Radar Data Display Project
Air Situational Awareness
ICAO E/CAR/CATG

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www.thalesgroup.com
Thales is trusted by 170 countries

- TopSky: 360
  - ATM Solutions
  - 700 Radars
  - 7,000 Navaids

- Over 140 Air Traffic Control Systems
- Over 20 Traffic Flow Management Systems
- Over 50 Tower Systems
- Over 3,000 Controller Positions
- Over 1,800 ADS-B & Multilateration Equipment
- Over 20 AIM Systems

2 out of every 3 planes take-off and land safely thanks to Thales.
### Thales Air Traffic Management Solutions

#### Automation
- ATC Centres
  - TopSky - ATC
- Simulation/Training
  - TopSky - Simulation
  - ScanSim
- Airport Towers
  - TopSky – Tower
  - ATALIS
- Flow Management & traffic sequencing
  - TopSky – ATFM
  - Maestro (AMAN/DMAN)
- Aeronautical Information Management
  - TopSky – AIM

#### Communication
- Aeronautical Messaging
  - TopSky - AMHS
- Air/Ground Datalink
  - TopSky - Datalink
  - DL-FEP, Pro-ATN
- 3rd Party Products
  - VCCS
  - VHF/UHF Radios

#### Navigation
- Conventional Navaids
  - MLS 480
  - ILS 420
  - CVOR 431 & DVOR 432
  - DME 415/435
  - NDB 436
  - TACAN 551 & TACAN 553

#### Surveillance
- Radar
  - STAR NG (S-Band)
  - TRAC 2000N (L-Band)
  - RSM 970S (Mode S)
- ADB-B & Multilateration
  - MAGS (ADS-B)
  - MAGS (MLAT/ WAM)
- FOD Detection System
  - FODetect

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**Enriched portfolio to help customers optimize their operations**
Presence in Latin America and Caribbeans

CNS/ATM

- 120 radars
- Local Production Unit
- 13 civil and military Radars
- 4 APP + 1 FIR

ATM (TopSky family)
Surveillance (Radar/ADS-B, MLAT...)
Communication/ Navaids
History of the Radar Display project

**Project**

- Improve Situational Awareness through Surveillance Data Sharing in Piarco FIR, with a first phase for the implementation of Radar Data Display

**French DGAC activities first phase**

- “The French Civil Aviation has donated and installed eleven (11) computers (IRMA) as part of the Phase 1 implementation of Radar Data Display. The computers process only the French radars exported from Piarco over the E/CAR AFS Network, and are to be used by States to gain experience in a surveillance environment and for situational awareness.” (progress report of the 6th Technical Group E/CAR/NTG and 4th Surveillance Data Sharing Group E/CAR/RD)
- This has given very good results but is lacking the integration of other radars/sensors than the French ones

**Operational Requirement**

- Eastern Caribbean islands required situational awareness (overflight, TMA/CTR) using all available sensors in the region will not allow low altitude coverage for each island, in a second phase ADS-B or local sensor might available
Operation Requirements and Assumptions

### Operational Requirement

- Eastern Caribbean islands required situational awareness (overflight, TMA/CTR) using all available sensors in the region will not allow low altitude coverage for each island, in a second phase ADS-B or local sensor might available

### Surveillance Data sharing

- Trinidad & Tobago could provide Asterix Category 62 data from their RDPS, plus NOTAM and FPL through the ECAR network
- Asterix Cat 62 includes mini flight plans

### Radar Data Display, Air Situational Awareness

- A Non Safety Critical system able to display information received from Cat 62
- Possibly capable to display data from a local sensor (after being processed by TTCAA RDPS and thru ECAR network or directly)
Thales proposed solutions

A - A simplified Automation System
- Standalone solution based on TopSky-ATC Automation Solution already installed in the region
- This would allow easy upgrades toward a solution to be used for “control”

B - An Air Situational Awareness
- Web-based solution based on ECOsystem, Collaborative Air Traffic Flow Management Solution and using Thales Cloud through the internet or the ECAR network

Options and future enhancements
- Depending on the selected solution, recording/replay, local sensors management, control features, weather display, Collaborative and CDM features …
A - ECOsystem functions

Web based HMI, Using Thales Cloud, Consolidation of external data sources for flight plan and surveillance

- FAA, Flight Aware, Satellite ADS-B
- Use or not of SWIM FAA if TTCAA already connected

Display Surveillance data

- Callsign, FL, Speed

Display past trajectories based on surveillance

Display estimated information based on flight plans

- Flight list, Planned trajectory and Vertical profile

Communication

- Chat between users

Possibility to use ECAR Network

- Either as a backup display only correlated tracks (from Cat 62 mini flight plans)
- Or as the only/main system
A - ECOsystem Architecture with Thales Cloud and ECAR network

ECOsystem receives raw data via VPN

ECOsystem backend receives surveillance data based on ASTERIX format (62) and flight plans

ECOsystem backend processes all the information and possibly consolidate with others inputs (Flightaware, ADS-B satellite, Weather ..)

ECOsystem frontend build data collection to be displayed on local HMI

As a backup and in case of communication failure, Thales Cat 62 transcoder interfaces with local HMI display thru ECAR network
A - ECOsystem Architecture using SWIM FAA

ECOsystem receives raw data via VPN

ECOsystem backend receives surveillance data based on ASTERIX format (62) and flight plans

ECOsystem backend processes all the information and possibly consolidate with others inputs (Flightaware, ADS-B satellite, Weather ..)

ECOsystem frontend build data collection to be displayed on local HMI

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SWIM FAA

Thales Cloud datacenter

Import SWIM data

Update HMI data

Thales backend

Thales frontend

Internet

HMI Local Display

HMI Local Display

HMI Local Display

Parco Local dataserver

Thales Cat 62 transcoder

TCAAA Local datacenter

Use as main flow

Use as backup

Use as main flow

Use as backup

Export data

ECAR Network
B - TopSky-ATC functions

Air Situation Awareness and Display
- Display Cat 62 Surveillance information from TTCAA RDPS (correlated with mini Flight Plan)

Monitoring
- Use of Cat 63 for TTCAA RDPS status

Possibility of Fast Correlation to assign a callsign to a track

Additional future Functional Capabilities (for Control)
- Full flight data processing functionality (including Surveillance ADS-B and WAM)
- Record and replay
- Route Charges Billing (Including IATA format)
- Raw Video Display
- Radar Fallback System (Bypass) LAN
- Direction Finder
- ATS Interfacility Data(link) Communications (ATS, OLDI, APAC, NAM)
- ADS-C/CPDLC
- Pre Departure Clearance
- Aeronautical Information: METEO data, NOTAM/MET database
B - TopSky-ATC Main Features

- Multiple Air Situation Displays
- Range of Graphic Tools
- On-line Map management
- Supervision Functions
- Future expansion:
  - Flight Lists, Paper Strips
  - Inter-sector Transfer Support
  - Flight Plan to Air Situation Display

Human Machine interface

- Operator interface
- Monitoring functions
- System configuration mgt.
- Control Function
- Open protocol (SNMP)
- Secure link to Thales (VPN)

Technical Monitoring and Control
B - TopSky-ATC Architecture with local ECAR network

- TopSky-ATC receives Surveillance data from TTCAA RDPS
- TopSky-ATC receives surveillance data based on ASTERIX format (62) and to present correlated tracks to the operator
- Use of NTP server or local one if available
Interactive Filter and Range Area is provided in the title bar

Panning and zoom options through mouse and keyboard

A Secondary ASDs can either be recalled using the previous settings or be redefined on the Main ASD before being reopened
B - HMI – Air Situation Display Tools

- Multiple Lat/long points can be marked on the ASD
- The Find Lat/Long tool allows an input lat/long to be identified on the ASD
- Multiple range rings may be created
Thank you for your attention

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