



STAKEHOLDER COLLABORATION TO ENSURE THE GLOBAL SUSTAINABILITY OF AVIATION

ICAO / CANSO - PBN WORKSHOP

PBN



Trinidad and Tobago update

Presented by:
Trinidad and Tobago

November 2013



References

- ICAO PBN toolkit
- ICAO Global Air Navigation Plan (Doc 9750)
- ICAO PBN Manual (Doc 9613)
- Piarco FIR PBN Action Plan
- TTCAA PBN Core Implementation Team Terms of Reference (Draft 4.0)



ICAO GANP 2013 - 2028



Doc 9750

DRAFT 2014-2018 Transition Edition

2013-2028

Global Air Navigation Capacity & Efficiency Plan

ICAO's Vision

Achieve the sustainable growth of the global civil aviation system.

Our Mission

The International Civil Aviation Organization is the global forum of States for international civil aviation. ICAO develops policies, standards, undertakes compliance audits, performs studies and analyses, provides assistance and builds aviation capacity through the cooperation of Member States and stakeholders.

2014-2016 Strategic Objectives

- A. **Safety:**
Enhance global civil aviation safety.
- B. **Air Navigation Capacity and Efficiency:**
Increase capacity and improve efficiency of the global civil aviation system.
- C. **Security and Facilitation:**
Enhance global civil aviation security and facilitation.
- D. **Economic Development of Air Transport:**
Foster the development of a sound and economically-viable civil aviation system.
- E. **Environmental Protection:**
Minimize the adverse environmental effects of civil aviation activities.

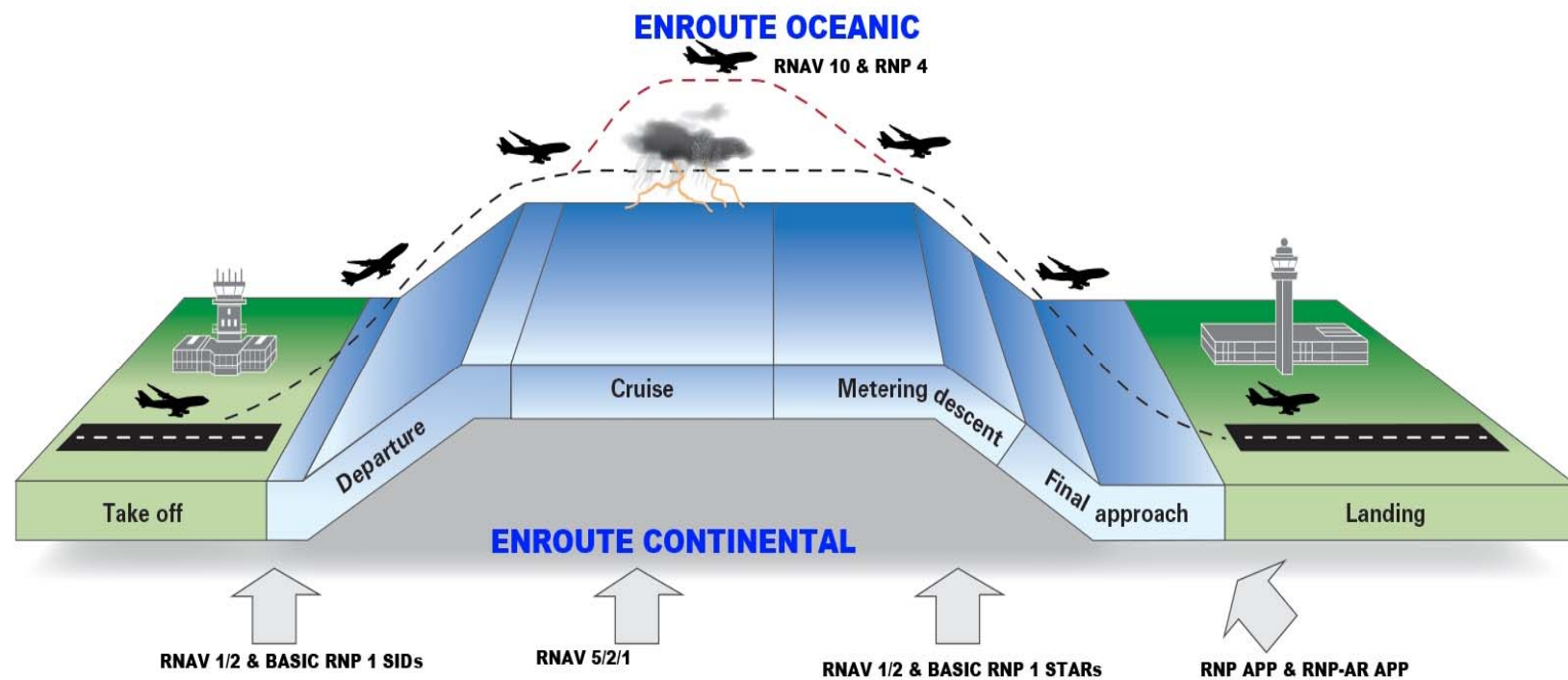


Why is PBN so important?

- The implementation of PBN is presently the global aviation community's highest Air Navigation priority (GANP 4th Edition)
- ICAO Resolution A37-11 urges states to implement RNAV and RNP ATS routes and approach procedures in accordance with ICAO PBN concept laid down in the PBN Manual DOC (9613)
- PBN is key to the implementation of ICAO's Aviation System Block Upgrades (ASBUs)
- Its an enabler to continuous climb and descent operations (CCOs and CDOs)
- Directly linked to GPIs 5, 9, 11, 20 & 21(RNAV enhancements through GNSS)



PBN Implementation





PBN Implementation- ICAO Recommendations

- Top-down approach
- Formation of a multidisciplinary team
- Collaborative decision making
- Safety Analysis
- Cost Benefit Analysis
- Testing/Simulations
- Implementation
- Monitoring



Formation of PBN Implementation Team

Core team composition

- ATCOs
- AIS
- CNS
- Procedure Designers
- Airspace planners
- Regulatory body
- Pilots/Airline operators





Other Stakeholders

- Airport Authorities
- Airline Operators
- General Aviation
- National Security
- Other relevant Ministries e.g.
(Environmental/Finance/Tourism etc.)



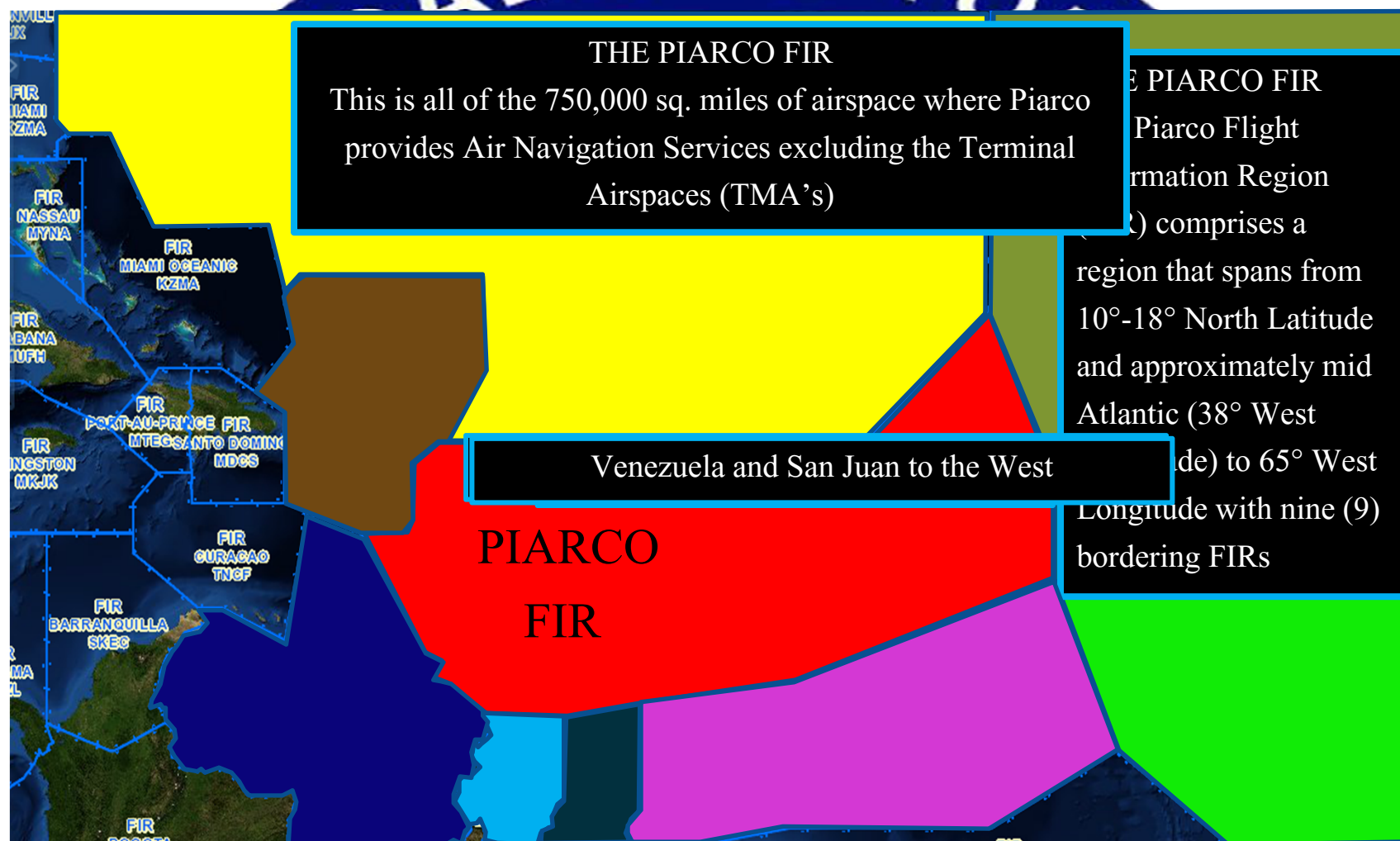


Piarco FIR



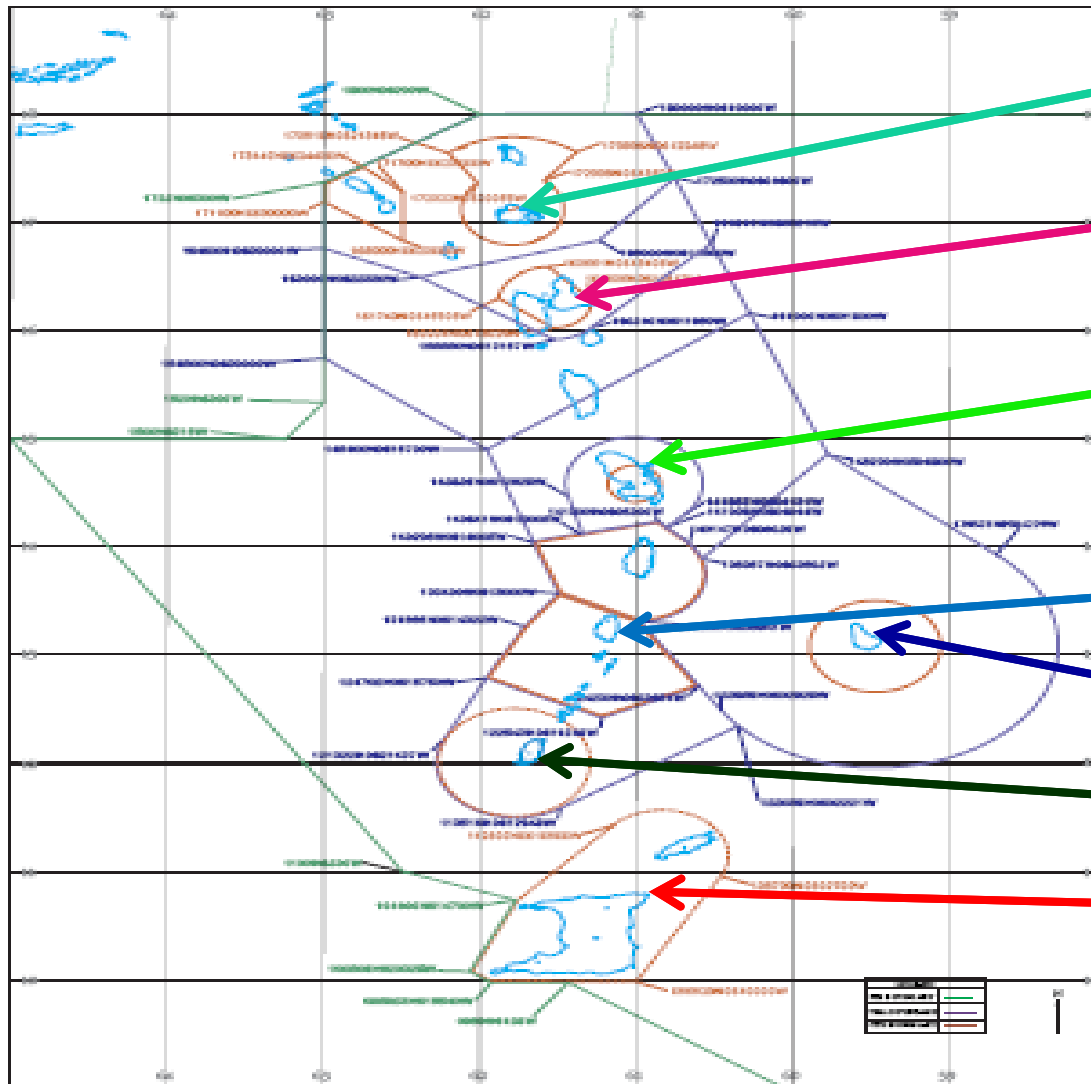


AIRSPACES AROUND THE PIARCO FIR





TMA's within the PIARCO FIR



ANTIGUA

GUADELOUPE

MARTINIQUE

ST. VINCENT AND THE
GRENADINES

BARBADOS

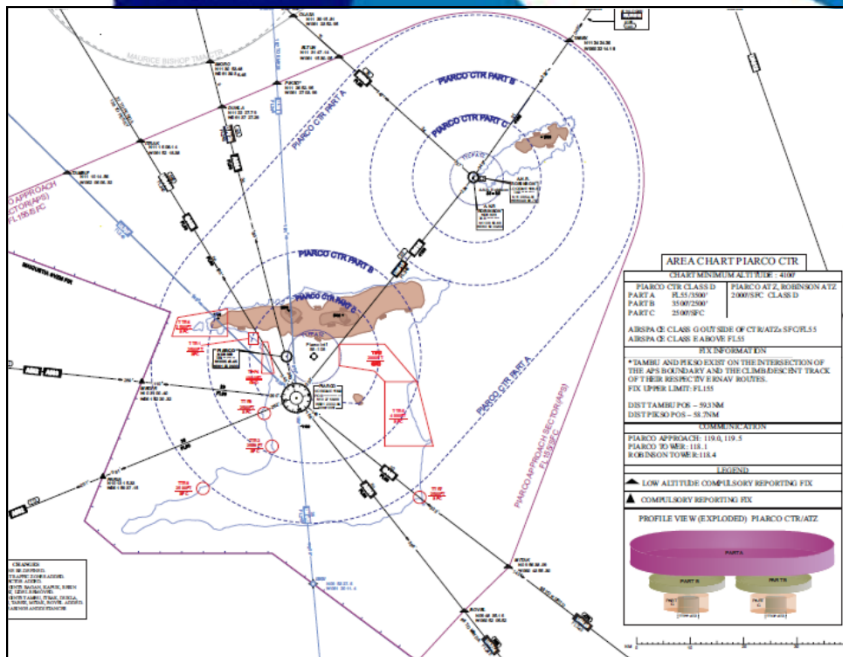
GRENADA

TRINIDAD AND TOBAGO



T&T's Responsibilities

- PBN implementation within the terminal airspace (Approach sector) of Trinidad and Tobago



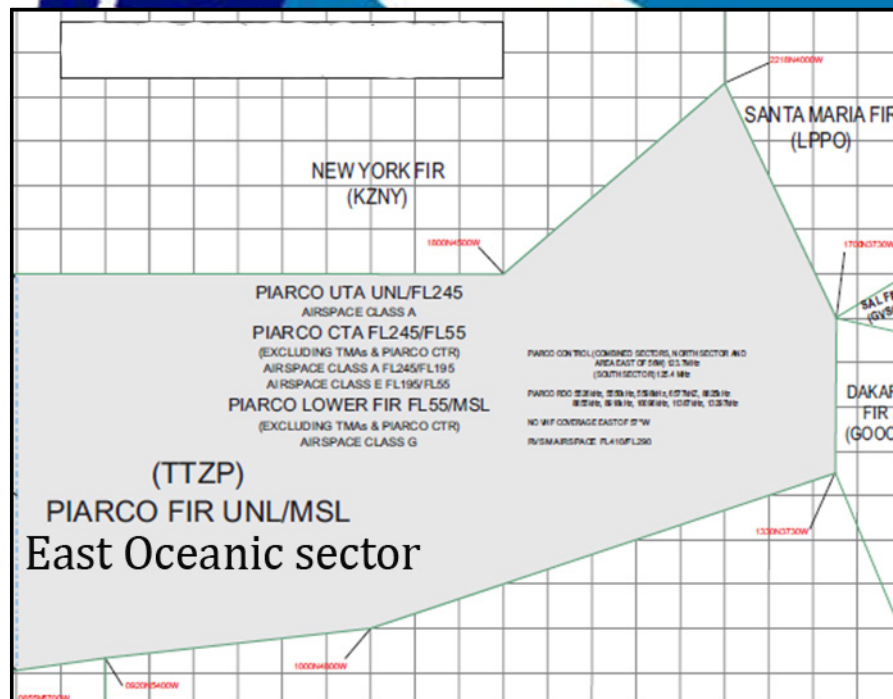
Short Term → Medium Term – RNAV₁
RNP BASIC
RNAV SIDS/STARS

Medium Term → Long Term – RNP AR
(RF-LEGS)



T&T's Responsibilities

PBN implementation within the En-route East Oceanic Sector of the Piarco FIR



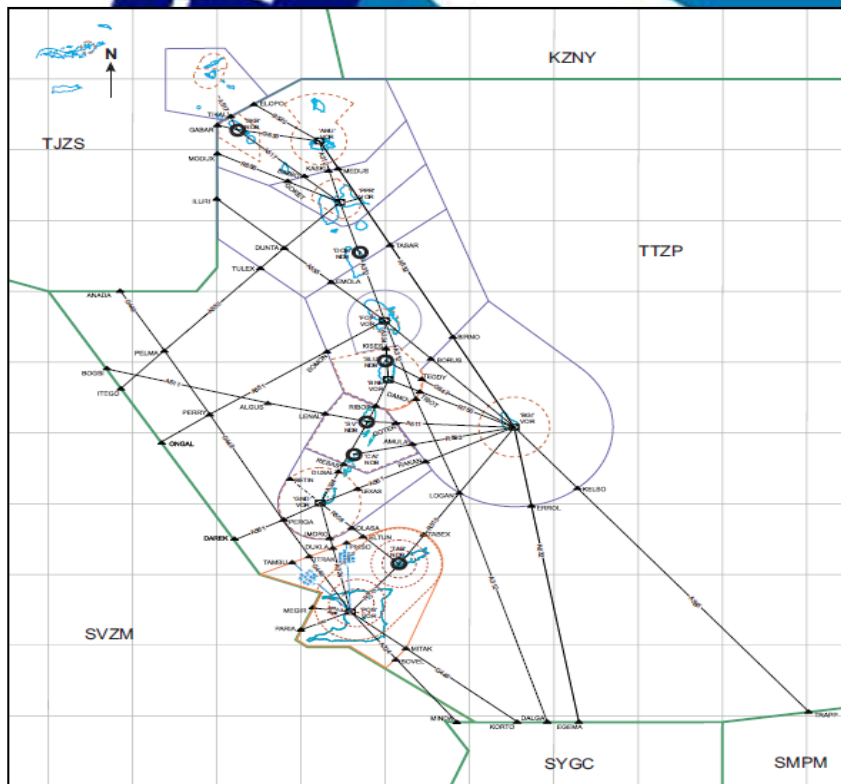
Short → Medium term – RNAV 10

Medium → Long term – RNP4



T&T's Responsibilities

- PBN implementation within the En-route Continental sector of the Piarco FIR



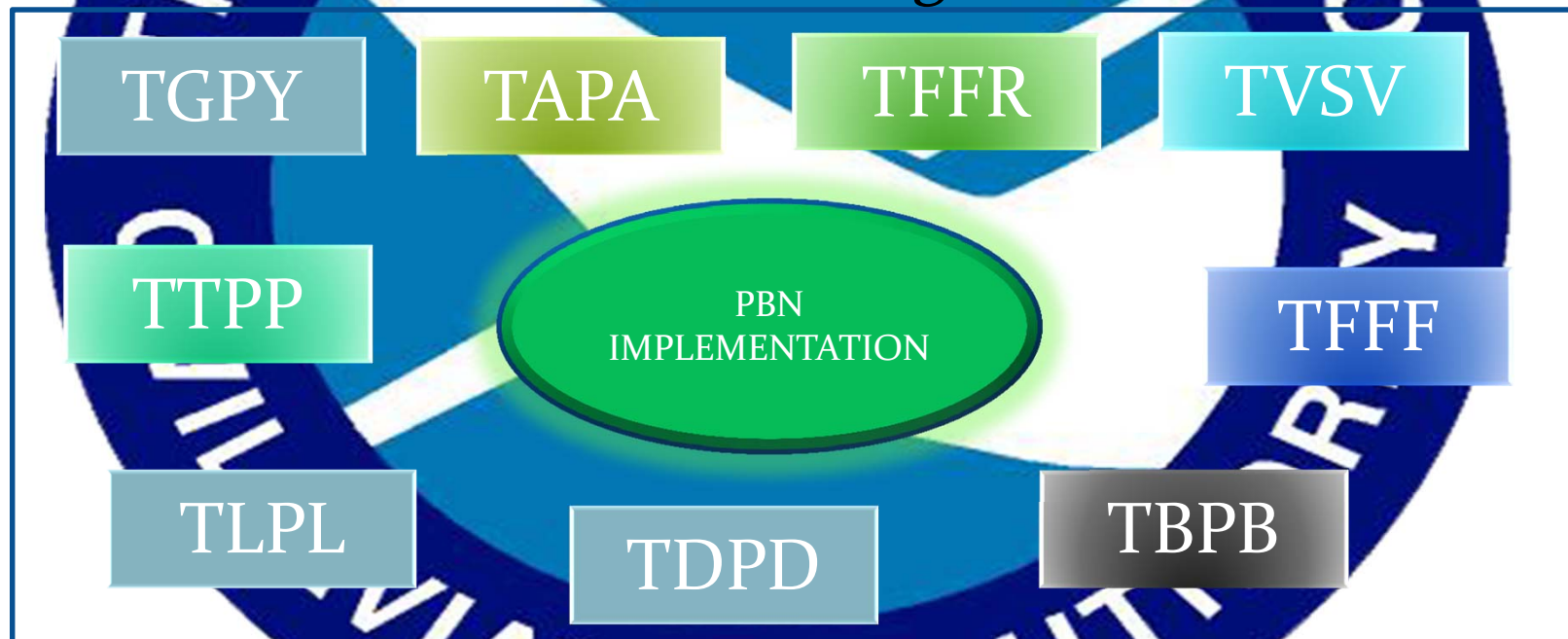
Short Term → Medium Term – RNAV₅

Medium Term → Long Term – RNAV₂



T&T's Responsibilities

Ensuring harmonization of PBN implementation within the ECAR Region





PBN Tasks

- Developing/modifying an airspace concept
- Electronic DATA collection /analysis /distribution
- Collaboration with stakeholders
- Developing/modifying regulatory framework
- Conducting cost benefit analyses
- Conducting safety assessments
- Developing/conducting training in PBN matters



Tasks accomplished

- Trinidad and Tobago, in accordance with the CAR/SAM Regional Air Navigation Plan, has incorporated the concepts of PBN into its strategic objectives plan and has developed and submitted to the ICAO NACC Office, a Piarco FIR PBN implementation roadmap





T&T's Presentation in Miami

Trinidad & Tobago PBN 2013 and Beyond

Let's do it!

Safely

Efficiently



Environmentally Friendly

22 MARCH 2013

DESIGNED BY RIAAZ MOHAMMED
& ELLISON RAMLOGAN



PBN AIRSPACE RE-DESIGN PROCESS



PLAN

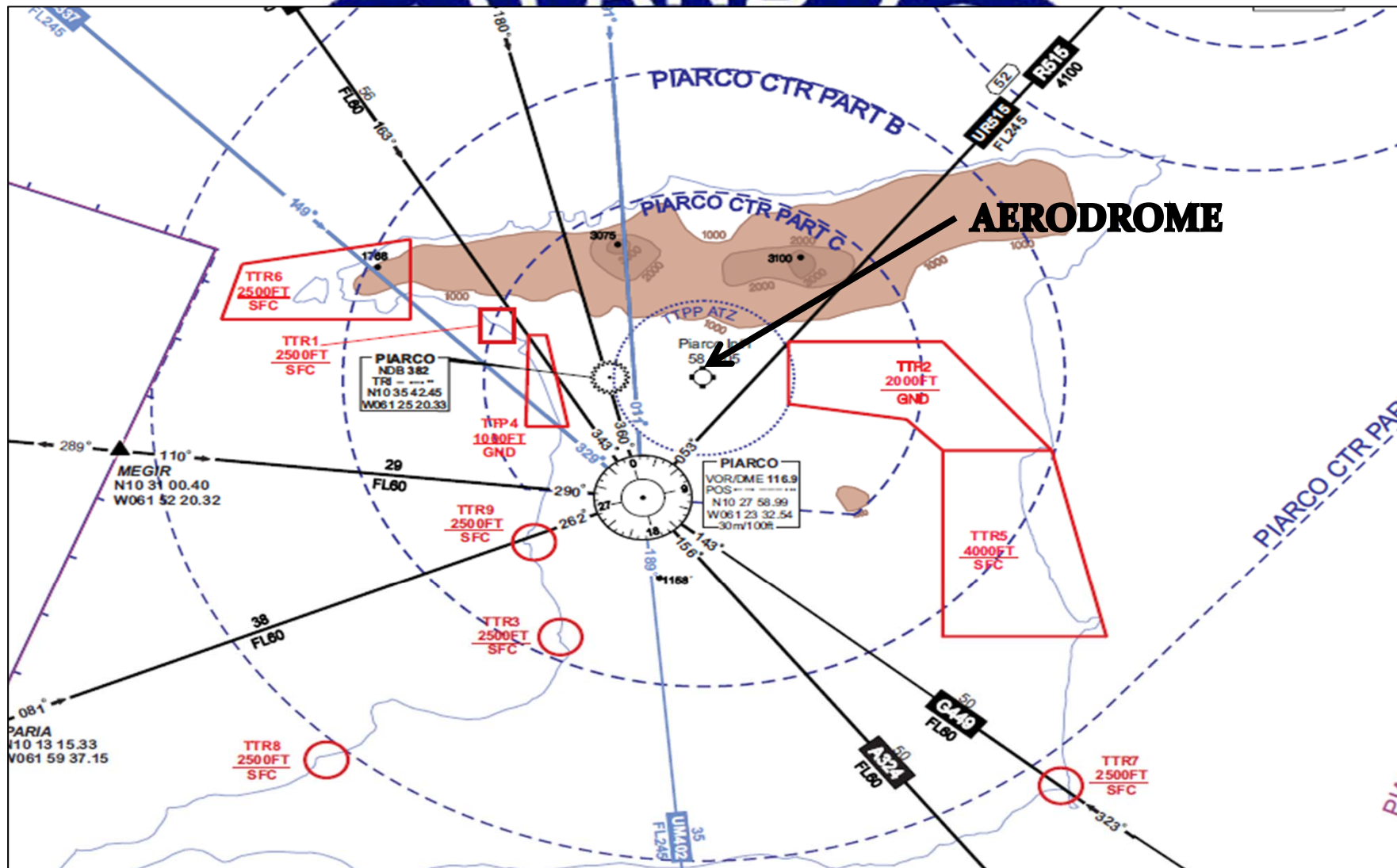
DESIGN

VALIDATE

IMPLEMENT

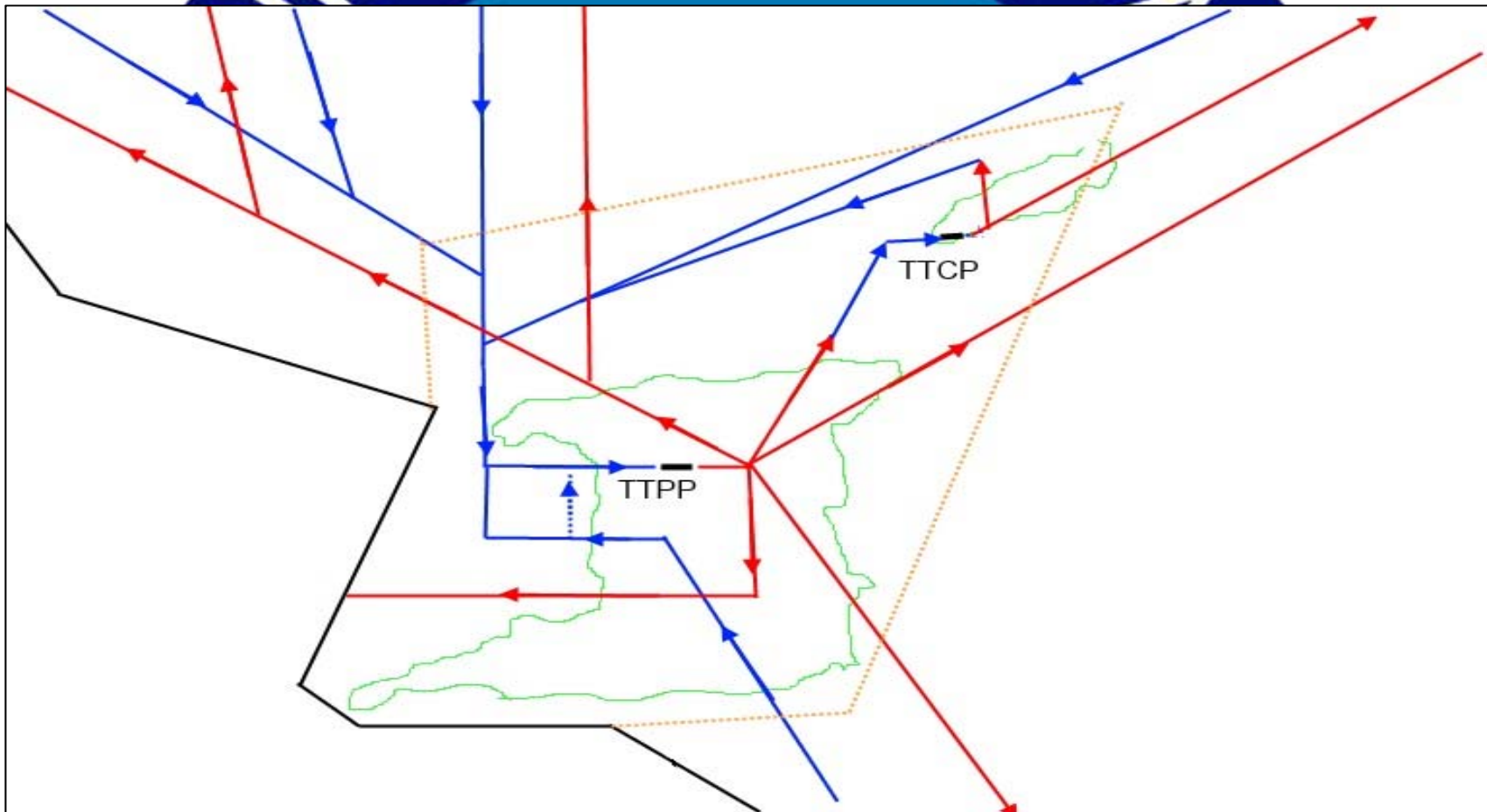


Our Terminal Airspace





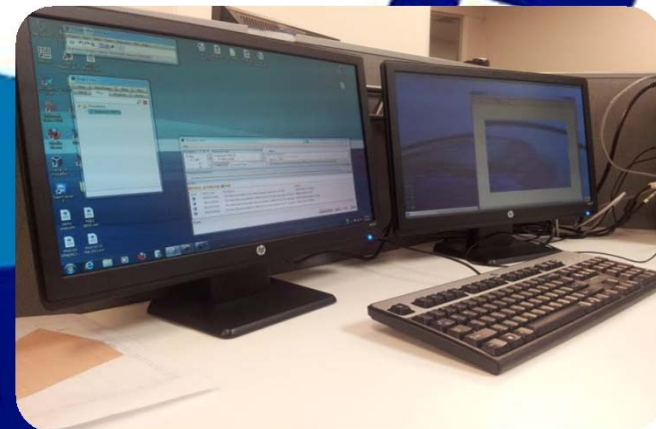
Conceptual re-design





Tasks accomplished

With regard to the approach sector, the TTCAA has invested heavily in both procedure design software and the development of personnel in this field. It is expected that by September 2014, Trinidad and Tobago will have RNP approaches with BaroVNAV, designed by TTCAA personnel, for all runways at Piarco and Robinson, as well as SIDs and STARs





Tasks accomplished

The ANS department of the TTCAA has already held introductory meetings with some air operators as well as one section of our military air-guard, and there are further meetings planned with other stakeholders planned

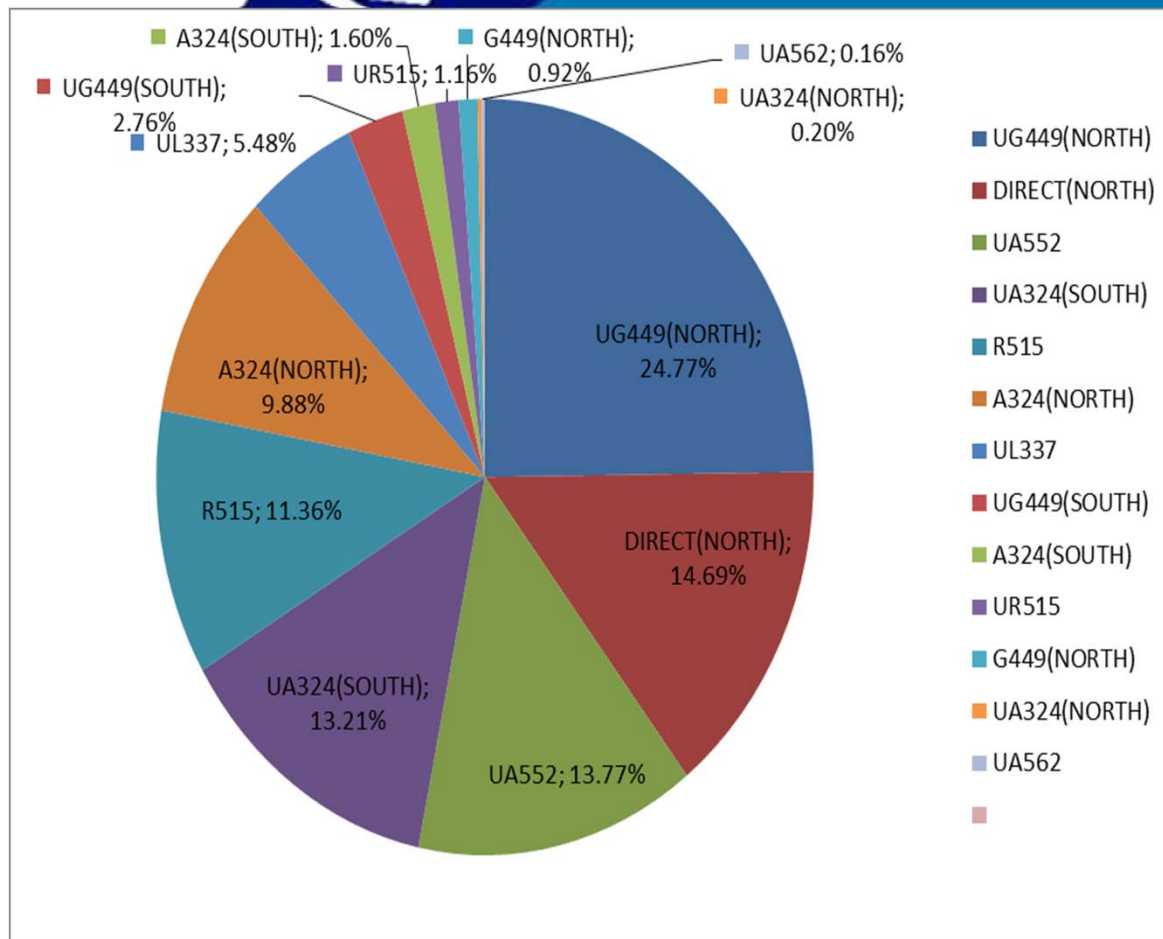
The TTCAA has also held meetings with the Lands and Survey Department of Trinidad and Tobago and has acquired ETOD for Piarco and ANR Robinson based on the accuracy requirements outlined in Annex 15





Work in progress

Analysis of TWR Traffic



ATS Routes Flown	Total	% of Total
UG449(NORTH)	639	26.05
DIRECT	363	14.80
UA552	341	13.90
UA324(SOUTH)	330	13.45
A324(NORTH)	239	9.74
R515	237	9.66
UL337	94	3.83
UG449(SOUTH)	65	2.65
UR515	58	2.36
A324(SOUTH)	45	1.83
G449	26	1.06
UA562	10	0.41
UA324(NORTH)	8	0.33



Work in progress - Analysis

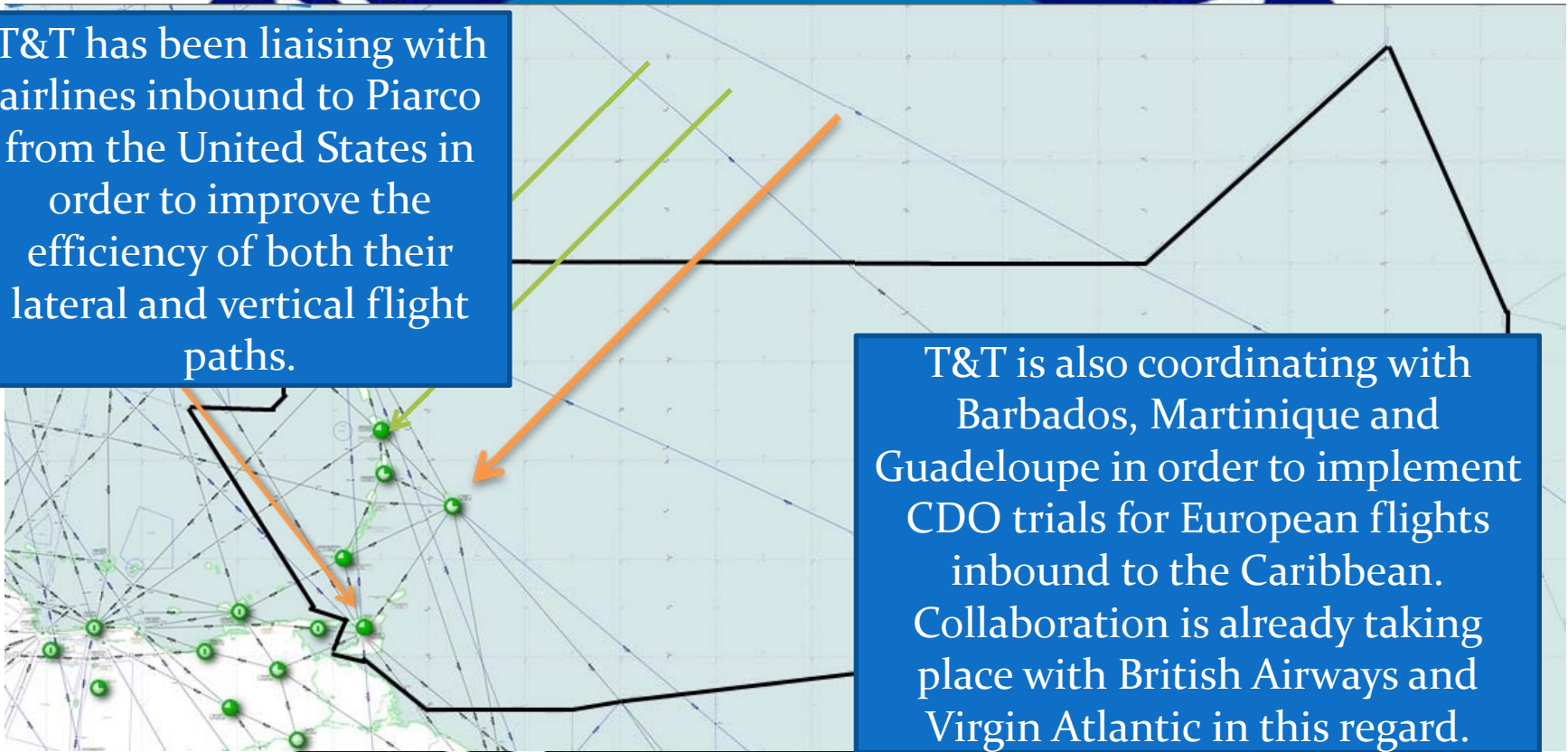
- Currently, the core team is in the process of analysing traffic data in the oceanic sector in preparation for conducting the required safety and cost-benefit analyses required for the possible introduction of a semi-flex RNAV route system in the oceanic sector aimed at increasing capacity, and improving safety and efficiency
- The team is also analyzing the current upper airspace route structure and is experimenting with conceptual re-designs



Work in progress - CDM

T&T has been liaising with airlines inbound to Piarco from the United States in order to improve the efficiency of both their lateral and vertical flight paths.

T&T is also coordinating with Barbados, Martinique and Guadeloupe in order to implement CDO trials for European flights inbound to the Caribbean. Collaboration is already taking place with British Airways and Virgin Atlantic in this regard.





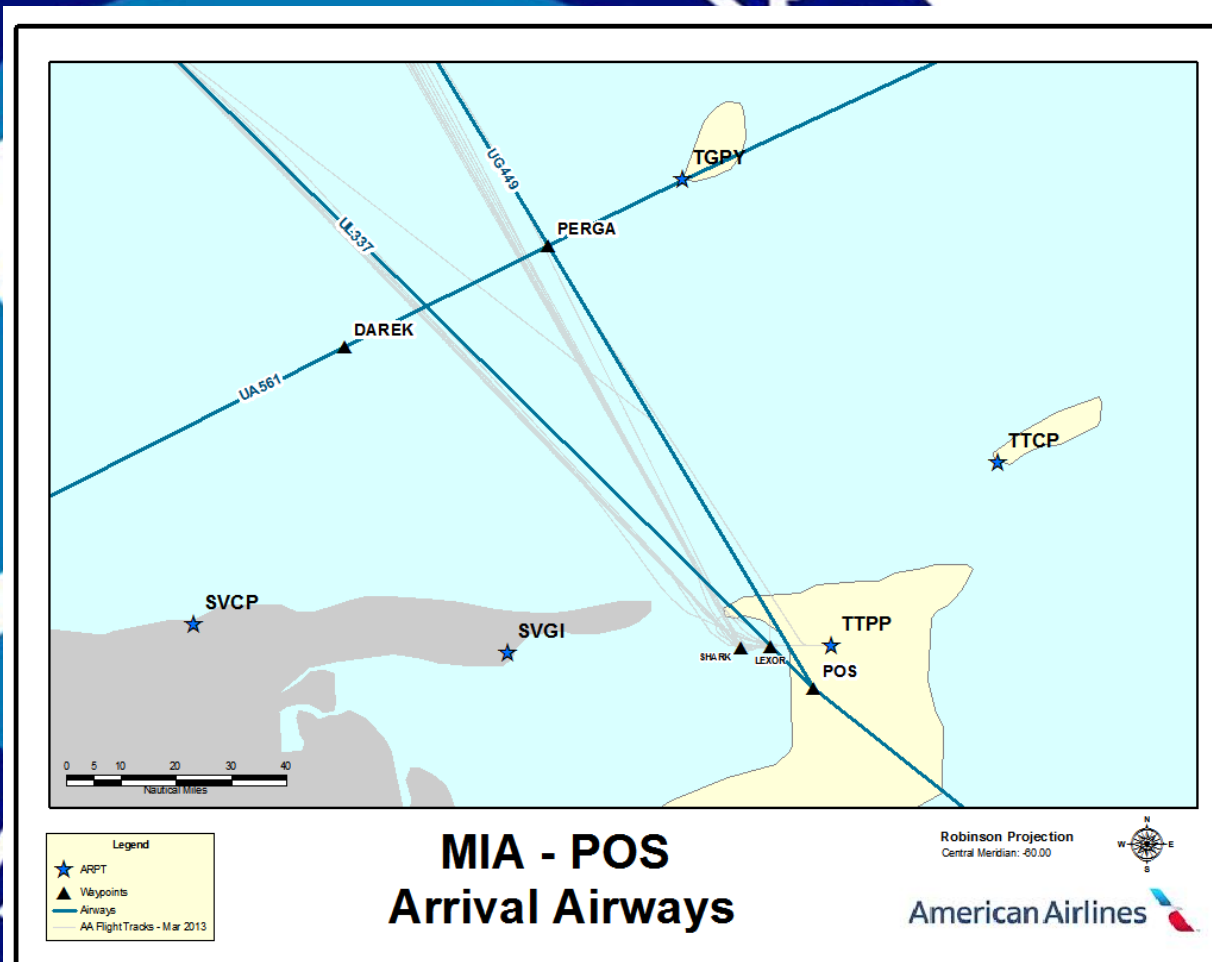
Collaboration with Barbados with regard to arrival / departure procedures in relation to CDOs/CCOs





Work in progress – Collaboration with Airlines

Information provided by American Airlines with regard to their flight paths into Trinidad





Work in progress – Collaboration with Airlines

Information provided by American Airlines based on a one minute level-off at F190

Based on \$2.986 USD per gallon. For 750lbs that equates to US \$111.94

777-300ER

	Time (min)	Fuel (lbs)	Dis (NM)
CDO Descent	17.2	1188	96.7
Step at FL190 for 1 min	20.9	1967	102.0

Notes Beginning at FL370 and 555,000lbs

A319 w/ Sharklets

	Time (min)	Fuel (lbs)	Dis (NM)
CDO Descent	15.9	318	93.5
Step at FL190 for 1 min	19.2	704	98.8

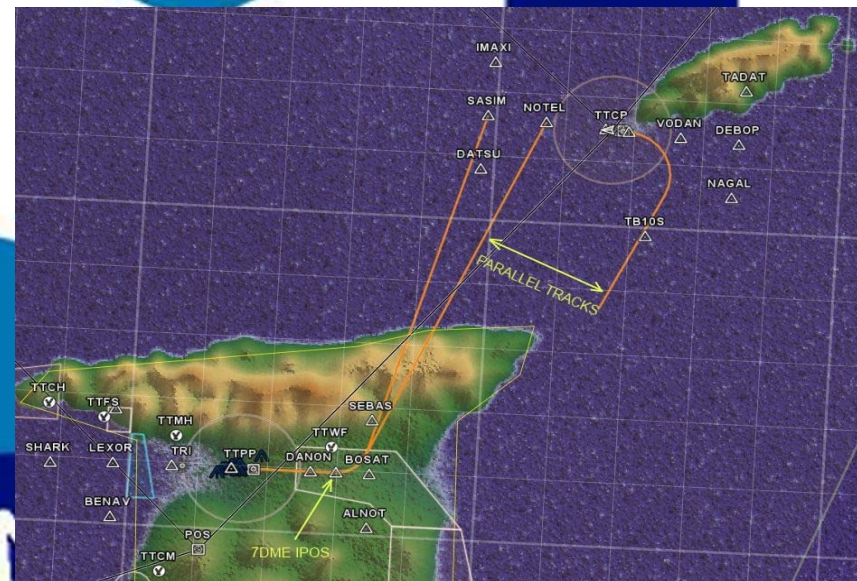
Notes Beginning at FL370 and 138,000lbs



Work in progress – Collaboration with Airlines

Trinidad and Tobago has been coordinating with the domestic carrier in order to develop an arrival /departure procedure between the islands of Trinidad and Tobago in order to improve the efficiency of their operation and reduce workload on our ATCOs

Trials with local operators





Work in progress – Collaboration with Regulatory Body

- Regulatory representative on Core Implementation Team
- Preliminary training provided in PBN Ops Approval
- Further training planned for Airworthiness and Flight Operations Inspectors



TRINIDAD AND TOBAGO CIVIL AVIATION AUTHORITY
P.O. Box 220, Victoria Park, Port of Spain, Trinidad and Tobago
Tel: (868) 464-4444, Fax: (868) 464-4445, Email: caa@caa.gov.tt

SCHEDULE 1 [Regulation 9 (1)]

APPLICATION FOR LICENSE TO OPERATE A SCHEDULED SERVICE

To: Director General of Civil Aviation

1. Applicant (Full name) _____
(If a body corporate give full particulars and title of applicant)

2. Nationality of Applicant(s) _____

3. Country in which aircraft are registered _____

4. Registered business address (a) Head Office _____
(b) In Trinidad and Tobago _____

5. Particulars of Route it is desired to operate -
(1) Point of Departure _____
(2) Point of Final Destination _____
(3) Intermediate landing points _____
(a) For traffic purposes _____
(b) For non-traffic purposes _____
(c) Weather alternatives _____

6. Period for which the License is required _____

7. Type of aircraft to be used and Passenger Seating Accommodation _____

8. Crew to be carried (Number and function) _____

9. Annexes:
A. Proposed Schedule of Frequencies, with details of intended Time Tables
B. Passenger Rates (Through and Intermediate)
C. Freight Rates (Through and Intermediate)
D. Annual Conveyance Rates (Through and Intermediate)
E. Free Baggage Allowance and Excess Baggage Rates
F. Total number of aircraft belonging to Applicant (individual types and seating capacity)
G. Total aircrew Personnel on Payroll (Pilot and Flight Attendants)
H. Details of the Insurance of the Aircraft for the proposed Route

10. The following documents must be submitted for consideration of this application:
(a) Certificate of Airworthiness
(b) Certificate of registration
(c) Air Operator Certificate/Operations Specification (showing area of operations)
(d) Evidence of satisfactory arrangements for:
- Maintenance
- Ground Handling including weight and balance
- Dangerous Goods

Date: _____ Name: _____
Signature: _____



Increased Greener Skies Efficiency



THANK YOU FOR YOUR
ATTENTION



Safe Skies For All