Implementation of Radar Data Processing and Exchange

Automation System and Integrated Telecommunications for Air
Navigation Services/System-Wide Information Management (SWIM) Workshop
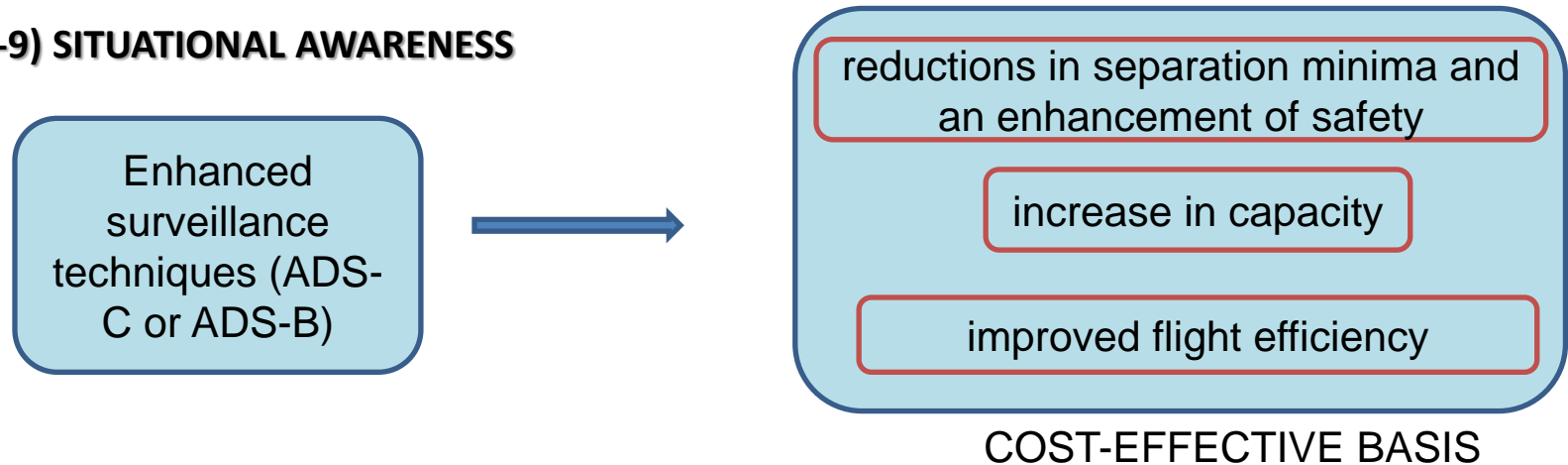(AUTO/SWIM)
Mexico City, Mexico, 21 to 24 April 2014

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Agenda

- Overview of Implementation References
- Radar Data Processing and Exchange implementation
- Status of Radar Data Exchange implementation

Overview of Implementation References: GANP-third edition

(GPI-9) SITUATIONAL AWARENESS

Enhanced surveillance techniques (ADS-C or ADS-B)

→

reductions in separation minima and an enhancement of safety

increase in capacity
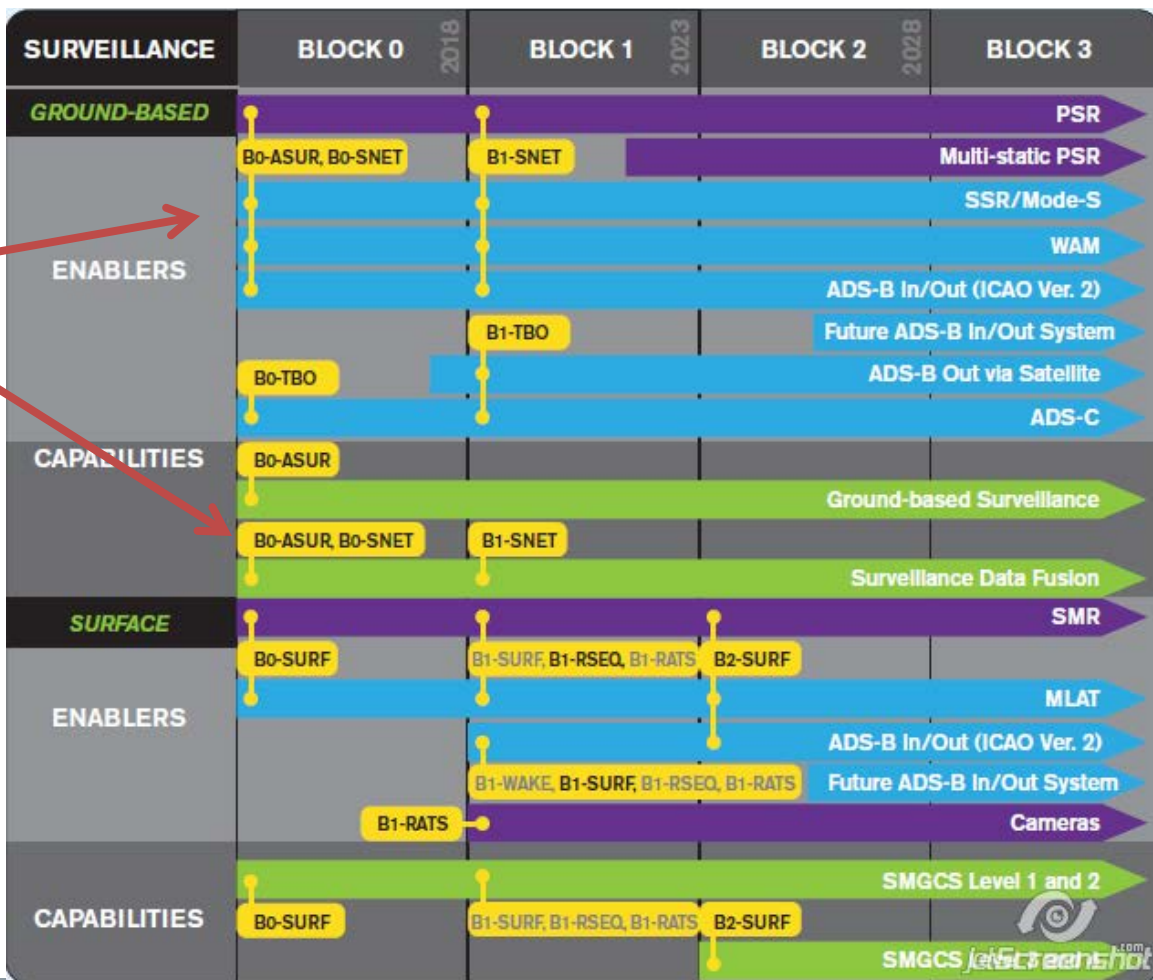
improved flight efficiency

COST-EFFECTIVE BASIS

- ✓ surveillance to areas where there is no primary or secondary radar
- ✓ in airspaces where radar is used, enhanced surveillance can bring further reductions in aircraft separation minima
- ✓ in high traffic density areas improve the quality of surveillance information (ground/ air), increasing safety levels.
- ✓ quality assured electronic terrain and obstacle data necessary to support the ground proximity warning systems with forward looking terrain avoidance function as well as a minimum safe altitude warning (MSAW) system

Overview of Implementation References: GANP-4th edition

Radar Surveillance is a baseline element for ASBU implementation such as B0-ASUR module

Use of some down-linked aircraft parameters (DAPs) and 25 ft altitude reporting to improve radar tracking algorithms.

Overview of Implementation References: CAR/SAM ANP

Sharing of radar data: In order to facilitate the implementation of surveillance radar service in a safe, efficient and cost beneficial manner, CAR/SAM States should consider the possibility of bilateral/multilateral arrangements for sharing of radar data between the ATC centres in neighboring States and the use of a common radar data format and a common communication protocol for radar data exchange in the CAR/SAM regions to be adopted by GREPECAS.

Surveillance Systems (CNS TABLE 4 A) ➔ Regional planning for SSR/PSR and ADS systems.

Overview of Implementation References: GREPECAS

To implement the **secondary surveillance radar** in Mode S, is essential to study and consider the areas in which the installation of this type of radar might be justified.

Initial considerations to implement SSR in Mode S:
o ensure the application of the assignment and application of aircraft addresses of 24 bits, provided by ICAO to the States (Annex 10, Vol. III, Appendix to Chapter 9);
o implementation of SSR in Mode S should be given priority in the enroute and terminal areas with high traffic density; and
o determine the number of aircraft equipped with transponder SSR in Mode S

Overview of Implementation References: GREPECAS

CONCLUSION 12/48 SAC-ASTERIX CODE ASSIGNMENT PLAN FOR THE CAR/SAM REGIONS
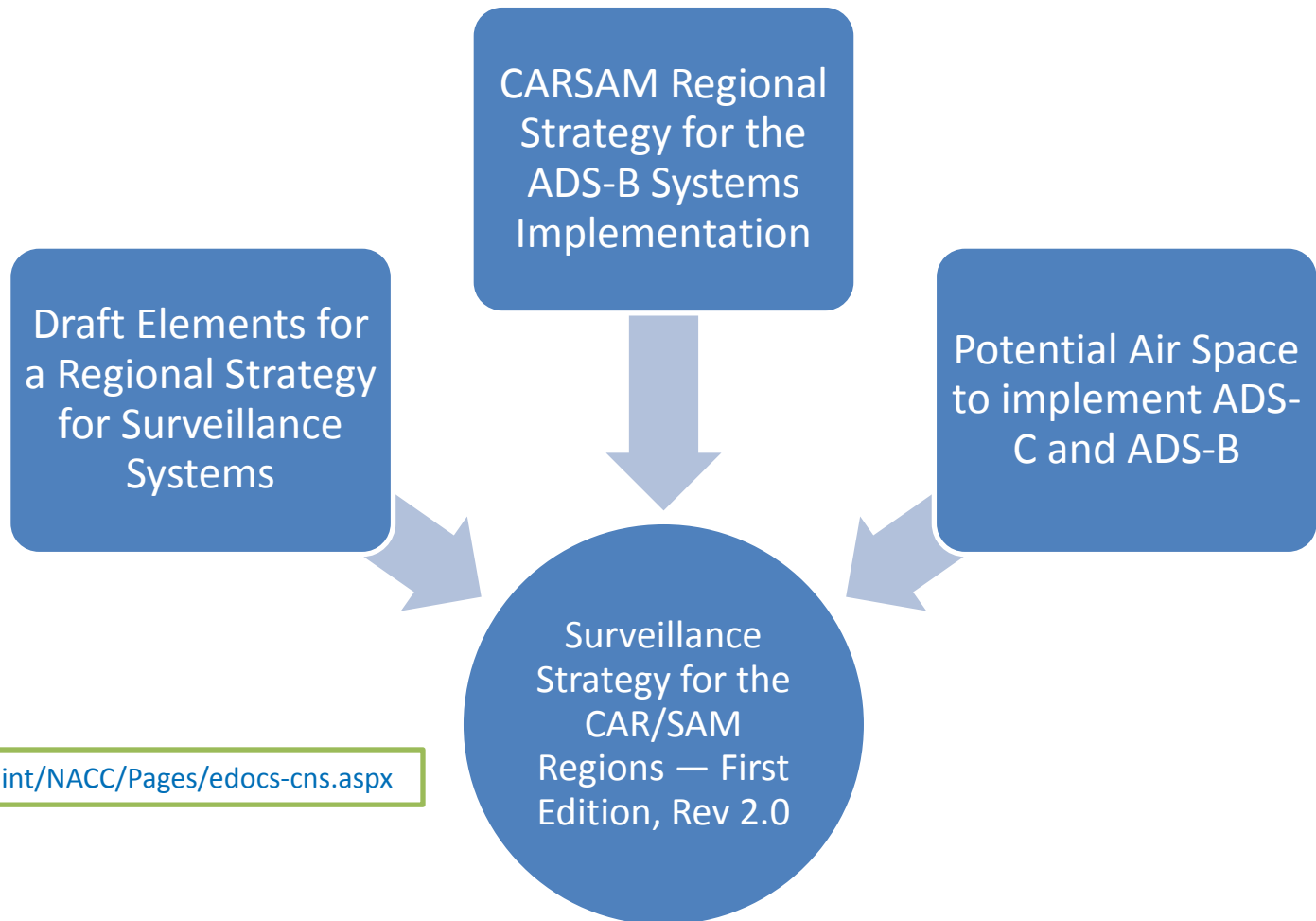
That States/Territories/International Organizations use the corresponding SAC-ASTERIX codes assigned in order to establish the identification of radar facilities to be used for radar data exchange.

CONCLUSION 12/49 GENERAL CRITERIA FOR THE IMPLEMENTATION OF SSR DATA EXCHANGE

That States/Territories/International Organizations, upon planning SSR data exchange, take the following into consideration:
a) send the ICAO NACC and SAM Regional Offices boundary SSR coverage up to FL 250, for regional dissemination;
b) extensively use the communications facilities available in intra/inter regional networks; and
c) coordinate pertinent technical-institutional aspects at bilateral or multilateral meetings.

Overview of Implementation References: GREPECAS

CARSAM Regional Strategy for the ADS-B Systems Implementation

Draft Elements for a Regional Strategy for Surveillance Systems

Potential Air Space to implement ADS-C and ADS-B

Surveillance Strategy for the CAR/SAM Regions — First Edition, Rev 2.0

http://www.icao.int/NACC/Pages/edocs-cns.aspx

Overview of Implementation References: GREPECAS

Surveillance Strategy for the CAR/SAM Regions , Rev 2.0

✓ Section 1: general considerations
✓ Section 2 the Surveillance Operational Scenario Evolution for short (2009-2010), medium (2010-2015) and long terms (2015-2025) for En-Route and TMA Airspace, Aerodrome Operations and Aircraft Systems.
✓ Section 3 the Surveillance Infrastructure Evolution required to cope with the foreseen operational environment and specifies a tentative action plan

Short term (until 2010)
Independent surveillance systems will be predominant in CAR/SAM Regions (ex. SSR, MSSR radars).
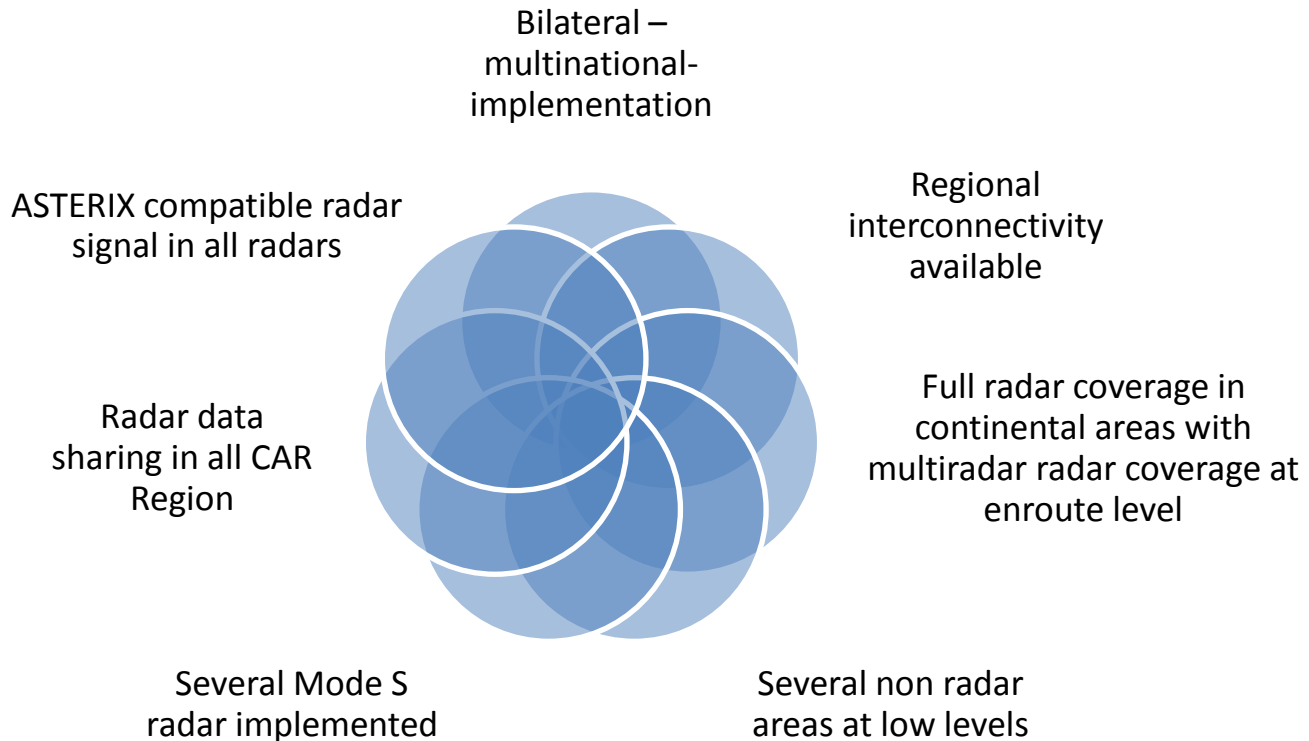
Medium term (2010-2015)
From 2010 onwards, the provision of Aircraft Derived Data to ground stations to support TMA and En Route operations is envisaged, following the increasing rate of Mode S equipped aircraft that will be able to transmit ADS-B messages (ADS-B out): ground Surveillance (ADS-B out) in a non-radar environment (ADS-B-NRA), in a radar environment (ADS-B-RAD) and Airborne Derived Data (ADS-B-ADD). ADS-B-out is expected to reach full operational capability status in 2015.

Long term (until 2015-2025)
Airborne Surveillance (ADS-B-in, possibly supplemented by TIS-B) including: Airborne situational awareness (ATSA-AIRB), visual separation on approach (ATSA-VSA) and In-trail Procedure in oceanic airspace (ATSA-ITP). ADS-B-in for air traffic situational awareness is expected to be launched after 2015.

Radar Data Processing and Exchange implementation

Bilateral – multinational- implementation

Regional interconnectivity available

Full radar coverage in continental areas with multiradar radar coverage at enroute level

Several non radar areas at low levels

Several Mode S radar implemented

Radar data sharing in all CAR Region

ASTERIX compatible radar signal in all radars

Status of Radar Data Exchange implementation

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Table CNS 4 – Surveillance Plan- MSSR/MSSS	☑
Agreements- bilateral	☑
Ensure RTQM and Performance/ Surveillance reliability and integrity criteria	**On-going**
Notification of surveillance identifier (SI) codes/ Interrogator identifier (II) codes	**On-going**
Automation – Data Processing	☑
Telecommunication media	☑
Radar data exchange with SAM Adjacent FIRs	**On-going**

Status of Radar Data Exchange implementation

Radar Coverage in main Traffic Flows

Coberturas Radar FL200

Status of Radar Data Exchange implementation

Radar Coverage in main Traffic Flows

Status of Radar Data Exchange implementation

Radar Coverage in main Traffic Flows
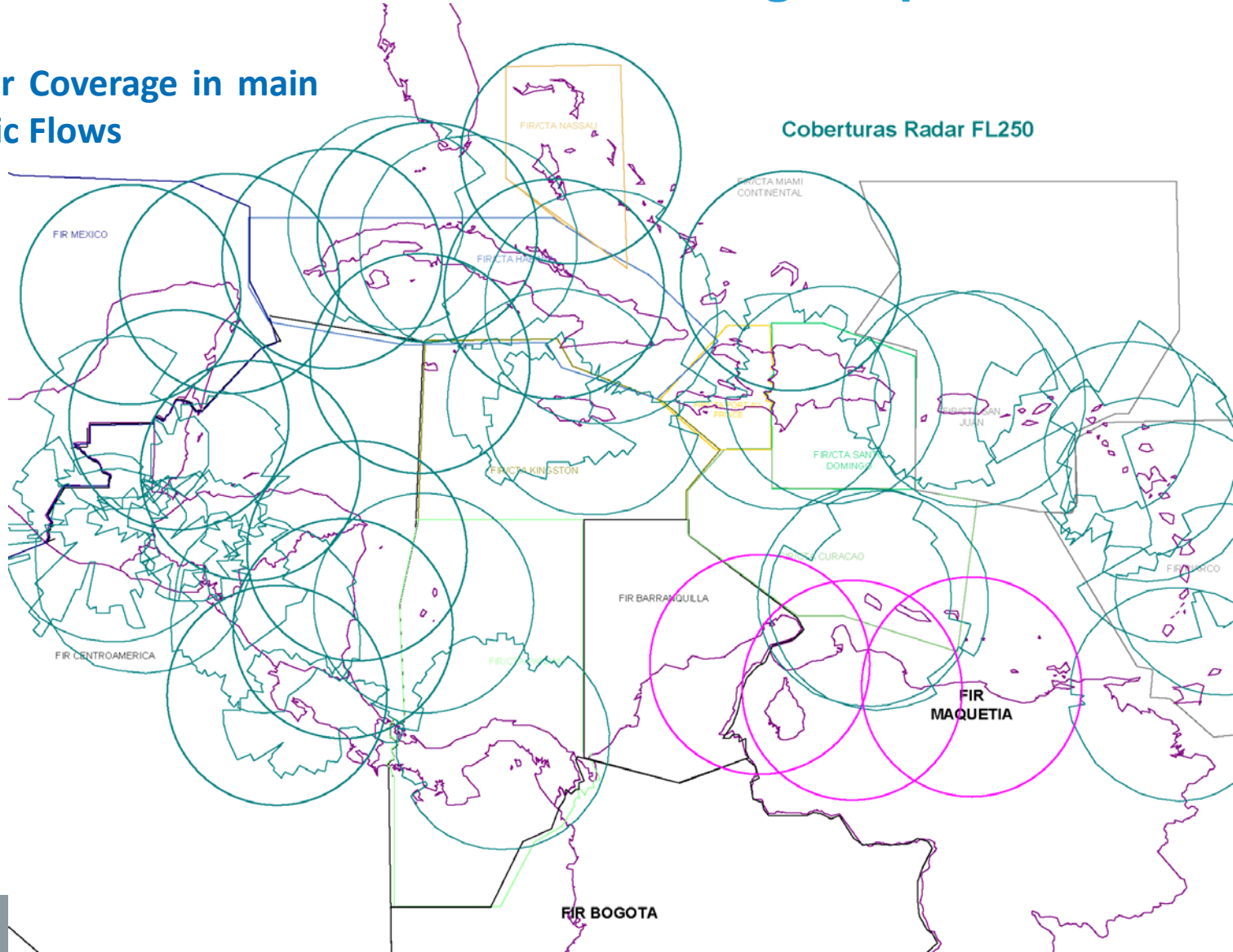
Status of Radar Data Exchange implementation

- Radar data sharing implemented through the E/CAR AFS network

- Trinidad and Tobago provides and hosts the radar data server for the sharing of radar data in the Eastern Caribbean
  - The radar data from Martinique and Guadeloupe radars are presently available at the Piarco ACC in addition to the Trinidad and Tobago radar data.
  - Through multi sensor fusion the Piarco ATM system will process and distribute via the E/CAR AFS network a seamless composite surveillance image to the E/CAR states.

- Radar Data Display implementation in E/CAR States – system tracks /E/CAR Radar Data Sharing Ad-hoc Group)
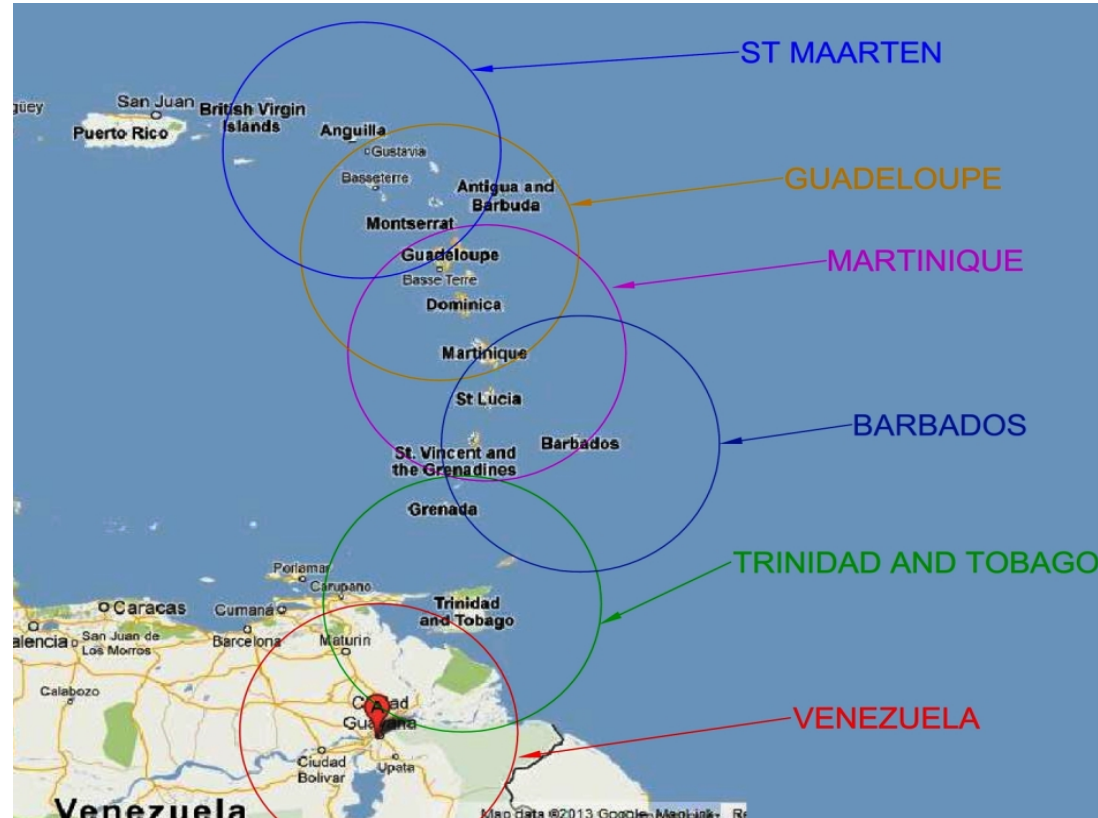
Status of Radar Data Exchange implementation: Operational

✓ Within Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, COCESNA)

✓ Mexico / Central America

✓ Central America/ Panama

✓ Mexico / USA

✓ Cuba/ Central America

✓ French Antilles / Saint Lucia / Trinidad & Tobago

Status of Radar Data Exchange implementation: On going

➢ Jamaica/Central America: testing

➢ Cuba/ Jamaica: testing

➢ Sint Maarten/ Trinidad and Tobago: Pending
  - ➢ several teleconferences
  - ➢ Action Plan agreed

➢ Cuba/Mexico: Pending agreement

➢ Barbados/Trinidad & Tobago: Pending

➢ Antigua Radar reactivation: Pending

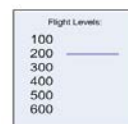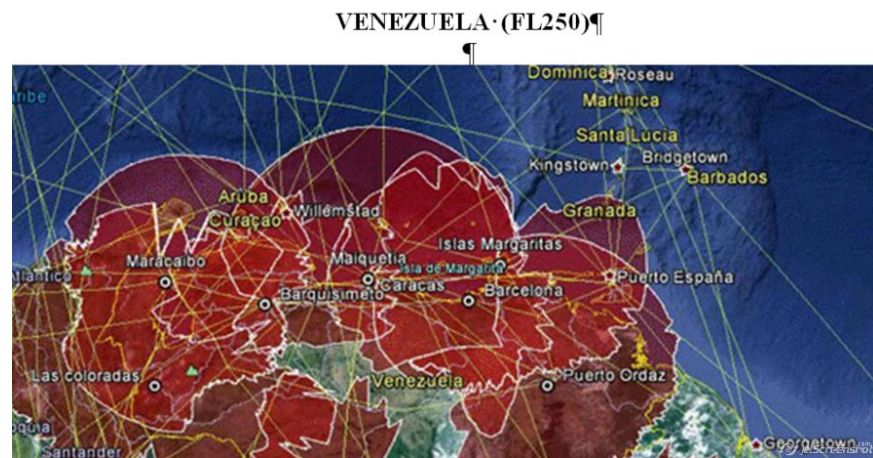➢ Dominican Republic/Curacao: Pending

Status of Radar Data Exchange implementation: On going

➤ Curacao/ Venezuela: Pending
- ➤ 2 teleconferences
- ➤ Action Plan agreed

VENEZUELA·(FL250)¶

➤ Curacao/ Trinidad and Tobago: Pending
- ➤ 4 teleconferences
- ➤ Action Plan Agreed

Status of Radar Data Exchange implementation: Future considerations

Mode S Radar implementation:

- ✓ 7 SSR Mode S Radar in Central America
- ✓ 1 SSR Mode S in Trinidad and Tobago
- ✓ Several SSRs in Mexico

ADS-B implementation (target 2018):

- ✓ Cuba
- ✓ Jamaica
- ✓ Trinidad and Tobago
- ✓ Mexico
- ✓ Central America

ADS-B

Ground Station