation, and surveillance equipment (e.g. Performance Based Navigation procedures (PBN). The formal implementation of Standard Instrument Departure procedures (SIDs) would improve on the safety, efficiency and management of airspace capacity.

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

A fundamental component 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. Trinidad and Tobago 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. Trinidad and Tobago considers two (2) airports, Piarco International Airport (TTPP) and ANR Robinson International Airport (TTCP) for airport oriented elements.

2.1.1 ASBU B0 Implementation Metrics and Targets

Table 2.1.1 provides the ASBU B0 Implementation Metrics, Targets, and Progress for each B0 Element.

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
Performance Improvement Area 1: Airport Operations				
ACDM	**1.** Interconnection between aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-1 Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-ACDM-1 Target 2:** Implement in 2000 **c.** 2	Status – Implemented
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-2 Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-ACDM-2 Target 2:** Implement in 2000 **c.** 2	Status – Implemented
	3. Interconnection between airport operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-3 Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-ACDM-3 Target 2:** Implement in 2000 **c.** 2	Status – Implemented
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-4 Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-ACDM-4 Target 2:** Implement in 2000 **c.** 2	Status – Implemented
	5. Collaborative departure queue management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ACDM-5 Target 1:** Assessed in Dec 2016 **a.** Yes **b.** None **B0-ACDM-5 Target 2:** Implement by N/A **c.** None	Status – N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
APTA	**1.** PBN approach procedures with vertical guidance to LNAV/VNAV minima	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? None, 1,2 **c.** How many aerodromes implemented the capability? None,1, 2	**B0-APTA-1 Target 1:** Assessed in 2010 a. Yes b. 2 **B0-APTA-1 Target 2:** Implemented in 2017 c. 2	Status – Implemented
	2. PBN approach procedures with vertical guidance to LPV minima	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-2 Target 1:** Assessed in 2015 **a.** Yes **b.** None **B0-APTA-2 Target 2:** **c.** None	Status – N/A
	3. PBN Approach Procedures without vertical guidance (LP, LNAV minima; using SBAS)	Number of aerodromes to be considered: 2 a. Have we assessed the need? Yes b. How many aerodromes need this capability? 2 c. How many aerodromes implemented the capability? 2	**B0-APTA-3 Target 1:** Assessed in 2000 a. Yes b. 2 **B0-APTA-3 Target 2:** Implemented in 2003 c. 2	Status – Implemented
	4. GBAS Landing System (GLS) Approach procedures	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-APTA-4. Target 1:** Assessed in 2000 **a.** Yes **b.** None **B0-APTA-4. Target 2:** Implement by N/A **c.** None	Status – N/A
RSEQ	**1.** AMAN via controlled time of arrival to a reference fix	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-1. Target 1:** Assessed in 2015 **a.** Yes **b.** None **B0- RSEQ-1 Target 2:** **c.** None	Status – N/A
	2. Departure management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-2. Target 1:** Assessed in 2015 **a.** Yes **b.** None **B0-RSEQ-2. Target 2:** **c.** None	Status – N/A
	3. Departure flow management	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-3. Target 1:** Assessed in 2015 **a.** Yes **b.** None **B0-RSEQ-3. Target 2:** **c.** None	Status – N/A
	4. Point merge	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-RSEQ-4. Target 1:** Assessed in 2015 **a.** Yes **b.** None **B0-RSEQ-4. Target 2:** **c.** None	Status – N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
SURF	**1.** A-SMGCS with at least one cooperative surface surveillance system	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-1. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-SURF-1. Target 2:** **c.** None	Status – N/A
	2. Including ADS-B APT as an element of A-SMGCS	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-2. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-SURF-2. Target 2:** **c.** None	Status – N/A
	3. A-SMGCS alerting with flight identification information	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-3. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-SURF-3. Target 2:** **c.** None	Status – N/A
	4. EVS for taxi operations	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-4. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-SURF-4. Target 2:** **c.** None	Status – N/A
	5. Airport vehicles equipped with transponders	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-SURF-5. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-SURF-5. Target 2:** **c.** None	Status – N/A
WAKE	**1.** New PANS-ATM wake turbulence categories and separation minima	*ICAO has not developed new minima.* Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-1. Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-WAKE-. Target 2:** Implemented in 2000 **c.** 2	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: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-2. Target 1:** Assessed in 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: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-3. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-WAKE-3. Target 2:** **c.** None	Status – N/A

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	4. Wake turbulence mitigation for departures procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-4. Target 1:** Assessed in 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: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-WAKE-5. Target 1:** Assessed in 2016 **a.** Yes **b.** None **B0-WAKE-5. Target 2:** **c.** None	Status – N/A
Performance Improvement Area 2: Globally Interoperable Systems and Data				
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:** Assessed in 2000 **a.** Yes **b.** Yes **B0-AMET-1.Target 2:** Implemented in Jan 2000 **c.** Yes	Status – Implemented
	2. IAVW	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-2. Target 1:** Assessed in 2000 **a.** Yes **b.** Yes **B0-AMET-2. Target 2:** Implemented in Jan 2000 **c.** Yes	Status – Implemented
	3. TCAC forecasts	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-AMET-3. Target 1:** Assessed in 2000 **a.** Yes **b.** Yes **B0-AMET-3.Target 2:** Implemented in Jan 2000 **c.** Yes	Status – Implemented
	4. Aerodrome warnings	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-4. Target 1:** Assessed in 2000 **a.** Yes **b.** 2 (TTPP, TTCP) **B0-AMET-4.Target 2:** Implement by 2019 **c.** None	Status – Planning
	5. Wind shear warnings and alerts	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-5. Target 1:** Assessed in 2000 **a.** Yes **b.** 2 **B0-AMET-4.Target 2:** Implement by 2019 **c.** 2	Status – Partially implemented
	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 2000 **a.** Yes **b.** Yes **B0-AMET-6. Target 2:** **c.** Yes	Status – Implemented

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	7. Other OPMET information (METAR, SPECI and/or TAF)	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-AMET-7. Target 1:** Assessed in 2000 **a.** Yes **b.** Yes **B0-AMET-6. Target 2:** **c.** Yes	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 2012 **a.** Yes **b.** Yes **B0-AMET-8.Target 2:** Implemented in 2014 **c.** Yes	Status - Implemented .
DATM	**1.** Aeronautical Information Exchange Model (AIXM)	**a.** Have we assessed the need? *Yes* **b.** Do we need this capability? *Yes* **c.** Have we implemented the capability? *No*	**B0-DATM-1. Target 1:** Assess by 2017 **a.** Yes **b.** Yes **B0-DATM-1. Target 2:** Implement by 2019 **c.** No	Status - Developing
	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 2015 **a.** Yes **b.** Yes **B0-DATM-2. Target 2:** Implemented in June 2016 **c.** Yes	Status – 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 2017 **a.** Yes **b.** Yes **B0-DATM-3. Target 2:** Implement by March 2019 **c.** No	Status - Planning
	4. eTOD	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-DATM-4. Target 1:** Assess by 2017 **a.** Yes **b.** Yes **B0-DATM-4. Target 2:** Implement by TBD **c.** None	Status - Developing
	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 2000 **a.** Yes **b.** Yes **B0-DATM-5. Target 2:** Implemented in 2000 **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 2016 **a.** Yes **b.** Yes **B0-DATM-6. Target 2:** Implement by 2019 **c.** Yes	Status – Implemented
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 2016 **a.** Yes **b.** Yes **B0-FICE-1. Target 2:** Implement by Dec 2019 **c.** No	Status - Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	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 2016 **a.** Yes **b.** Yes **B0-FICE-1. 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 2016 **a.** Yes **b.** Yes **B0-FICE-1. 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 2016 **a.** Yes **b.** Yes **B0-FICE-1. Target 2:** Implement by Dec 2019 **c.** No	Status - Developing
Performance Improvement Area 3: Optimum Capacity and Flexible Flights				
ACAS	**1.** ACAS II (TCAS version 7.1)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-1. Target 1:** Assessed in 2016 **a.** Yes **b.** Yes **B0-ACAS-1. Target 2:** Implement by 2016 **c.** Yes	Status – Implemented
	2. Auto Pilot/Flight Director (AP/FD) TCAS	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-2. Target 1:** Assessed in 2016 **a.** Yes **b.** No **B0-ACAS-2. Target 2:** **c.** No	Status - N/A
	3. TCAS Alert Prevention (TCAP)	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-ACAS-3. Target 1:** Assessed in 2016 **a.** Yes **b.** No **B0-ACAS-3. Target 2:** **c.** No	Status - N/A
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 2020 **a.** No **b.** TBD **B0-ASEP-1. Target 2:** Implemented by TBD **c.** No	Status – 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 2020 **a.** Yes **b.** TBD **B0-ASEP-2. Target 2:** Implemented by TBD **c.** No	Status – 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 2016 **a.** Yes **b.** Yes **B0-ASUR-1. Target 2:** Implement by 2019 **c.** No	Status - Developing

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	2. Multilateration (MLAT)	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-ASUR-2. Target 1** Assessed in 2016**:** **a.** Yes **b.** 2 **B0-ASUR-2. Target 2:** Implemented by 2020 **c.** None	Status - Developing
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 2016 **a.** Yes **b.** Yes **B0-FRTO-1. Target 2:** Implement by 2020 **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 2016 **a.** Yes **b.** Yes **B0-FRTO-2. Target 2:** Implement by 2020 **c.** Yes	Status – Partially implemented
	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 2016**:** **a.** Yes **b.** Yes **B0-FRTO-3. Target 2:** Implement by 2020 **c.** Yes	Status – Partially implemented
	4. CPDLC used to request and receive re-route clearances	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-FRTO-4. Target 1:** Assessed in 2016 **a.** Yes **b.** Yes **B0-FRTO-4. Target 2:** Implement by 2020 **c.** Yes	Status – Partially implemented CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.
NOPS	**1.** Sharing prediction of traffic load for next day	**a.** Have we assessed the need? *Yes or No* **b.** Do we need this capability? *Yes or No* **c.** Have we implemented the capability? *Yes or No*	**B0-NOPS-1. Target 1:** Assessed in Sep 2017 **a.** Yes **b.** Yes **B0-NOPS-1. Target 2:** Implement by Dec 2019 **c.** No	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 2017 **a.** Yes **b.** Yes **B0-NOPS-2. Target 2:** Implement by Dec 2019 **c.** Yes	Status – Partially 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 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 2007 **a.** Yes **b.** Yes **B0-SNET-1. Target 2:** Implemented in 2012 **c.** Yes	Status – Implemented

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	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 2007 **a.** Yes **b.** Yes **B0-SNET-2. Target 2:** Implemented in 2012 **c.** Yes	Status – Implemented
	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 2007 **a.** Yes **b.** Yes **B0-SNET-3. Target 2:** Implemented in 2012 **c.** Yes	Status – Implemented
	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 2007 **a.** Yes **b.** Yes **B0-SNET-4. Target 2:** Implemented in 2012 **c.** Yes	Status – Implemented
Performance Improvement Area 4: Efficient Flight Paths				
CCO	**1.** Procedure changes to facilitate CCO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-1. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **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: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-2. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **B0-CCO-2. Target 2:** Implement by Dec 2019 **c.** None	Status – Partially implemented
	3. PBN SIDs	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CCO-3. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **3. Target 2:** Implement by Dec 2019 **c.** None	Status - Developing .
CDO	**1.** Procedure changes to facilitate CDO	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CDO-1. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **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: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** Have we implemented the capability? *None, 1, or 2*	**B0-CDO-2. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **B0-CDO-2. Target 2:** Implement by Dec 2019 **c.** None	Status – Partially implemented

Block 0 Modules	Elements	Metrics	Targets	Status & Remarks
	3. PBN STARs	Number of aerodromes to be considered: 2 **a.** Have we assessed the need? *Yes or No* **b.** How many aerodromes need this capability? *None, 1, or 2* **c.** How many aerodromes implemented the capability? *None, 1, or 2*	**B0-CDO-3. Target 1:** Assessed in 2016 **a.** Yes **b.** 2 **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 2000 **a.** Yes **b.** Yes **B0-TBO-1. Target 2:** Implement by 2016 **c.** Yes	Status – Implemented
	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 2000 **a.** Yes **b.** Yes **B0-TBO-2. Target 2:** Implement by Dec 2019 **c.** Yes	Status – Partially Implemented CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.
	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 2000 **a.** Yes **b.** Yes **B0-TBO-3. Target 2:** Implement by Dec 2019 **c.** Yes	Status – Partially Implemented CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.
	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 TBD **a.** No **b.** No **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 are 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								2
	2. Interconnection between aircraft operator & airport operator systems to share surface operations information								2
	3. Interconnection between airport operator & ANSP systems to share surface operations information								2
	4. Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information								2
	5. Collaborative departure queue management				2				
APTA	1. PBN approach procedures with vertical guidance to LNAV/VNAV minima								2
	2. PBN approach procedures with vertical guidance to LPV minima				2				
	3. PBN approach procedures without vertical guidance to LNAV minima								2
	4. GBAS Landing System (GLS) procedures to CAT I minima				2				
RSEQ	1. AMAN via controlled time of arrival to a reference fix				2				
	2. Departure management				2				
	3. Departure flow management				2				
	4. Point merge				2				
SURF	1. A-SMGCS with at least one cooperative surface surveillance system				2				
	2. Including ADS-B APT as an element of A-SMGCS				2				
	3. A-SMGCS alerting with flight identification information				2				
	4. EVS for taxi operations				2				
	5. Airport vehicles equipped with transponders				2				
WAKE	1. New PANS-ATM wake turbulence categories and separation minima								2
	2. Dependent diagonal paired approach procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				2				
	3. Wake independent departure and arrival operations (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart				2				
	4. Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart based on observed crosswinds				2				
	5. 6 wake turbulence categories and separation minima				2				
Performance Improvement Area 2: Globally Interoperable Systems and Data									
AMET	1. WAFS								✓
	2. IAVW								✓
	3. TCAC forecasts								✓
	4. Aerodrome warnings					2			
	5. Wind shear warnings and alerts							2	
	6. SIGMET								✓
	7. Other OPMET information (METAR, SPECI and/or TAF)								2
	8. QMS for MET								✓
DATM	1. Standardized Aeronautical Information Exchange Model (AIXM)						✓		
	2. eAIP								✓

Module	Elements	Need Analysis				Implementation Status (if Element is needed)			
		Not Started	In Progress	Need	N/A	Planning	Developing	Partially Implemented	Implemented
	3. Digital NOTAM						✓		
	4. eTOD						2		
	5. WGS-84								✓
	6. QMS for AIM								✓
FICE	1. AIDC to provide initial flight data to adjacent ATSUs						✓		
	2. AIDC to update previously coordinated flight data						✓		
	3. AIDC for control transfer						✓		
	4. AIDC to transfer CPDLC logon information to the Next Data Authority						✓		
Performance Improvement Area 3: Optimum Capacity and Flexible Flights									
ACAS	1. ACAS II (TCAS version 7.1)								✓
	2. AP.FD function				✓				
	3. TCAP function				✓				
ASEP	1. ATSA-AIRB	✓							
	2. ATSA-VSA	✓							
ASUR	1. ADS-B						✓		
	2. Multilateration (MLAT)						2		
FRTO	1. CDM incorporated into airspace planning							✓	
	2. Flexible Use of Airspace (FUA)							✓	
	3. Flexible routing							✓	
	4: CPDLC used to request and receive re-route clearances				✓			✓	
NOPS	1. Sharing prediction of traffic load for next day							✓	
	2. Proposing alternative routings to avoid or minimize ATFM delays							✓	
OPFL	1. ITP using ADS-B				✓				
SNET	1. Short Term Conflict Alert implementation (STCA)								✓
	2. Area Proximity Warning (APW)								✓
	3. Minimum Safe Altitude Warning (MSAW)								✓
	4. Medium Term Conflict Alert (MTCA)								✓
Performance Improvement Area 4: Efficient Flight Paths									
CCO	1. Procedure changes to facilitate CCO						2		
	2. Airspace changes to facilitate CCO							2	
	3. PBN SIDs						2		
CDO	1. Procedure changes to facilitate CDO						2		
	2. Airspace changes to facilitate CDO							2	
	3. PBN STARs						2		
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

2.2 ASBU Block 1 Implementation Targets and Status

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

2.3 ASBU Block 2 Implementation Targets and Status

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

2.4 ASBU Block 3 Implementation Targets and Status

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

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

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

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

4. Trinidad and Tobago State Aviation System Improvements (SASI) Status

Trinidad and Tobago State Aviation System Improvements (SASI) are broken into three categories; (1) Equipment upgrades; (2) Procedure upgrades; and (3) Infrastructure upgrades.

The details of upgrades are recorded using SASI ANRFs and provided in **Appendix I.**

4.1 Equipment Upgrades

Equipment upgrades are not identified at this time.

4.2 Procedure Upgrades

Procedure upgrades are not identified at this time.

4.3 Infrastructure Upgrades

The following three (3) infrastructure upgrades have been identified to address anticipated airport and airspace demand growth.

- Airport Terminal Development – Status: Planning
- Airport Runway Rehabilitation and extension – Status: Analysis in Progress
- Control Tower and Technical Building upgrade – Status: N/A

5. Trinidad and Tobago State 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

Trinidad and Tobago 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.)

Trinidad and Tobago 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.)

Trinidad and Tobago 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: Trinidad and Tobago ASBU Block 0 ANRFs

ACDM

	TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block-Module**	**B0 - ACDM**	**Date**	November 2018	
	Module Description: Implements collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.					
	Element Implementation Status					
1	**Element Description:** Interconnection between aircraft operator and ANSP systems to share surface operations information				**Date Implemented** 2000	**Status** Implemented
	Status Details Verbal information shared. Information also notamized.					
2	**Element Description:** Interconnection between aircraft operator & airport operator systems to share surface operations information				**Date Implemented** 2000	**Status** Implemented
	Status Details: Verbal information shared. Information also notamized.					
3	**Element Description:** Interconnection between airport operator & ANSP systems to share surface operations information				**Date Implemented** 2000	**Status** Implemented
	Status Details Verbal information shared. Information also notamized.					
4	**Element Description:** Interconnection between airport operator, aircraft operator & ANSP systems to share surface operations information				**Date Implemented** 2000	**Status** Implemented
	Status Details Verbal information shared. Information also notamized.					
5	**Element Description:** Collaborative departure queue management				**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Trinidad and Tobago has acquired an ATFM system which provides departure demand information. At this point in time a departure metering system is not required.					
	Achieved Benefits					
	Access and Equity **Element 1:** Enhanced equity on the use of aerodrome facilities.					
	Capacity **Element 1:** Enhanced use of existing infrastructure of gate and stands. Reduced workload, better organization of the activities to manage flights. Enhanced aerodrome capacity according with the demand.					

	Efficiency **Element 1, 2, 3, 4:** Increased efficiency of the ATM system for all stakeholders. In particular for aircraft operators it will be improved situational awareness (aircraft status both home and away); enhanced fleet predictability and punctuality; improved operational efficiency (fleet management); and reduced delays.
	Environment **Element 1, 2, 3, 4:** Reduced taxi time; reduced fuel and carbon emission; and lower aircraft engine run time. Improved aerodrome expansion in accordance with Master Plan.
	Safety **Element 1, 2, 3, 4:** Improved safety
	Implementation Challenges
	Ground system Implementation **None**
	Avionics Implementation **None**
	Procedures Availability **None**
	Operational Approvals
	Notes None

APTA

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	**B0 - APTA**	**Date**	November 2018

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

Element Implementation Status

1	**Element Description:** PBN Approach Procedures with vertical guidance to LNAV/VNAV minima	**Date Implemented** MARCH 2017	**Status** Implemented
	Status Details TTPP – LNAV Approaches for both runway ends (10/28) are implemented. BARO-VNAV Approaches implemented March 2017. TTCP – LNAV Approaches for both runway ends (11/29) are implemented. BARO-VNAV Approaches implemented by March 2017.		
2	**Element Description:** PBN approach procedures with vertical guidance to LPV minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details		
3	**Element Description:** PBN Approach Procedures without vertical guidance to LNAV minima	**Date Implemented** OCTOBER 2003	**Status** Implemented
	Status Details No SBAS infrastructure at TTPP/TTCP. TTPP – LNAV Approaches for both runway ends (10/28) are implemented. TTCP – LNAV Approaches for both runway ends (11/29) are implemented.		
4	**Element Description:** GBAS Landing System (GLS) procedures to CAT I minima	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required		

Achieved Benefits

Access and Equity
Element 1&3: Increased aerodrome accessibility, especially around mountains and in low visibility operating conditions

Capacity
Element 1&3: Increased runway capacity

Efficiency
Element 1&3: Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays

Environment
Element 1&3: Reduced emissions due to reduced fuel burn due to lowering minima for landing that result in fewer diversions, cancellations, and/or delays.

Safety
Element 1&3: Increased safety through stabilized approach paths.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation **None**
Procedures Availability **None**
Operational Approvals **None**
Notes None

RSEQ

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	**B0 - RSEQ**	**Date**	November 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 Trinidad and Tobago has acquired an ATFM system which provides arrival demand information. At this point in time an arrival metering system is not required.		
2	**Element Description:** Departure management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Trinidad and Tobago has acquired an ATFM system which provides departure demand information. At this point in time a departure metering system is not required.		
3	**Element Description:** Departure flow management	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Trinidad and Tobago has acquired an ATFM system which provides departure demand information. At this point in time a departure metering system is not required.		
4	**Element Description:** Point merge	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Analysis of traffic density shows that this is not required at this time		

Achieved Benefits	
	Access and Equity
	Capacity Trinidad and Tobago ATFM system will optimize usage of terminal airspace and runway capacity.
	Efficiency Trinidad and Tobago ATFM system will harmonize arriving traffic flow from en route to terminal and aerodrome. Streamlined departure traffic flow and smooth transition into en-route airspace. Decreased lead time for departure request and time between call for release and departure time.
	Environment
	Safety

Implementation Challenges	
	Ground system Implementation
	Avionics Implementation

	Procedures Availability
	Operational Approvals
	Notes Regarding Point Merge, apart from low density traffic, there are airspace limitations preventing the use of this technique.

SURF

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	**B0 - SURF**	**Date**	November 2018

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

Element Implementation Status

1	**Element Description:** A-SMGCS with at least one cooperative surface surveillance system	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required.		
2	**Element Description:** ADS-B APT	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required.		
3	**Element Description:** **A**-SMGCS alerting with flight identification information	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required.		
4	**Element Description:** EVS for taxi operations	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required.		
5	**Element Description:** Airport vehicles equipped with transponders	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details At this point in time this is not required.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals
Notes

WAKE

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	1	**Block - Module**	**B0 - WAKE**	**Date**	November 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 Implemented** 2000		**Status** Implemented
	Status Details TIME-BASED WAKE TURBULENCE LONGITUDINAL SEPARATION MINIMA according PANS ATM 4444				
2	**Element Description:** Dependent diagonal paired approach procedures for parallel runways with centre lines spaced less than 760 meters (2,500 feet) apart		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
3	**Element Description:** Wake independent departure and arrival procedures (WIDAO) for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
4	**Element Description:** Wake turbulence mitigation for departures (WTMD) procedures for parallel runways with centrelines spaced less than 760 meters (2,500 feet) apart		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details N/A				
5	**Element Description:** 6 wake turbulence categories and separation minima		**Date Planned/Implemented** N/A		**Status** N/A
	Status Details Not required				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					

Avionics Implementation
Procedures Availability
Operational Approvals
Notes

AMET

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	**B0 - AMET**	**Date**	November 2018

Module Description: Global, regional and local meteorological information:

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

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

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

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

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

Element Implementation Status

1	**Element Description:** WAFS	**Date Implemented** 2000	**Status** Implemented
	Status Details TRINIDAD AND TOBAGO has working arrangements with WAFS WASHINGTON and WAFS LONDON		
2	**Element Description:** IAVW	**Date Implemented** 2000	**Status** Implemented
	Status Details TRINIDAD AND TOBAGO has working arrangements VAAC WASHINGTON		
3	**Element Description:** TCAC forecasts	**Date Implemented** 2000	**Status** Implemented
	Status Details TRINIDAD AND TOBAGO has working arrangements with TCAC MIAMI		
4	**Element Description:** Aerodrome warnings	**Date Planned** TBD	**Status** Plannning
	Status Details The Trinidad and Tobago Meteorological Service will be taking action for full implementation of the provision of aerodrome warnings, however the implementation date is still to be determined.		
5	**Element Description:** Wind shear warnings and alerts	**Date Planned** TBD	**Status** Partially Implemented
	Status Details Currently, the Trinidad and Tobago Meteorological Service provides verbal updates to the Piarco Tower. Digital Wind shear alerts to be provided with the implementation of the AWOS (Automatic Weather Observing System).Work is in progress.		
6	**Element Description:** SIGMET	**Date Implemented**	**Status** Implemented
	Status Details The Trinidad and Tobago Meteorological Service provides SIGMETs for the PIARCO FIR compliance with ICAO Annex3		

7	**Element Description:** Other OPMET information (METAR, SPECI and/or TAF)	**Date Implemented**	**Status** Implemented
	Status Details The Trinidad and Tobago Meteorological Service provides OPMET information for Trinidad and Tobago in compliance with ICAO Annex3		
8	**Element Description:** QMS for MET	**Date Implemented** 2014	**Status** Implemented
	Status Details Transition from 2008 ISO: 9001 to 2015 ISO: 9001standard. QMS ISO certified in 2017.		
Achieved Benefits			
Access and Equity			
Capacity			
Efficiency			
Environment			
Safety			
Implementation Challenges			
Ground system Implementation			
Avionics Implementation			
Procedures Availability			
Operational Approvals			
Notes			

DATM

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	**B0 - DATM**	**Date**	November 2018

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

Element Implementation Status

1	**Element Description:** Standardized Aeronautical Information Exchange Model (AIXM)	**Date Planned** March 2019	**Status** Developing
	Status Details AIXM was tested at the MINI GLOBAL 11 Meeting (Daytona Beach, USA, April 2016). The introduction of digital processing and digital management of information using the aeronautical information exchange model (AIXM) has been initiated, but not complete.		
2	**Element Description:** eAIP	**Date Implemented** JUNE 2016	**Status** Implemented
	Status Details As of 2017, the ECAR AIP is only available on the TTCAA website via password controlled access.		
3	**Element Description:** Digital NOTAM	**Date Planned** March 2019	**Status** Planning
	Status Details Dependent on the completion of Element 1 (AIXM 5.1 Implementation)		
4	**Element Description:** eTOD	**Date Planned/Implemented** TBD	**Status** Developing
	Status Details The eTOD software was acquired in 2012. Obstacle databases for TTCP and TTPP are populated from previous surveys but require assessment and inclusion of new obstacles around both aerodromes. Agreements with other states agencies to be developed to satisfy data need for Area 1 and Area 2.		
5	**Element Description:** (Identified by NACC) WGS-84	**Date Implemented** **2000**	**Status** Implemented
	Status Details WGS-84 datum implemented. All updates and new information will follow AIXM 5.2 WGS-84 from entry.		
6	**Element Description:** QMS for AIM	**Date Planned/Implemented** December 2016	**Status** Implemented
	Status Details ISO 9001:2008 Certification first achieved May 2017. ISO 9001:2015 Certification August 2018.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety
Implementation Challenges
Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals
Notes

FICE

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	2	**Block - Module**	**B0 - FICE**	**Date**	November 2018

Module Description: Improves coordination between air traffic service units (ATSU) by using ATS inter facility data communication (AIDC) defined by the ICAO Manual of Air Traffic Services Data Link Applications (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process, particularly for oceanic ATSUs. 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 Implemented** TBD	**Status** Developing
	Status Details Trinidad and Tobago and the United States have agreed to engage in interoperability message set testing.		
2	**Element Description:** AIDC to update previously coordinated flight data	**Date Implemented** TBD	**Status** Developing
	Status Details Trinidad and Tobago and the United States have agreed to engage in interoperability message set testing.		
3	**Element Description:** AIDC for control transfer	**Date Implemented** TBD	**Status** Developing
	Status Details Trinidad and Tobago and the United States have agreed to engage in interoperability message set testing.		
4	**Element Description:** AIDC to transfer CPDLC logon information to the Next Data Authority	**Date Implemented** TBD	**Status** Developing
	Status Details Trinidad and Tobago and the United States have agreed to engage in interoperability message set testing.		

Achieved Benefits

Access and Equity

Capacity
Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases.

Efficiency
The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding.

Environment

Safety
Better knowledge of more accurate flight plan information for ATC.

Implementation Challenges

Ground system Implementation
Tests showed incompatibility with New York based on software issues. Software upgrades required. Upgrades are planned for the third quarter (Q3) 2019.

Avionics Implementation

Procedures Availability
Operational Approvals
Notes

ACAS

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - ACAS**	**Date**	November 2018

Module Description: Provides 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 Implemented** June 2018	**Status** Implemented
	Status Details All Caribbean Airlines aircraft are in compliance with the TTCAA instructions and TCAS11 version 7.1		
2	**Element Description:** Auto Pilot/Flight Director (AP/FD) function	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details There are no AP/FD capabilities with the installed Version 7.1.		
3	**Element Description:** TCAS Alert Prevention (TCAP) function	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details There are no TCAP capabilities with the installed Version 7.1.		

Achieved Benefits

Access and Equity

Capacity

Efficiency
ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations.

Environment

Safety
ACAS increases safety in the case of breakdown of separation.

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

ASEP

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - ASEP**	**Date**	November 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** Not Started	**Status** Not Started
	Status Details Need for collaboration with airline operators		
2	**Element Description:** ATSA-VSA	**Date Planned/Implemented** Not Started	**Status** Not Started
	Status Details Need for collaboration with airline operators		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability

Operational Approvals

Notes

ASUR

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - ASUR**	**Date**	November 2018

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

Element Implementation Status

1	**Element Description:** ADS-B	**Date Planned** Ground based ADS B December 2019 Space based ADS B December 2019	**Status** Developing
	Status Details Trinidad and Tobago will be using ground based ADS B as enhancement for its conventional secondary surveillance radar (SSR).(DEC 2019) Caribbean Airlines advised that all of their fleet will be ADS-B compliant by December 2019. All Bristow Helicopters Caribbean fleet are ADS-B compliant. National Helicopters Services Limited less than 50% of fleet ADS B OUT equipped. PHI Oil and Gas is fully ADS B compliant.		
2	**Element Description:** MLAT	**Date Planned** December 2019	**Status** Developing
	Status Details Trinidad and Tobago will be using MLAT as enhancement for its conventional secondary surveillance radar (SSR).(DEC 2019)		

Achieved Benefits

Access and Equity

Capacity
Typical separation minima are 3 NM or 5 NM enabling a significant increase in traffic density compared to procedural minima. Improved coverage, capacity, velocity vector performance and accuracy can improve ATC performance in both radar and non-radar environments. Terminal area surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.

Efficiency

Environment

Safety
Reduction of the number of major incidents. Support to search and rescue.

Implementation Challenges

Ground system Implementation
Coverage area based on terrain.

Avionics Implementation
Procedures Availability
Operational Approvals
Notes

FRTO

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - FRTO**	**Date**	November 2018

Module Description: Allow the use of airspace which would otherwise be segregated (i.e. Special Use Airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.

Element Implementation Status

1	**Element Description:** CDM incorporated into airspace planning	**Date Planned/Implemented** Start December 2015	**Status** Partially Implemented
	Status Details Piarco PBN plan completed March 2015. Redesign of Upper level routes. Creation of STARs and SIDS, CCOs, CDOs. CDM with adjacent FIRs and TMAs within the Piarco FIR. This is an ongoing process based on requests or ATS considerations.		
2	**Element Description:** Flexible Use of Airspace (FUA)	**Date Planned/Implemented** Start December 2015	**Status** Partially Implemented
	Status Details TRINIDAD AND TOBAGO has redesigned the use of its national airspace since 2012 and it is an ongoing process		
3	**Element Description:** Flexible route systems	**Date Planned/Implemented** Start February 2016	**Status** Partially Implemented
	Status Details This is being offered to airlines based on requests at this time. KLM Royal Dutch Airlines utilizing direct routes within the Piarco FIR.		
4	**Element Description:** CPDLC used to request and receive re-route clearances	**Date Implemented** See details	**Status** Partially Implemented
	Status Details CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety

Implementation Challenges

Ground system Implementation

Avionics Implementation

Procedures Availability
Operational Approvals
Notes

NOPS

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - NOPS**	**Date**	November 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. 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** March 2019	**Status** Partially Implemented
	Status Details ATFM procedures utilized in the Piarco FIR. An ATFM system was procured and installed in October 2017. Procedures have been developed and training is currently being administered to ATS Staff. External Stakeholders to receive training by 1Q 2019. LOAs under development.		

2	**Element Description:** Proposing alternative routings to avoid or minimize ATFM delays	**Date Planned/Implemented** See Details	**Status** Partially Implemented
	Alternative routings are collaborated with adjacent FIRS to avoid delays.		

Achieved Benefits

Access and Equity
Improved access by avoiding disruption of air traffic in periods of demand higher than capacity. ATFM processes take care of equitable distribution of delays.

Capacity
Better utilization of available capacity, network-wide; in particular the trust of ATC not being faced by surprise to saturation tends to let it declare/use increased capacity levels; ability to anticipate difficult situations and mitigate them in advance.

Efficiency
Reduced fuel burn due to better anticipation of flow issues; a positive effect to reduce the impact of inefficiencies in the ATM system or to dimension it at a size that would not always justify its costs (balance between cost of delays and cost of unused capacity). Reduced block times and times with engines on.

Environment
Reduced fuel burn as delays are absorbed on the ground, with shut engines; re-routing, however, generally put flights on a longer distance, but this is generally compensated by other airline operational benefits.

Safety
Reduced occurrences of undesired sector overloads.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation
None

Procedures Availability
None

Operational Approvals None
Notes None

OPFL

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - OPFL**	**Date**	November 2018
Module Description: Enables aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is significant fuel 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 Not required at this time.				
Achieved Benefits					
Access and Equity					
Capacity					
Efficiency					
Environment					
Safety					
Implementation Challenges					
Ground system Implementation					
Avionics Implementation					
Procedures Availability					
Operational Approvals					
Notes					

SNET

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	3	**Block - Module**	**B0 - SNET**	**Date**	November 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)	**Date Planned/Implemented** July 2012	**Status** Implemented
	Status Details Piarco ACC facility has STCA (MCI) algorithms monitoring the aircraft.		
2	**Element Description:** Area Proximity Warning (APW)	**Date Planned/Implemented** July 2012	**Status** Implemented
	Status Details Piarco ACC facility has APM (Approach Path) and GTM (General Terrain) algorithms monitoring the aircraft.		
3	**Element Description:** Minimum Safe Altitude Warning (MSAW)	**Date Planned/Implemented** July 2012	**Status** Implemented
	Status Details Piarco ACC facility has short-term conflict alert area proximity warnings and minimum safe altitude warning algorithms.		
4	**Element Description:** Medium Term Conflict Alert (MTCA)	**Date Planned/Implemented** July 2012	**Status** Implemented
	Status Details Piarco ACC facility has MTCA (Lateral, Proximity, and Maneuvering) algorithms monitoring the aircraft		

Achieved Benefits

Access and Equity

Capacity

Efficiency

Environment

Safety
Element 1, 2 & 3: Significant reduction of the number of major incidents.

Implementation Challenges

Ground system Implementation
None

Avionics Implementation
None

Procedures Availability
None

Operational Approvals
None

Notes
None

CCO

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	**B0 - CCO**	**Date**	November 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** October 2019	**Status** Developing
	Status Details Route and associated airspace changes are routinely made as part of PBN procedure design and implementation processes. Upper Level routes are being redesigned and optimized to link to CCOs. Trinidad and Tobago requires an update to its terrain and obstacle database.		
2	**Element Description:** Route changes to facilitate CCO	**Date Planned/Implemented** Start August 2017	**Status** Partially Implemented
	Status Details Route and associated airspace changes are routinely made as part of PBN procedure design and implementation processes.		
3	**Element Description:** PBN SIDs	**Date Planned/Implemented** October 31, 2019	**Status** Developing
	Status Details PBN SIDs is to be implemented as part of the Piarco PBN redesign. Trinidad and Tobago requires an update to its terrain and obstacle database.		

Achieved Benefits

Access and Equity
Element 1: Only at locations where PBN SIDs can be published to deconflict traffic flows with additional/different routing options.
Element 3: Only at locations where PBN SIDs can be published to deconflict traffic flows with additional/different routing options.

Capacity
N/A

Efficiency
Element 1: Cost savings through reduced fuel burn due to improved vertical profiles.
Reduction in the number of required radio transmissions, and therefore controller and pilot workloads.
Element 3:
Only at locations where PBN SIDs can be published to shorten typically flown terminal routing options, or to improve flow interaction, or improve vertical profiles.

Environment
Element 1: Reduced emissions as a result of reduced fuel burn (IFSET)
Element 3: Reduced emissions as a result of reduced fuel burn (IFSET)

Safety
Element 1: RNAV SIDs facilitate executing stabilized approaches.
Element 3: More consistent flight paths and stabilized approach paths.

Implementation Challenges

Ground system Implementation
Acquisition of updated terrain and obstacle data

Avionics Implementation
None

CDO

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	**B0 - CDO**	**Date**	November 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** October, 2019	**Status** Developing
	Status Details Route and associated airspace changes are routinely made as part of PBN procedure design and implementation processes. Upper Level routes are being redesigned and optimized to link to CDOs. Trinidad and Tobago requires an update to its terrain and obstacle database.		
2	**Element Description:** Route changes to facilitate CDO	**Date Planned/Implemented** Started August, 2017	**Status** Partially Implemented
	Status Details Route and associated airspace changes are routinely made as part of PBN procedure design and implementation processes. Upper Level routes are being redesigned and optimized to link to CDOs.		
3	**Element Description:** PBN STARs	**Date Planned** October, 2019	**Status** Developing
	Status Details PBN STARs are to be implemented as part of the Piarco PBN redesign. Trinidad and Tobago requires an update to its terrain and obstacle database.		

Achieved Benefits

Access and Equity
Element 1: Only at locations where PBN STARs can be published to deconflict traffic flows with additional/different routing options.
Element 3: Only at locations where PBN STARs can be published to deconflict traffic flows with additional/different routing options.

Capacity
N/A

Efficiency
Element 1: Cost savings through reduced fuel burn due to improved vertical profiles. Reduction in the number of required radio transmissions, and therefore controller and pilot workloads
Element 3:
Only at locations where PBN STARs can be published to shorten typically flown terminal routing options, or to improve flow interaction, or improve vertical profiles.

Environment
Element 1: Reduced emissions as a result of reduced fuel burn (IFSET)
Element 3: Reduced emissions as a result of reduced fuel burn (IFSET)

Safety
Element 1: RNAV STARs facilitate executing stabilized approaches.
Element 3: More consistent flight paths and stabilized approach paths.

Implementation Challenges

Ground system Implementation
Acquisition of updated terrain and obstacle data

Avionics Implementation
None

Procedures Availability Establishment of upper level routes to link CDOs
Operational Approvals None
Notes None

TBO

TRINIDAD AND TOBAGO ASBU Air Navigation Reporting Form (ANRF)					
PIA	4	**Block - Module**	**B0 - TBO**	**Date**	November 2018

Module Description: Implements an initial set of data link applications for surveillance and communications in air traffic control (ATC), supporting flexible routing, reduced separation and improved safety.

Element Implementation Status

1	**Element Description:** ADS-C over oceanic and remote areas	**Date Implemented** Implemented July 7th 2016	**Status** Implemented
	Status Details		
2	**Element Description:** CPDLC over continental areas	**Date Planned/Implemented** See details	**Status** Partially Implemented
	Status Details CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.		
3	**Element Description:** CPDLC over oceanic and remote areas	**Date Planned/Implemented** See details	**Status** Partially Implemented
	Status Details CPDLC was implemented in July 2016, however due to differences in the software the service was curtailed. It is expected to resume in December 2019.		
4	**Element Description:** SATVOICE direct controller-pilot communication (DCPC)	**Date Planned/Implemented** N/A	**Status** N/A
	Status Details Not required at this time		

Achieved Benefits

Access and Equity

Capacity
Element 1: A better localization of traffic and reduced separations allow the increasing of offered capacity.
Element 2&3: Reduced communication workload and better organization of controller tasks allowing increased sector capacity.

Efficiency
Element 1: Routes/tracks and flights can be separated by reduced minima, allowing flexible routings and vertical profiles closer to the user-preferred routes/tracks.

Environment
Element 1: Reduced emissions as a result of reduced fuel burn

Safety
Element 1: Increased situational awareness; ADS-C based safety nets like cleared level adherence monitoring, route adherence monitoring, danger area infringement warning; and better support to search and rescue.
Element 2&3: Increased situational awareness; reduced occurrences of misunderstandings; solution to stuck microphone situations.

Implementation Challenges

Ground system Implementation
Avionics Implementation
Procedures Availability
Operational Approvals
Notes

Appendix E: Trinidad and Tobago ASBU Block 1 ANRFs

Insert ASBU B1 ANRFs in the future.

Appendix F: Trinidad and Tobago ASBU Block 2 ANRFs

Insert ASBU B2 ANRFs in the future.

Appendix G: Trinidad and Tobago ASBU Block 3 ANRFs

Insert ASBU B3 ANRFs in the future.

Appendix H: Trinidad and Tobago RASI ANRFs

Trinidad and Tobago RASI Air Navigation Reporting Form (ANRF)			
ICAO NACC Regional Initiatives		**Date**	November 8, 2018
Module Description: ICAO NACC RO has identified airport improvements.			
Element Implementation Status			
1	**Element Description:** Aerodrome certification	**Date Implemented** 2008	**Status** Implemented
	Status Details Annual certification is done on both TTPP and TTCP according to the Trinidad and Tobago Civil Aviation Regulations No 12		
2	**Element Description:** Heliport operational approval	**Date Implemented** 2008	**Status** Implemented
	Status Details Mixture of Heliports and Helidecks. These consist of Hospital and Oil/Gas installations. These are not used for international operations. Annual certification is done on all Heliports and Helidecks		
3	**Element Description:** Visual aids for navigation	**Date Implemented** 2008	**Status** Implemented
	Status Details This is required for compliance with Trinidad and Tobago Civil Aviation Regulations No 12.		
4	**Element Description:** Aerodrome Bird/Wildlife Organization and Control Programme	**Date Planned** Dec 2019	**Status** Partially Implemented
	Status Details Wildlife study is presently done at both TTPP and TTCP. Draft Aerodrome Bird/Wildlife Organization and Control Programme are under review.		
Achieved Benefits			
Access and Equity			
Capacity:			
Efficiency			
Environment:			
Safety			
Implementation Challenges			
Ground system Implementation:			
Avionics Implementation:			
Procedures Availability:			
Operational Approvals:			
Notes .			

Appendix I: Trinidad and Tobago SASI ANRFs

Trinidad and Tobago SASI Air Navigation Reporting Form (ANRF)				
Infrastructure Upgrades			**Date**	November 2018
Module Description: Development of major components of the overall Airport/Aerodrome to meet the demands of the growing Aviation Industry. This will improve capacity and safety in the in terminal and allow seamless maneuvering of wide body Aircraft (example B777) at the turning bay. Such maneuvering will reduce runway occupancy time and reduce surface wear and tear. New ATC facility is required to meet the demands of increase staffing. Improving operational space is vital to meet the need of increased traffic. The benefits of such infrastructure upgrades will increase an overall traffic management efficiency and enhance safety.				
Element Implementation Status				
1	**Element Description:** Airport Terminal Development	**Date Planned/Implemented** TBD	**Status** Planning	
	Status Details There are no immediate plans for terminal development at TTPP. Capacity enhancement is achieved through operational procedures and resource planning. However, the current terminal building at TTCP does not meet passenger demands during peaks. Aa new terminal will be built pursuant to airport master plan by end of 2020.			
2	**Element Description:** Airport Runway Rehabilitation and Extension	**Date Planned/Implemented** TBD	**Status** Under review by Engineering Department. Rehabilitation may be due by 2025 at TTPP.	
	Status Details A number of deteriorated areas were patched and additional areas form part of a bigger pavement rehabilitation programme that has prioritized work to be done on the movement area at TTPP			
3	**Element Description:** Control Tower and Technical Building Upgrades	**Date Planned/Implemented** N/A	**Status** N/A	
	Status Details			
Achieved Benefits				
Access and Equity				
Capacity Element 1 - Airport Terminal Development: Increase the capacity to handle passengers smoothly at the peak arrival periods.				
Efficiency				
Environment				
Safety Element 2 - Airport Runway Rehabilitation and Extension: Improve operational safety of aircraft. Element 3 - Control Tower and Technical Building Upgrades: Improve operational safety of aircraft and ATCOs.				
Implementation Challenges				
Ground system Implementation				
Avionics Implementation				
Procedures Availability				
Operational Approvals				
Notes Element 1 - Airport Terminal Development: Address the airport terminal security issues.