SURVEILLANCE INFRASTRUCTURE IN TÜRKİYE

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DHMI AT A GLANCE

- DHMI (State Airport Authority) is a 100% state-owned government organisation, since 1933 under Ministry of Transportation and Infrastructure.

- DHMI provides:
  - Air Navigation Services for Tower, Approach and En-Route
  - Installation and operation of ATM/CNS systems and facilities
  - Airport operations

AIR NAVIGATION SERVICES IN NUMBERS

Airspace	982.286 km^2	Air Traffic Controller	2037
Controlled Airways	66.708 km	ATSEP	680
Number of traffics (2021)	1.500.000 flights	AIM Expert	583
Area Control Center	1	Pilot	15
Radar Approach Control Center	7	Flight Technician	7
Procedural Approach Control Center	41		
Tower	52		
Aircrafts	2		
Helicopters	2		

TURKISH AIRSPACE

SMART ATC SYSTEM ARCHITECTURE

SMART ATC SYSTEM

Linux based architecture

ARTAS in main centers

Local trackers in all centers

FDPS in main centers

More than 200 airspace sectors

15 integrated remote towers

Safety Nets (STCA, APM, APW, MSAW)

MTCD, AMAN

Free Route Airspace

SMART ATC SYSTEM

This WAN handles:
- Radar data
- VHF Voip Stations
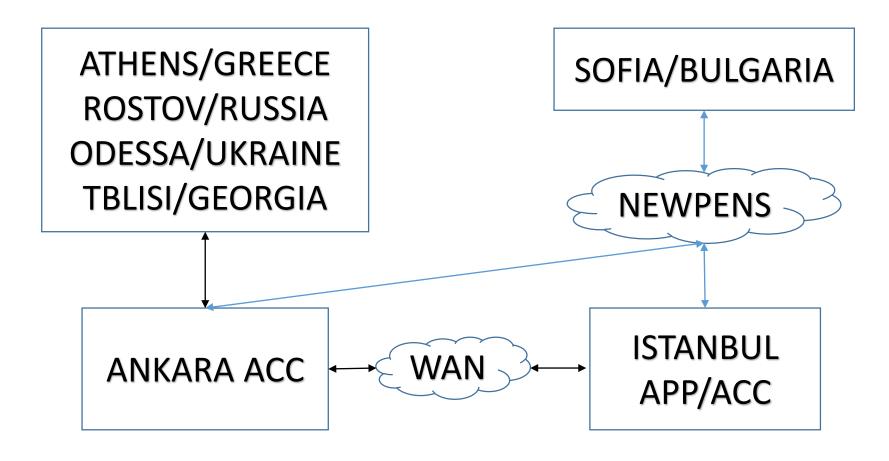- Flight plans and messages exchanged between ATM centers

Redundant Wide Area Network provided by Turk Telecom and TURKSAT
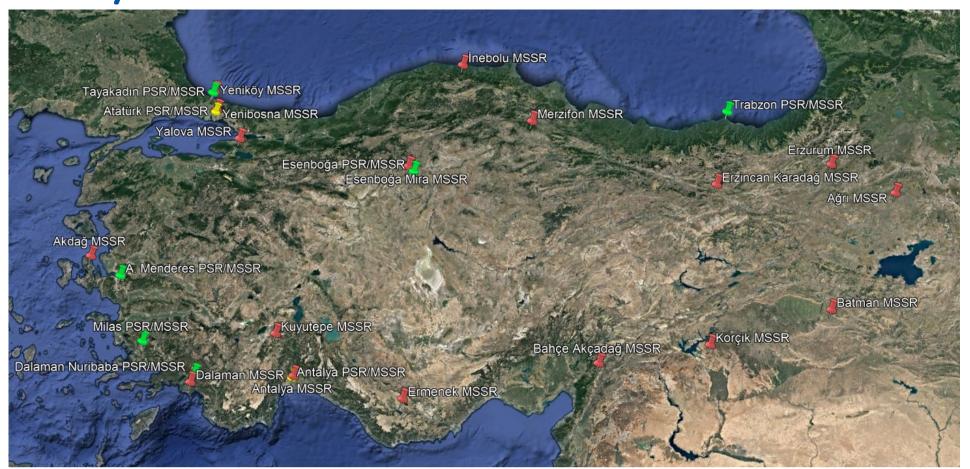
NEIGHBOUR FIRs

OLDI CONNECTIONS

TMA/EN-ROUTE SURVEILLANCE
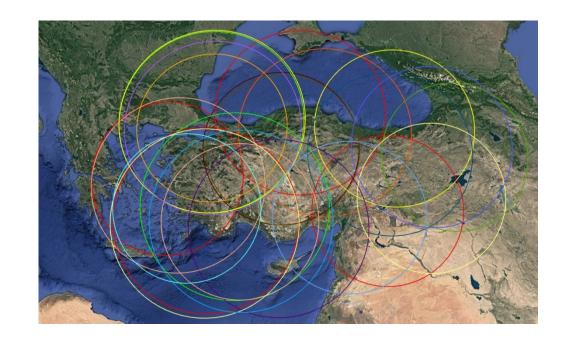

25 Mode S MSSR

8 PSR

TMA/EN-ROUTE SURVEILLANCE

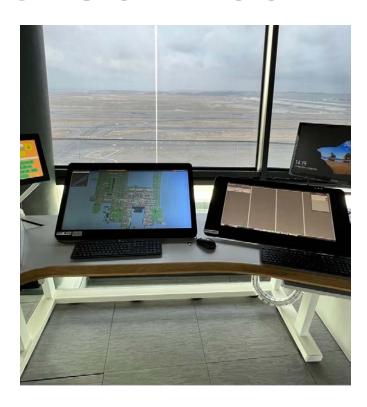| SENSOR TYPE	NUMBERS	MANUFACTURER	MODEL
PSR	4	RAYTHEON	ASR 10 SS
PSR	3	LEONARDO	ATCR-33 S DPC
PSR	1	INDRA	INDRA 2D
SSR MODE S ELS	6	LEONARDO	SIR-S
SSR MODE S EHS	16	INDRA	IRS 20 MP/S
SSR MODE S EHS	3	INDRA	IRS 20 MP/L

SURVEILLANCE COVERAGE

GROUND SURVEILLANCE

✈ SURVEILLANCE

🚨 AIRPORT SAFETY NETS

»» ROUTING

»» GUIDANCE

İstanbul Airport

İstanbul Atatürk Airport

İstanbul Sabiha Gökçen Airport

Ankara Esenboğa Airport

Antalya Airport

ADS-B

1090 MHz ADS-B Ground Receiver developed by TUBITAK.

10 receiver is installed on ATC Towers.

Back up and low level coverage

Satellite based ADS-B

No ADS-B mandate

SURVEILLANCE DATA FORMATS

∨ ASTERIX packet, Category 020
    Category: 20
    Length: 141
  ∨ Asterix message, #01, length: 138
      FSPEC
      > 010, Data Source Identifier
      > 020, Target Report Descriptor
      > 140, Time of Day
      > 041, Position in WGS-84 Coordinates
      > 042, Position in Cartesian Coordinates
      > 161, Track Number
      > 170, Track Status
      > 070, Mode-3/A Code in Octal Representation
      > 202, Calculated Track Velocity in Cartesian Coordinates
      > 090, Flight Level in Binary Representation
      > 220, Target Address
      > 245, Target Identification
      > 210, Calculated Acceleration
      > 400, Contributing Devices
      > 250, Mode S MB Data
      > 230, Communications/ACAS Capability and Flight Status
      > Reserved Field

∨ ASTERIX packet, Category 062
    Category: 62
    Length: 286
  ∨ Asterix message, #01, length: 140
      FSPEC
      > 010, Data Source Identifier
      > 015, Service Identification
      > 070, Time Of Track Information
      > 105, Calculated Position In WGS-84 Co-ordi
      > 100, Calculated Track Position (Cartesian)
      > 185, Calculated Track Velocity (Cartesian)
      > 210, Calculated Acceleration (Cartesian)
      > 060, Track Mode 3/A Code
      > 380, Aircraft Derived Data
      > 040, Track Number
      > 080, Track Status
      > 290, System Track Update Ages
      > 200, Mode of Movement
      > 295, Track Data Ages
      > 136, Measured Flight Level
      > 220, Calculated Rate Of Climb/Descent
      > 390, Flight Plan Related Data
      > 510, Composed Track Number
      > 500, Estimated Accuracies
      > 340, Measured Information

∨ ASTERIX packet, Category 048
    Category: 48
    Length: 50
  ∨ Asterix message, #01, length: 47
      FSPEC
      > 010, Data Source Identifier
      > 140, Time of Day
      > 020, Target Report Descriptor
      > 040, Measured Position in Polar Co-ordinates
      > 070, Mode-3/A Code in Octal Representation
      > 090, Flight Level in Binary Representation
      > 220, Aircraft Address
      > 240, Aircraft Identification
      > 161, Track Number
      > 042, Calculated Position in Cartesian Co-ordinates
      > 200, Calculated Track Velocity in Polar Co-ordinates
      > 170, Track Status
      > 230, Communications/ACAS Capability and Flight Status
      Special Purpose Field

DAPs/ADDs

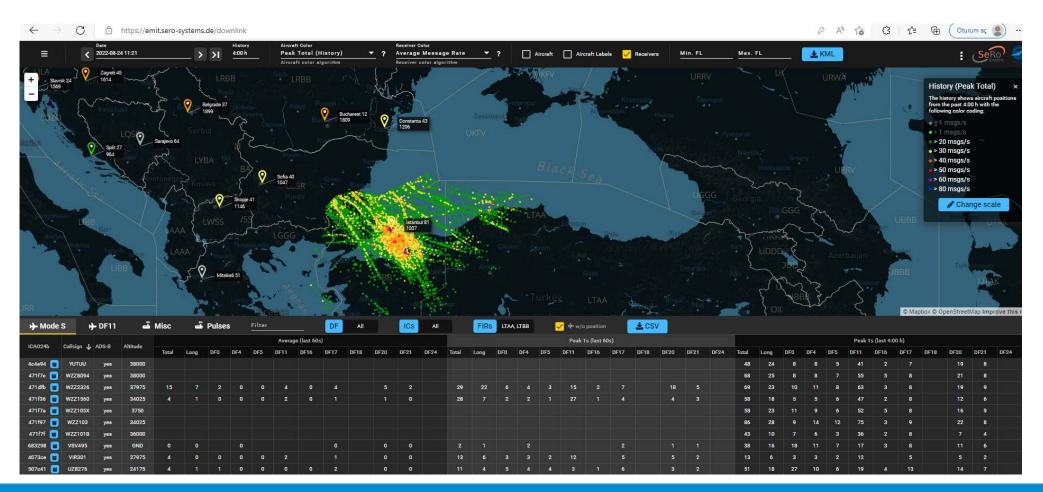| Register	Name	Usage
1,0	Datalink Capability Report	Displayed
2,0	ACID	Warning if different than Flight Plan
3,0	ACAS Resolution Advisory Report	Captured by radar sensors, not processed by ATM system
4,0	FMS Selected Altitude	Warning if different than CFL. Used in MSAW, APW and STCA
5,0	Roll Angle, True track angle, Track angle rate, True airspeed	Diplayed
5,0	Ground speed	Displayed

DAPs/ADDs

Register	Name	Usage
6,0	Magnetic heading	Part of OPS procedure
6,0	Indicated airspeed	IAS is used as part of OPS procedure for the flights below FL250
6,0	Mach no	Mach no is used as part of OPS procedure for the flights above FL250
6,0	Barometric altitude rate	Part of OPS procedure

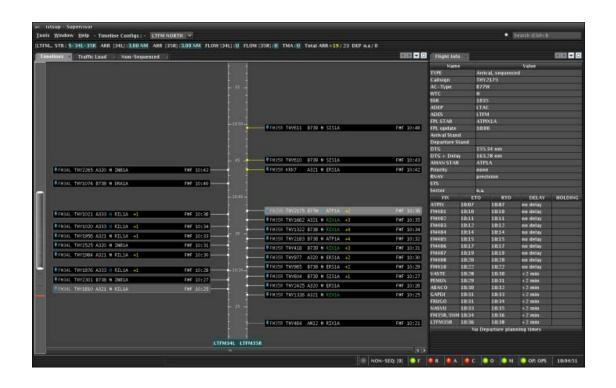# 1030/1090 RF MONITORING

ARRIVAL MANAGER/BULATSA INTEGRATION

- AMAN system at Istanbul Atatürk APP Unit

- AMAN CWPs at Sofia ACC Unit

- Surveillance data from BULATSA

- Extending AMAN horizon

FUTURE PLANS

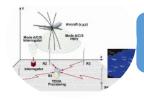Radar Renowal

ADS-B Implementation

New ATM Automation System

Multilateration

DISCUSSIONS

Drones

Unmanned Aircraft Systems

RF Pollution

THANK YOU