BRIEFING OF JAMAICA'S CDO/CCO & ENVIRONMENTAL ACTIVITIES

Presented by:

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"It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest"

How does this principle operate in the context of efficiency, safety, ATM Restructuring & environmental protection?

Air Canada Rouge making its inaugural flight into Montego Bay on Friday, November 1, with some 259 passengers from Toronto, Canada. The airline is scheduled for daily flights into Montego Bay, throughout the winter tourist season, ending in May 2014.

The Air Transaero 747 flight from Eastern Europe arrives at the Sangster International Airport in Montego Bay, on Friday, November 1, with upgraded seating from 320 seats to 530 seats. The aircraft is scheduled for flights to Montego Bay every ten days throughout the winter tourist season, ending in May 2014

Financial Benefits of CDO/CCO

- Tourism is a US$2B/annual industry in Jamaica ranking #1 in revenue
- 70% of passengers arrive by aircraft

Study by an American Air Carrier CDO v/s Step Descent

777-300ER

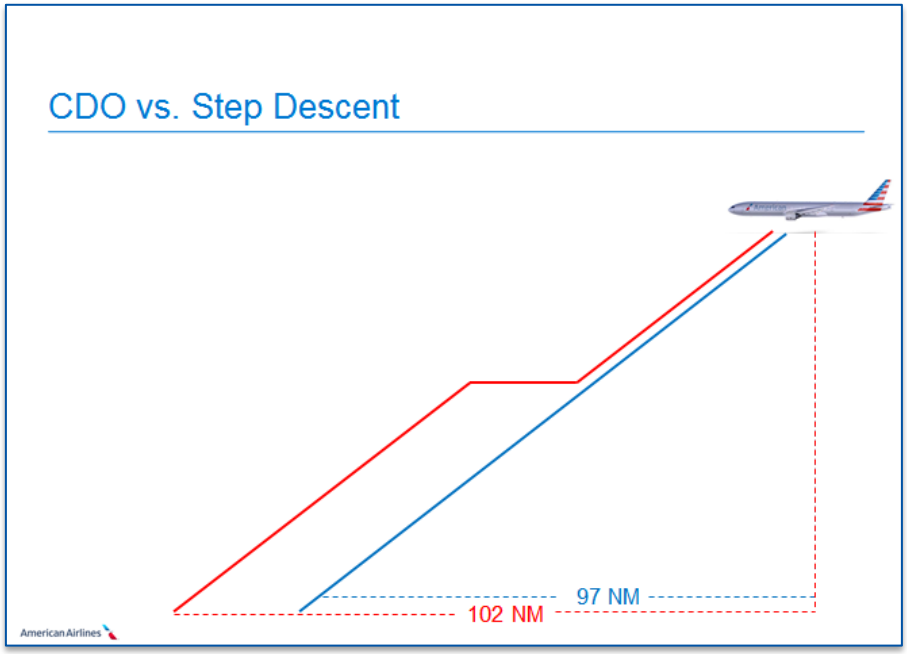
	Time (min)	Fuel (lbs)	Dis (NM)
CDO Descent	17.2	1188	96.7
Step at FL190 for 1 min	20.9	1967	102.0

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



The findings demonstrate savings on an A319 of $60,000 annually on fuel alone and a <u>whopping</u> $120,450 on a B777

Public vs. Private Benefits

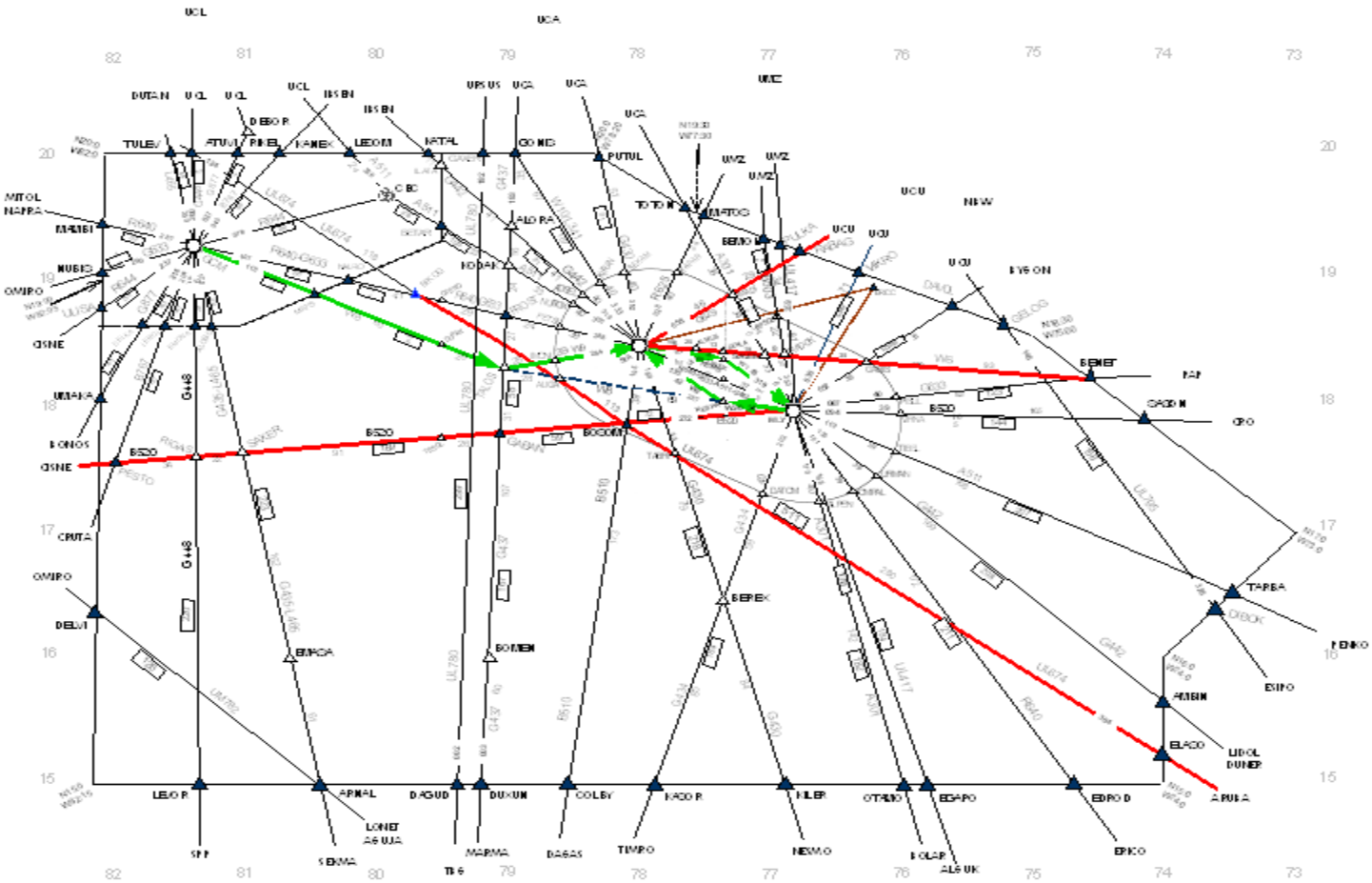
- The benefits of noise and air quality protection are borne by everyone, including those that didn't play any role in those activities.
- ANS restructuring & Fuel savings, however, accrues a direct private benefit to the airline and the environment through fuel savings and Co2 reduction.

Jamaica as a change agent

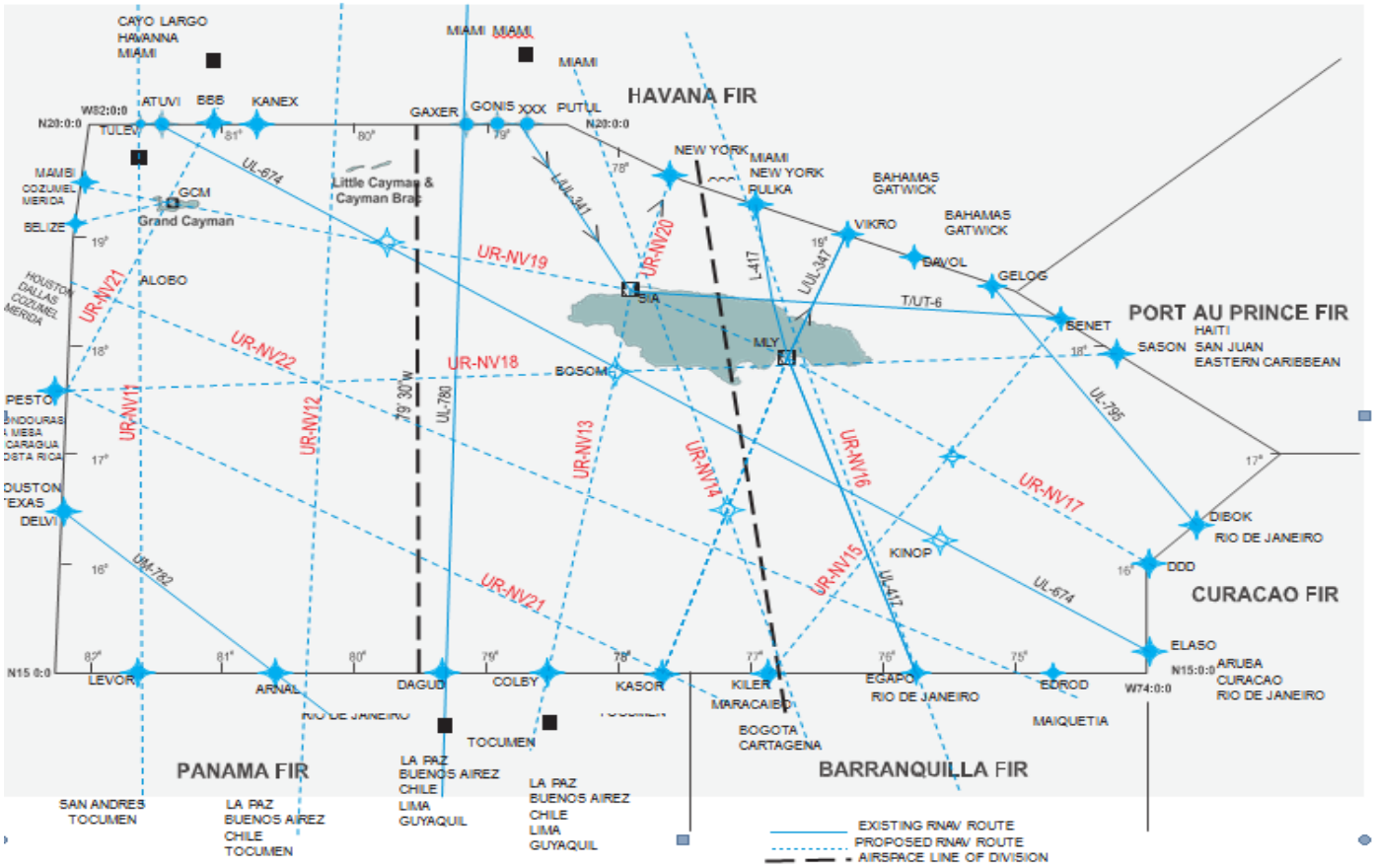
The surest way that we can help to protect the future population is to recognize the role of self interest in human decision making, and exploit all measures to partner and **collaborate**, globally, in the development and effective implementation of economically feasible (and sometimes profitable) measures to reduce Aviation's environmental footprint.

This requires emphasis on route structure changes including RNAV Routes, CDO, RNP arrivals & CCO implementation in our airspace and airports

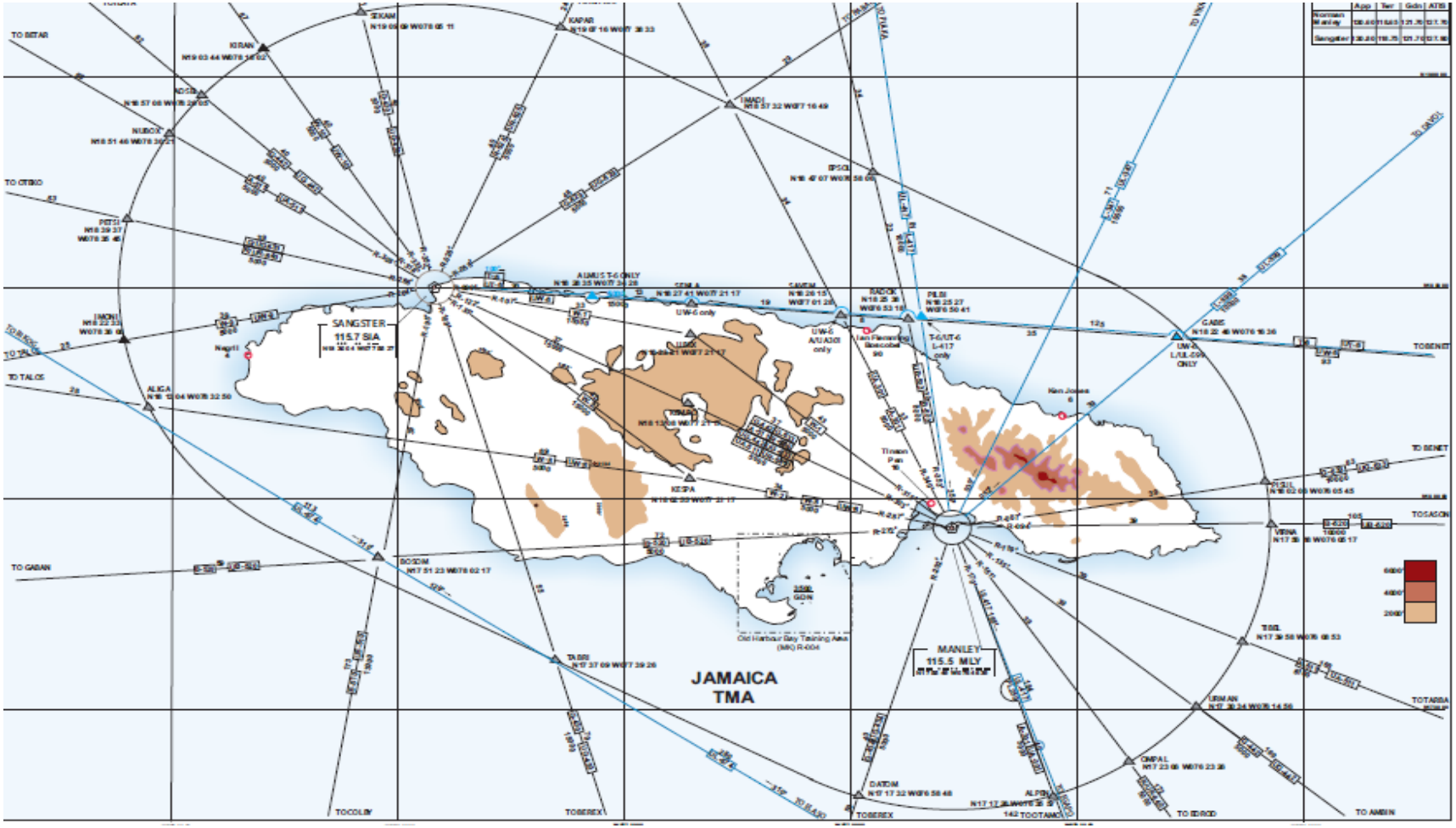
Current Route Structure



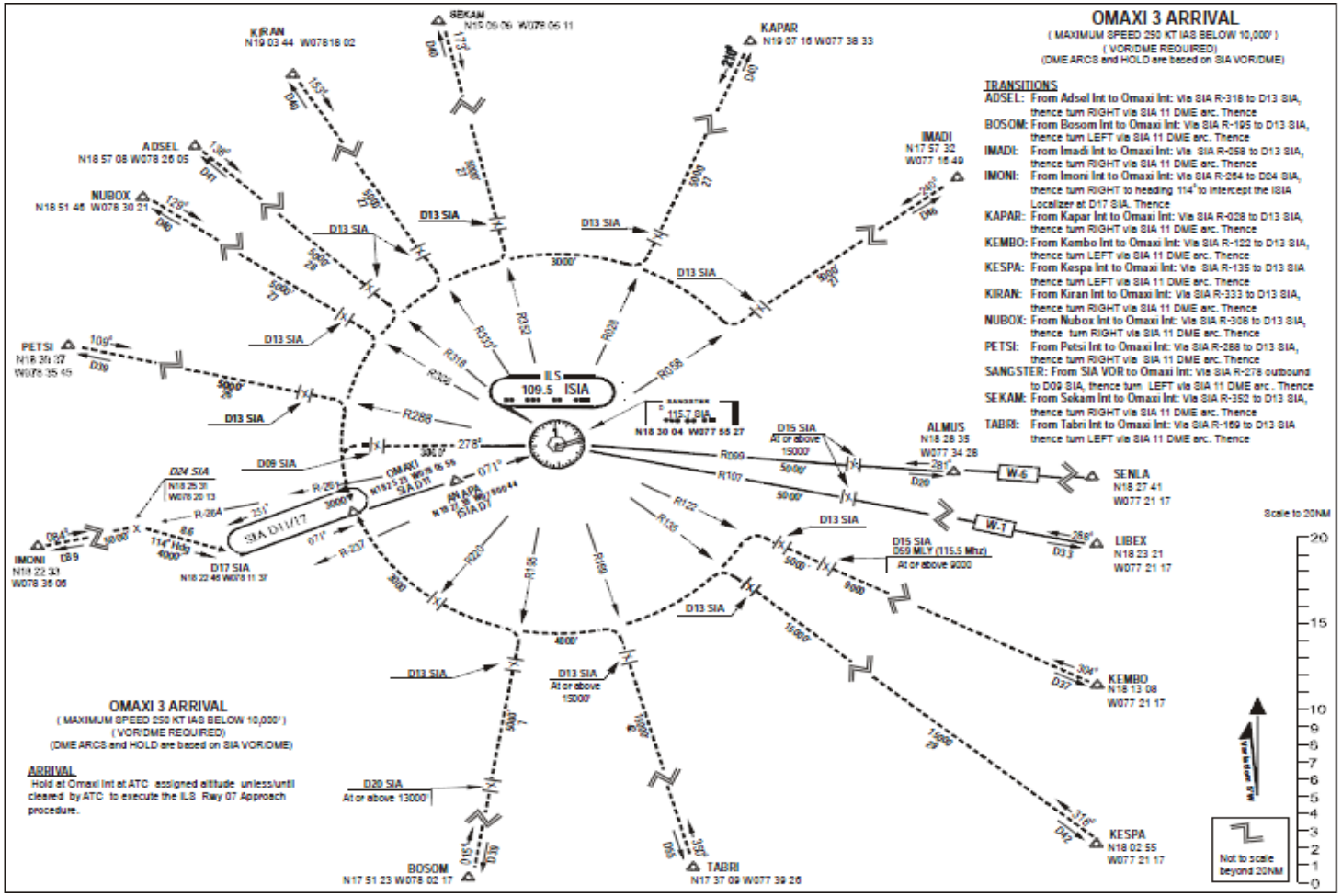
The Future with RNAV Routes



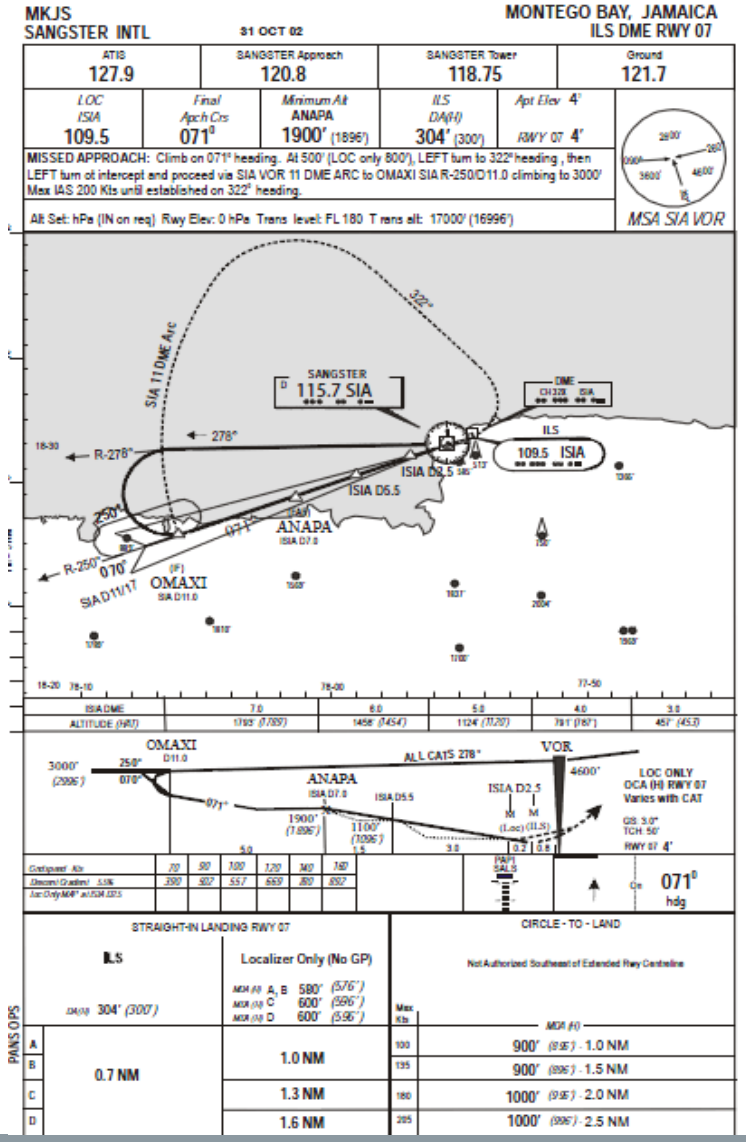
Current Jamaica TMA



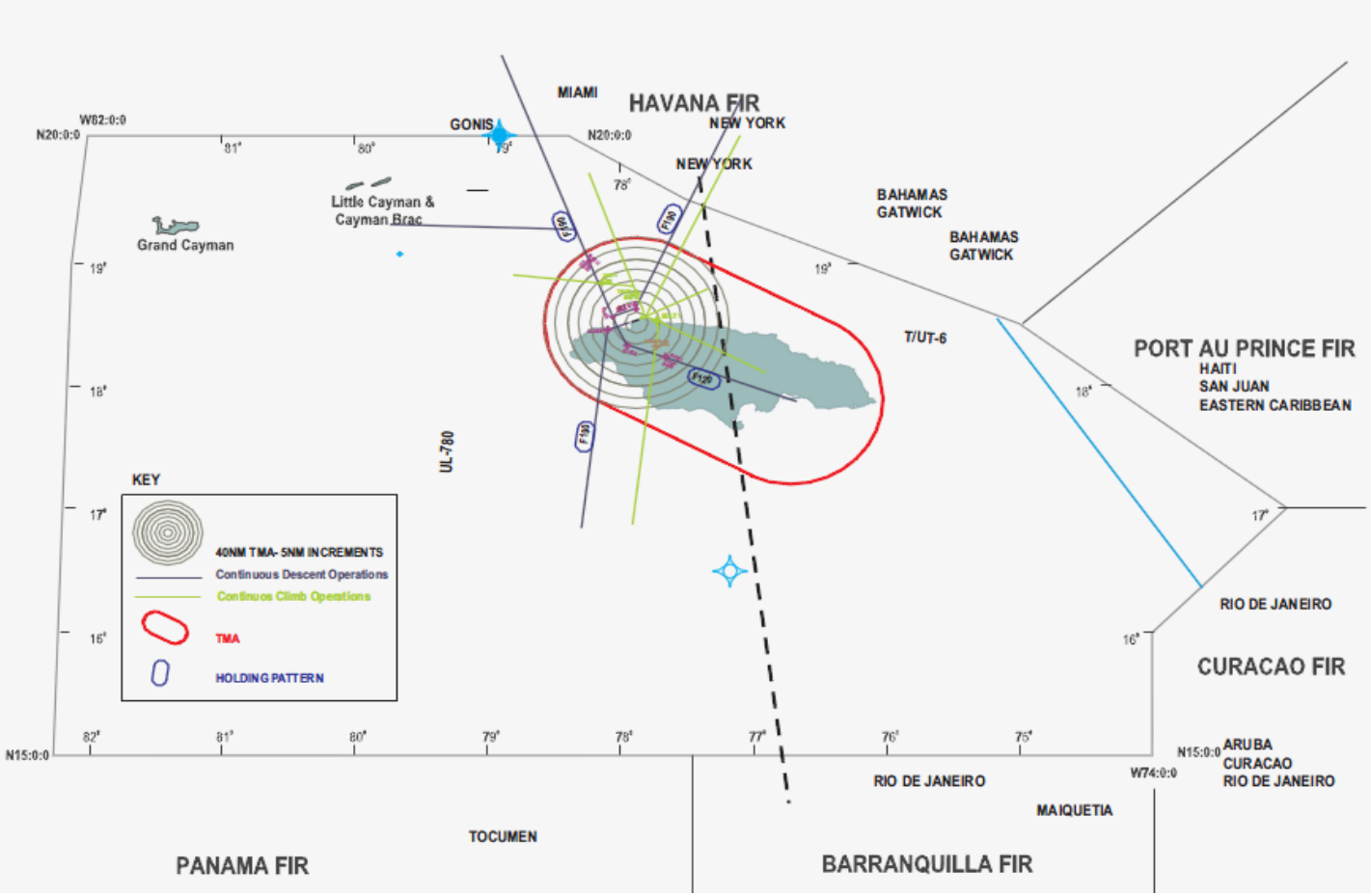
Conventional STAR

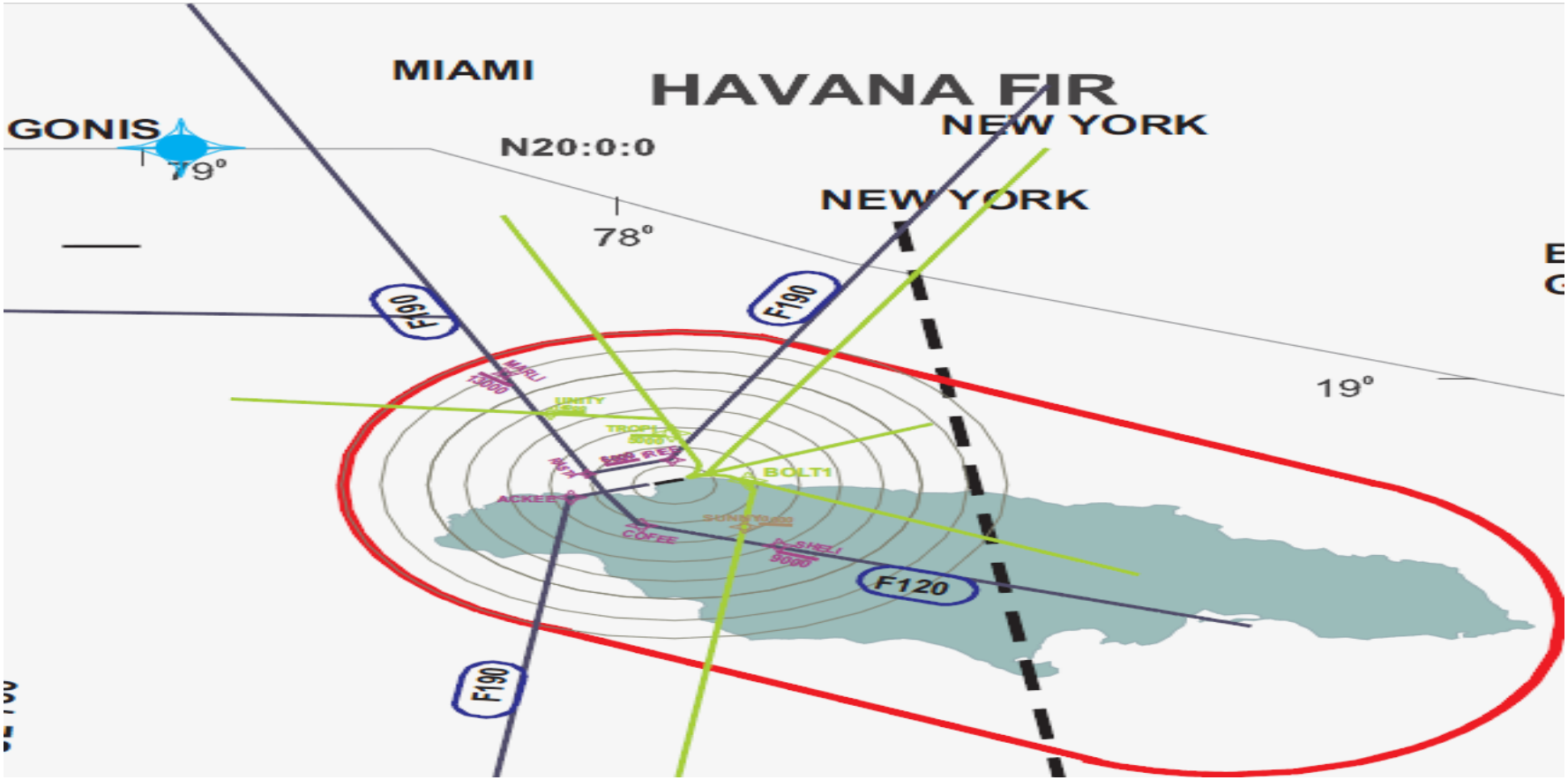


ILS DME APPROACH RWY 07 SANGSTER



Future TMA using Concept of CDO& CDO's




MIAMI
HAVANA FIR
GONIS
79°
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NEW YORK
NEW YORK
78°
F190
F190
19°
BOLT1
COFEE
F120
F190

Strategy

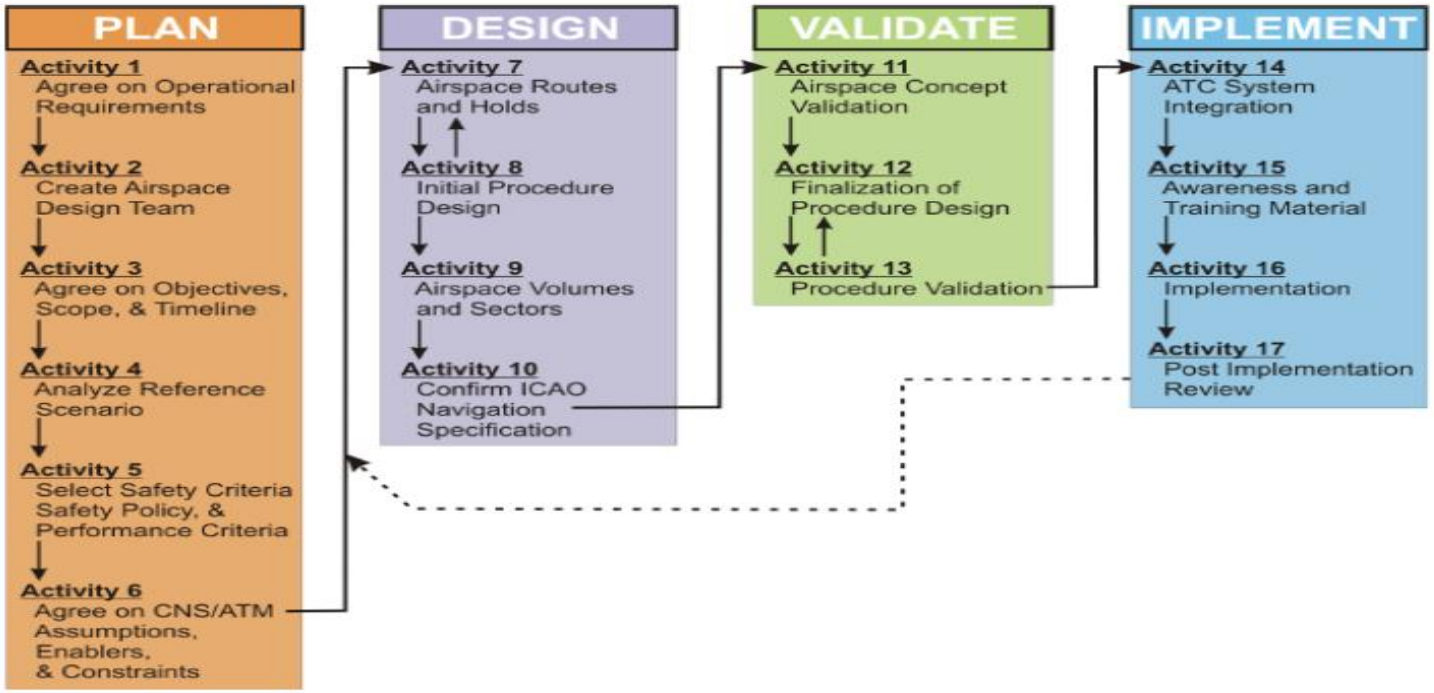
PLAN

DESIGN

VALIDATE

IMPLEMENT

National Action Plan



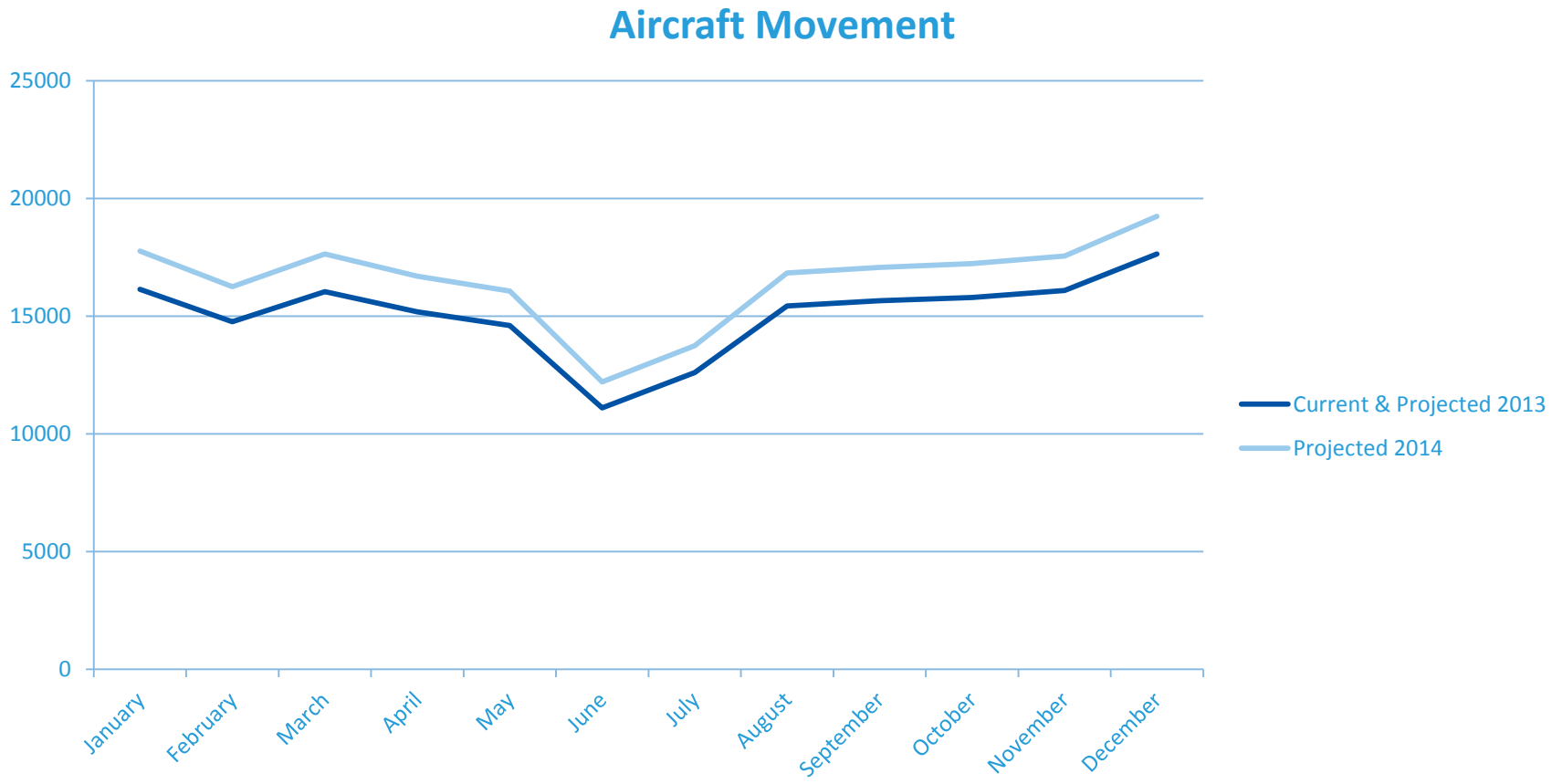
Priority Focus Areas

- Fuel Savings and Emission Reductions
- Renewing our aging technology
- Introducing ASBU, PBN & RNP procedures
- Introducing RNAV routes where necessary
- Aircraft Noise Certification
- Introducing ADS-B surveillance
- Introducing CPDLC & AIDC
- Introducing gate hold where necessary to reduce emissions from aircraft at holding point

Scenario

- Aircraft mix- A320 , A330, B737, B752,B744, B763, C560, C650 , Cessna, helicopters, etc.
- RWY 07/25 main runway in use
- STAR's and SID's – RNAV, RADAR, ILS, VOR/DME
- Noise Abatement procedure (Hotels)

Current Traffic & proposed Growth



Issues

- CDO & CCO not implemented to benefit airlines, ATC & Environment
- Challenge with aircraft on arrival from MKJP or the East coming overhead the VOR to land at MKJS and crossing Traffic departing MJKS to KJFK and Europe
- Complaints from hotels close to arrival and departure due to aircraft noise

Most Significant Fuel Savings (ICAO Circular 303)

- "The most significant fuel saving is likely to come from improvements to CNS/ATM systems.

- CNS/ATM will permit more direct routings and the use of more efficient flight conditions such as optimum altitude and speed, and flexible flight plan routings. "

Domestic Plan

- Developed National Environmental Action Plan pursuant to ICAO resolution A37-19.
- Developed comprehensive plan and framework for modernization of CNS/ATM systems.
- Developed training programmes under CNS/ATM modernization which incorporated environmental best practices

National Action Plan

- Based on Performance Based Navigation (PBN).
  - RNAV 5 implementation.
  - Route re-alignment, establishment or removal as necessary.
  - RNAV(GNSS) Approach Procedures with Vertical Guidance.
  - Continuous Climb Operations to cruise level and speed
  - Continuous Descent Operations.
- Supported by modern CNS/ATM infrastructure.
- Performance monitoring using ICAO Fuel Savings Estimation Tool (IFSET)

At the gate:

- Unnecessary fuel on board means unnecessary additional aircraft weight
- ATC need to notify pilots if delay in start up or push back is expected.
- This will help pilots to plan for GPU or APU use.
- ATC can also help in making choice for the shortest taxi route to runway with rolling line up.
- Runway direction matched to departure direction, if possible

Factsheet

It takes fuel to carry fuel!

- Each 1000kg unnecessary fuel requires burning another 300kg fuel to carry it on a 7 hour trip

Factsheet

Aircraft engines are designed for flying

- Each 1 min taxi burns 3-10kg fuel
- **A340** can save 140kg fuel by taxiing for 8 min on 1 engine.

Factsheet

Auxiliary power unit (APU)

- APU costs 30 to 50 times more than ground power

APU: Engines

- A 1-minute anticipation in each A.P.U. start adds up to major fuel savings (2000 to 4000 kg per year).
- Each minute additional flight time in 'wrong-direction' after take-off equals fuel for 9 minutes of taxi time.

Planning

- Activity 1- **Agree on Operational Requirements**-
  - Safety , Capacity , Efficiency , Environment or Access
- Activity 2- **Create Airspace Design team**-
  - (ATC, Regulator, Procedure Designer and other Stakeholders)
- Activity 3- **Agree on Objectives, Scope and Timelines**
- Activity 4- **Analyze the reference Scenario-**
  - Performance indicators and Benchmarks- (gauges how the airspace is currently performing, what works well and what could be improved.)
- Activity 5- **Select Safety Criteria, Safety Policy and Performance** (qualitative and/ or quantitative)
  - laid down in the safety policy. addresses issues such as Safety Management Systems, Safety Assessment Methodologies and evidence to show that the airspace concept is safe.
- Activity 6- **Agree on ATM/CNS assumptions, enablers and constraints (current and future)**-
  - Traffic Analysis, ATC Systems, Surveillance and communications means/coverage.

Design

- Activity 7- **Airspace Routes and holds-**
  - Iterative Process: Design Routes, Initial Procedure Design Analysis and define the airspace volumes and sectorize these, if necessary. The composites are Arrivals, Departures, Transitions, VFR & Military
- Activity 8 - **Initial Procedure Design-**
  - done concurrently with the airspace design. First analyze the design to determine the navigation performance required. Then assess fleet capability to determine if it can meet the required navigation performance of the intended design. The NAVAID Infrastructure is also considered, if it can provide the coverage required by the intended design. The proposed routes and holds are then analyzed to determine if they are feasible , given they are governed by the previous requirements and that of appropriate spacing and obstacle criteria.
- Activity 9- **Design airspace volumes and sectors-**
  - Sectorize to manage ATC Workloads and airspace volumes. This should also be an iterative process.
- Activity 10- **Confirm ICAO NAV Specification-**
  - Review NAV Specs; Identify appropriate Navigation Specification; (RNAV 5 – en- route and terminal)

Validate

- Activity 11- **Airspace Concept and Validation**-
  - Three types: 1) Airspace Modelling 2) Real Time Simulation and 3) Fast time Simulation. The main objectives of validation are 1) to assess if the project objectives can be achieved by the implementation of the airspace design; 2) prove the ATM validity of the airspace design; 3) identify potential weaknesses and 4) prove that the design is safe and support safety assessment.
- Activity 12- **Finalization of procedure design-**
  - Design according to PANS_OPS DOC 8168 and RNP AR Design manual DOC 9905.
- Activity 13- **Procedure Validation-**
  - Verification of terrain, obstacle and aeronautical data used to support design; Validate intended use of procedure(match to conceptual design);Validate correct application of criteria; Validate flyability and human factors (charting);Flight Inspection (if required)

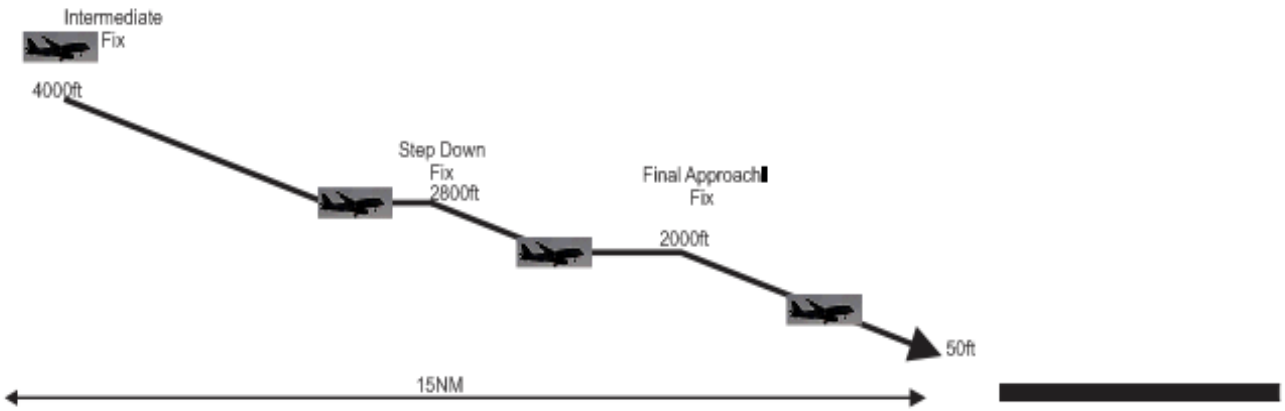
Implement

- Activity 14- **ATC System Integration-**
  - Ensure that ATC Systems are equipped to display the capabilities of the aircraft. Some of the systems impacted include the Flight Data Processor; Radar Data Processor and Situation Display.
- Activity 15- **Awareness and Training Material**-
  - Considerable training for flight crews and ATC is required especially for awareness and introduction to PBN.
- Activity 16 - **Implementation-**
  - Review all critical factors; Maintain a standard implementation planning process; Determine if the Safety and Performance criteria are satisfied; Determine if the required changes have been made to the ATM Systems and NAVAID Infrastructure; Monitor the Implementation process; Support the ATC managers should it become necessary to use redundancy or contingency procedures; Provide Support and information to ATC and pilots; Maintain a record of implementation related difficulties; Also record first aircraft to fly the procedure, the time and issues, if any.
- Activity 17- **Post Implementation Review**-

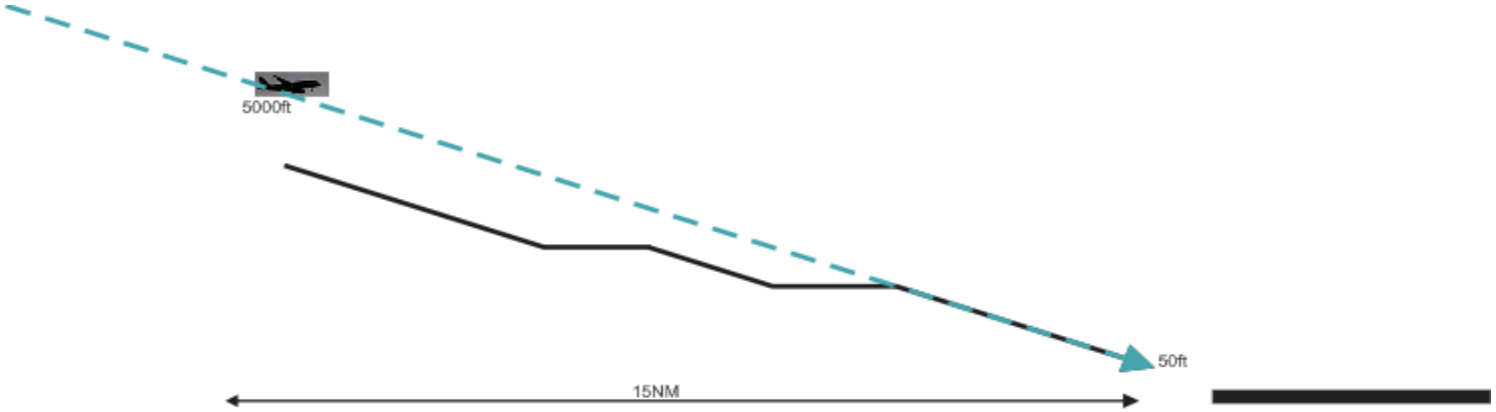
➢ Keep a log (evidence of safety assessment, objectives being met and related issues)

National Action Plan

Simplified Profile Extract of present ILS Approach



National Action Plan CDO



New Approach – CDO (Manley)

For the purposes of the scenario, which is to demonstrate fuel savings, a section of the Approach was overlaid with continuous descend methodology which assumes that a continuous 3 degree descent from the 15 nm at an altitude of 5000 feet to the missed approach point. This scenario saw fuel savings of an estimated 28.7% and 105800 Kgs in Co2 emissions for Manley

Solution

- Utilize aircraft performance capabilities
- Redesign the TMA procedures
  -RNP APPROACHES
  -Continuous Climb and Descent Operations
- Crossing Restrictions
- Implement Holding Patterns at Fuel Efficient Altitudes
- Reduce ATC Workload – Less Communication
- Mitigate Environmental Issues(NOISE)

Plan (Regional)

- Establishment of Standing Committee on Environmental Protection & en-route restructuring under the Caribbean Aviation Safety and Security Oversight System (CASSOS).
- Assisted other CASSOS Member States in refining existing environmental plans.
- Coordinated Member States' action plans to ensure that fuel savings are carried out throughout the region.

PREACH

- Jointly sponsored Fuel Efficiency Workshop with International Air Transport Association.
- Held in Kingston, Jamaica and Port of Spain, Trinidad and Tobago.
- Attracted attendance from Air Operators (Commercial and General Aviation), Air Navigation Service Providers, Aerodrome Operators and Contracted Agents, etc.
- FEGA principles and efficient & flexible flight planning introduced to Air Transport Operators

Regulate

- Introduced regulatory measures in December 2012 to support ANSP planning and implementation efforts.

- Regulatory measures included:
- Aerodrome Collaborative Decision Making (A-CDM)
- ANSP adoption of commercial best practices to support modernization planning and implementation.

- Air Operator Noise Certification requirements.

Activate the solutions

- Phased implementation commencing in 2014.
- New Microwave radio network (2013-2014)
- Two new Towers at Sangster and Kingston-2014
- New mode “S” SSR radars - 2014
- New Automation in ATC Centre – 2015
- AIS to AIM 2015/2016 (includes, AIM WxxM)
- CPDLC - 2016
- ADS-B - 2017

How did we contain costs?

- Research and development costs were minimized by utilizing guidance material and planning activities already under-way by ICAO & IATA.
- Use of tools such as IFSET & IATA fuel tool minimized information technology and monitoring costs.
- Maximum use of in-house expertise.

TRAINING - CAATI

- Recurrent training being done for ATCs in CDO & CCO Operations
- Curriculum for new ATCs includes
- CDO/CCO
- RNP issues
- New Automation in ATC Centre
- AIS to AIM
- CPDLC
- ADS-B is on Trial – moving from 30% hits to 70% at this time for ADS-B equipped aircraft in the FIR

- 5th NGAP and TRAINAIR PLUS Regional Symposium Montego Bay, Jamaica from 5 to 7 February 2013.
- A total of 306 people from more than 20 States came together to exchange views, best practices and
- experiences in aviation training, as well as to network and enhance collaboration opportunities.
- Jamaica Civil Aviation Authority (JCAA) and the Civil Aviation Authority Training Institute (CAATI) jointly hosted the event.
- Indonesia, Turkey next in South Africa 10 12 December 2013

THANK YOU