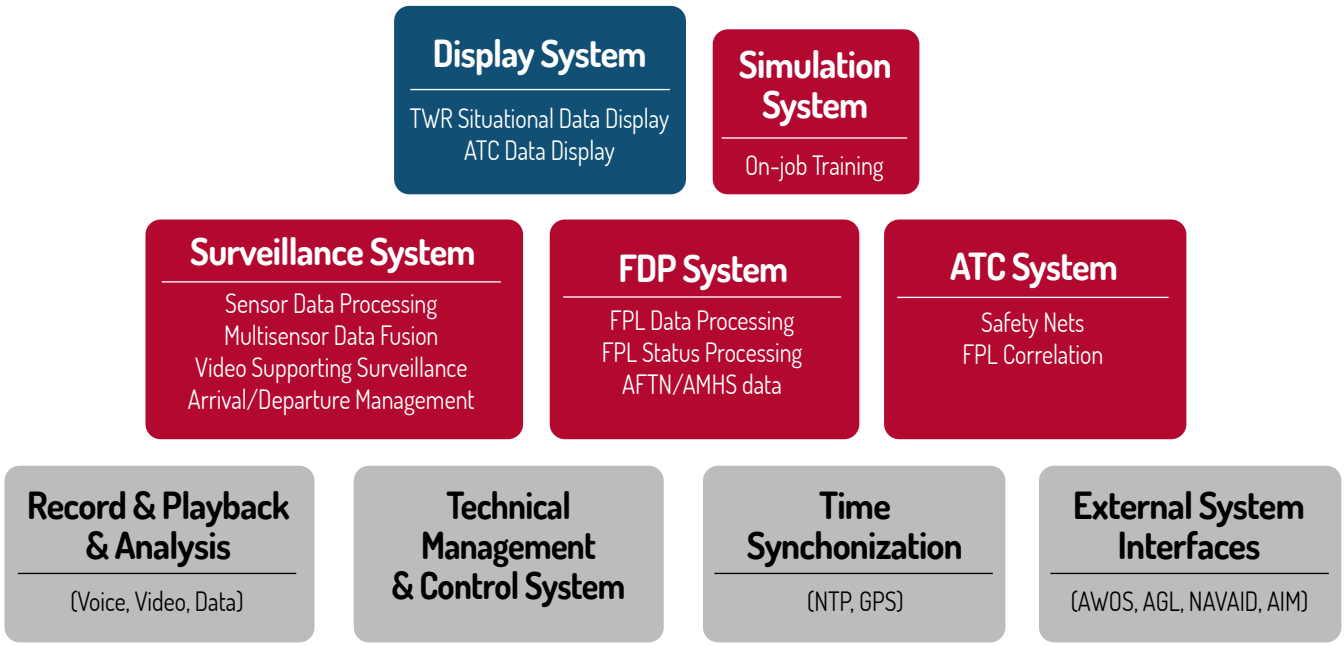
ERIS-A
AIRPORT ATC SYSTEM

ERIS-A: AIRPORT ATC SYSTEM

ERIS-A belongs to the family of advanced airport surveillance data processing and display systems designed for air traffic control and flight planning operations on TMA and airport level, developed in compliance with ICAO and EUROCONTROL standards.

ERIS-A, generating surveillance and aeronautical data, is designed to support air traffic control within the Remote Tower concept as well.



KEY FEATURES:

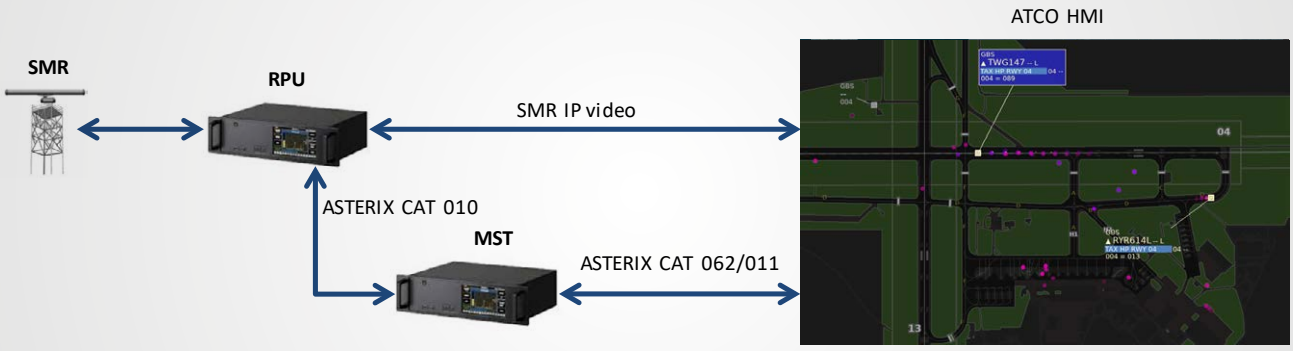
- Open and modular architecture
- Modern multi-sensor surveillance tracker
- Complete air/ground picture in compliance with A-SMGCS Level I
- Airport Safety Support Service (RMCA, CATC, CMAC) in compliance with A-SMGCS Level II
- Electronic Clearance Input and Routing Service as parts of Airport Safety Support Service
- Electronic Flight Strips integrated into situational display
- Usable as a contingency system
- Complex supervision and monitoring system
- Continuous operational data recording, archiving and replay system
- Configurable HMI at ATCOs working positions
- Supporting data for airside security awareness and Airport Management
- Airport map layout editor as a part of delivery

ERIS-A: AIRPORT ATC SYSTEM

Data Processing Modules

ERIS RPU — Radar Processing unit is responsible for

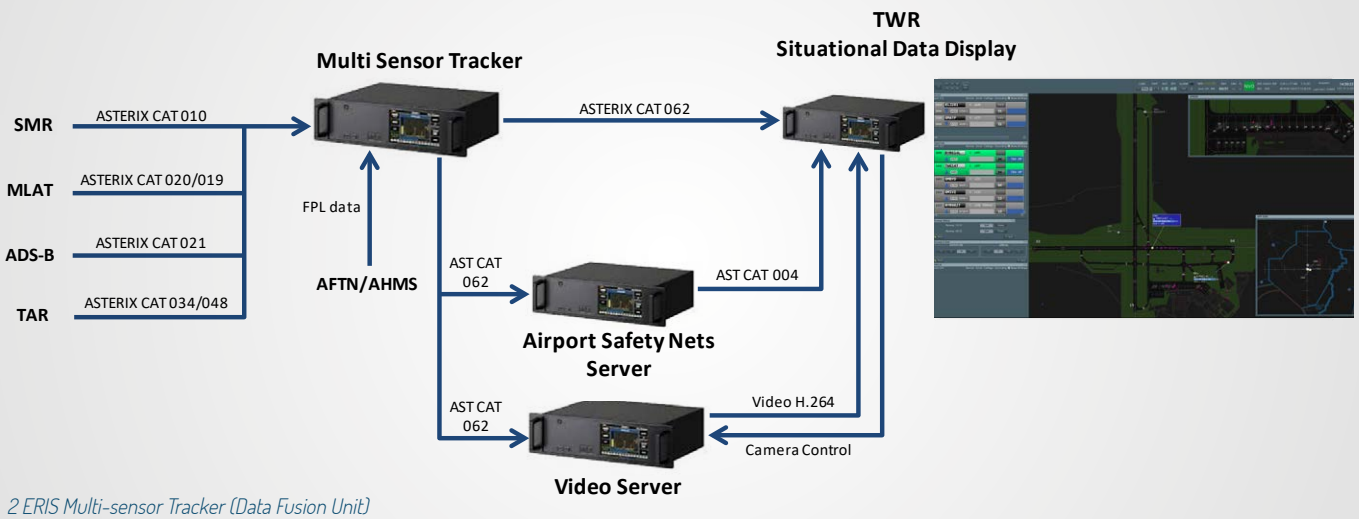
- Surveillance movement radar (SMR) raw data processing, plot extraction and track processing
- Detection and tracking of non-cooperative target movements on the RWYs and TWYs
- Distribution of SMR video and plots/tracks in ASTERIX CAT 010 format within ERIS network



1 ERIS SMR Radar Processing

ERIS MST — Multi-Sensor Tracker is the key element of the ERIS system performing the following tasks:

- Gathering and decoding data from different surveillance data sources (PSR/MSSR, MLAT, ADS B, SMR) and forwarding them for further processing
- Creating and maintaining system tracks by fusing heterogenous surveillance data sources
- Providing surveillance information within the configurable Area of Interest
- Providing system tracks within ERIS network



2 ERIS Multi-sensor Tracker (Data Fusion Unit)

ERIS-A: AIRPORT ATC SYSTEM

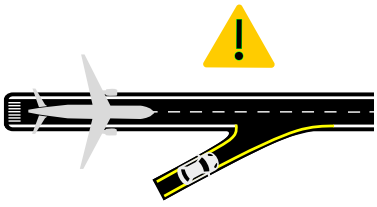
Safety Net Module

is designed to perform the following tasks:

- **Runway Monitoring and Conflict Alerting (RMCA)** – automatic generation of warnings and alerts in case of a potential short-term collision to mitigate safety risks caused by incursion of airport operational areas and/or loss of separation minima between mobiles. The Alert reports provided in ASTERIX CAT 004.
- **Indicating Conflicting ATC Clearances (CATC)** – providing the controller with a set of predictive clearances and indicating conflicting clearances via **HMI-Electronic clearances**.
- **Providing Conformance Monitoring Alerts for Controllers (CMAC)** – issuance of warnings upon ground movements of aircraft and vehicles of which paths and behaviour deviate from issued clearances.
- **Providing Arrival and Departure List** – aircraft take-off/landing monitoring to improve ATCO's situational awareness during low visibility operation and/or unbalanced increase of traffic density.

Airport Safety Nets contribute to the safety aspect of airside operation, enabling Controllers to prevent hazards/incidents resulting from Controller, Flight Crew or Vehicle Driver operational errors or deviations.

EXAMPLES OF CALCULATED ALERTS:



LIST OF CALCULATED RMCA:

- Approaching/Arriving aircraft – Obstacle on RWY
- Departing aircraft – Crossing Incursion in restricted area
- Stop bar/Holding point crossed
- Vehicle on RWY or Safety strip
- Arrival to/Departure from wrong RWY
- Arrival/Departure Opposite Traffic Alert
- Arriving and Departing aircraft on intersecting RWY

LIST OF CALCULATED CMAC:

- No Push-back, No Start-up approval
- No Taxi approval
- Lining up on wrong RWY
- Landing on wrong RWY

LIST OF CALCULATED CATC:

- Line Up vs Take off
- Take off vs Line Up
- Line Up vs Landing
- Landing vs Line Up
- Crossing/Entering RWY vs Take off
- Entering RWY vs Closed RWY

ERIS-A: AIRPORT ATC SYSTEM

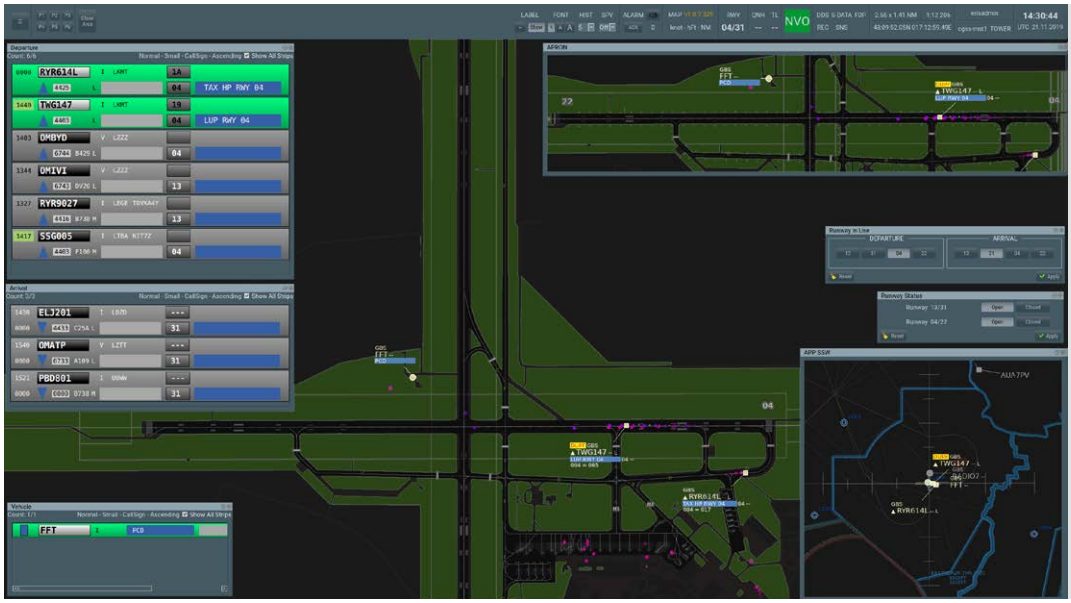
Display Modules

ATCO display HMI was developed in close cooperation with controllers as a multiuser system meaning all activities at any CWP and processing results appear at all other CWPs without any latency.

Display module presents complete traffic situation (Traffic Context Picture – TCP) with appropriate target labels, trajectories incl. history, conflict alerts, and supplementing ATC-related information in a specific layer hierarchy.

SPECIFIC LAYER HIERARCHY FOR SUPPLEMENTING ATC-RELATED INFORMATION:

[1] Airport map layout | [2] SMR raw video | [3] System tracks/plots | [4] Activated secondary windows | [5] Modal windows (e.g. Alarm), status panel and Menus



Traffic Context Picture

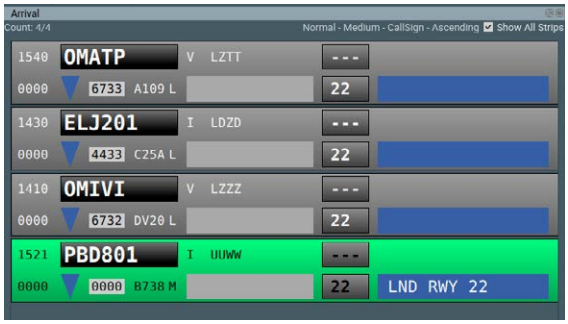
- **Static information**
  Map layout, Airport Data, AIXM data
- **Surveillance data**
  System tracks, selected Surveillance sources
- **Flight planning information**
  Electronic flight strips
- **Safety Nets Warning and Alerts**
- **Arrival, Departure, Vehicle lists**
- **Current weather conditions**

The HMI provides the ATCOs with a set of **predictive clearances** to be issued with respect to operational and safety aspects, and local rules by selecting a target label or a strip.

The controllers are provided with **routing tools** for generating individual routes for mobiles respecting the Airport Layout Mode as well as current constraints (i.e. closed taxiways or runways).

User profile management allow for applying **user specific settings** of position and traffic situation, range and centre position of situational window, number of history dots, colour scheme, target label, configuration (font, pre-set position based on category, items).

Safety Nets Alerts and Clearance Inputs are displayed in the target label and electronic flight strip

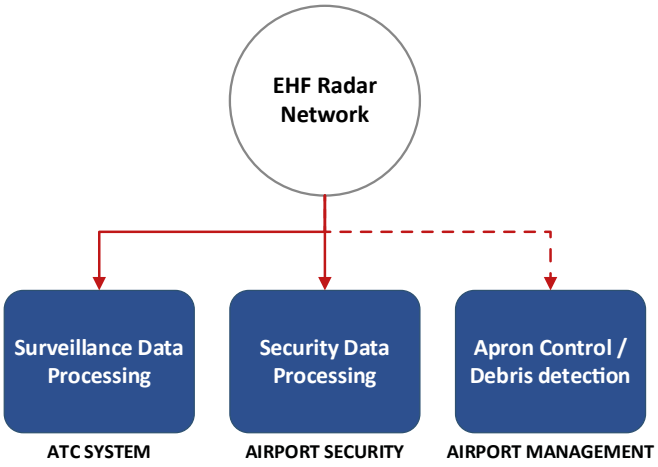


ERIS-A: ALTERNATIVE AIRPORT SURVEILLANCE SYSTEM

ERIS-A is a Common Ground Surveillance System (CGSS) intended for non-cooperative target detection and tracking, consisting of a network of Extra High Frequency (EHF) high-precision short range radars and advanced SW processing system providing key information on targets – position, size, speed and direction of movements.

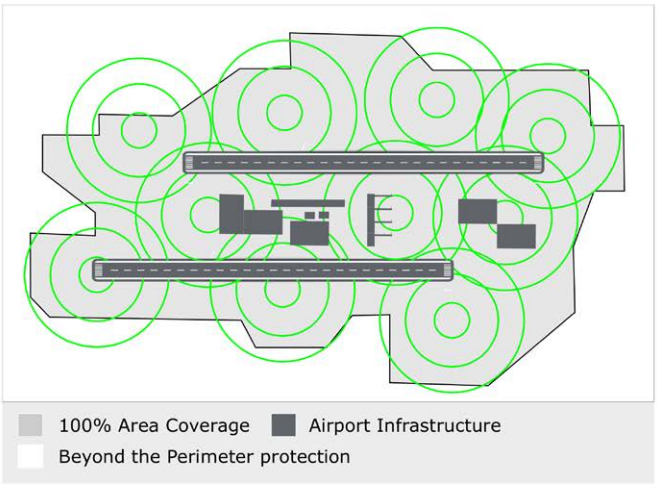
CGSS PROVIDES:

- Cost effective coverage of airport areas capable of competing with conventional X-band radar systems
- Reliable solution for operation in all weather conditions while running at very low power consumption (<20 W) and reduced maintenance costs
- Surveillance information that can effectively support the video system within Remote TWR concept
- Solution supplemented by automatically controlled PTZ cameras to provide a video of occurring conflict situation. This can be recorded by the video cameras and sent to a control centre for on-line monitoring and/or incident investigation



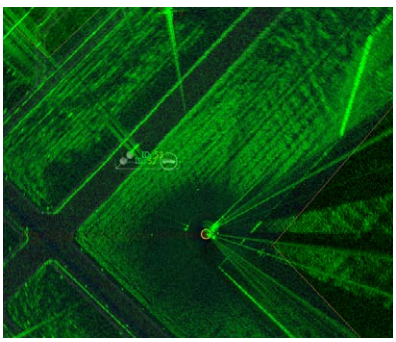
3 CGSS Multi-mission system - can concurrently be used for various purposes

For surface movement control purposes, radars of 800 up to 3 000 metre detection range can be used, operating in 360° scanning mode at 25 cm resolution and up to 1 sec data update rate.



4 EHF radar network. The number of radars and their deployment depend on the geographical conditions of the controlled airport area.

In partnership with NAVTECH RADAR



5 Raw EHF radar video

6 EHF Radar installation

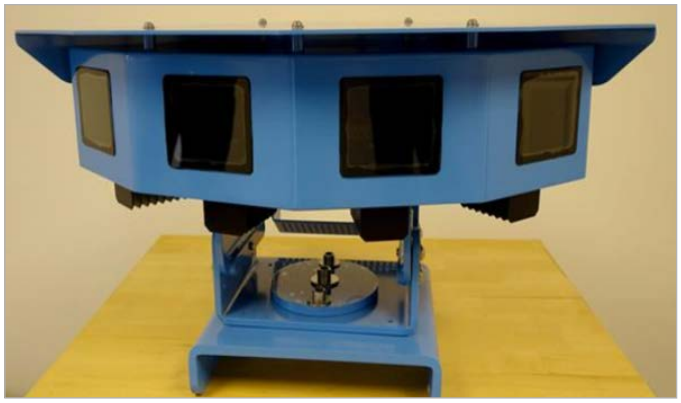
ERIS-A: VIDEO SURVEILLANCE SYSTEM

The role of **Video Surveillance System (VSS)** is to control the camera system, process video and distribute the picture gathered by the camera system.

VSS as a source of video information provides supplementary surveillance information to facilitate a target identification while contributing to airport traffic safety and eliminating false alerts and/or false targets within the system-controlled area.

Controlled traffic video supports ATC by shortening ATCO response time in case of safety warnings, and by reducing false alarm rate and providing additional identification of object in conflict.

7 PTZ Camera



8 Panoramic Camera

9 Augmented video - Labeled target in video display

10 EHF Radar installation (white dome on the left)

VSS KEY FUNCTIONS:

- ASTERIX CAT 062, CAT 011 processing
- Follow Up Target, Follow Up Target in Conflict, Look At [position]
- Picture-from-picture (PfPi)
- Combination of Fix, Hot-Spot and PTZ cameras
- Video Stream Recording
- Surveillance Video Wall and Video Clients on ATCO CWPs

ERIS-A: INTEROPERABILITY WITH CONCEPTS AND LEGISLATIVE

ICAO DOC 9830-AN/452

Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual, First Edition – 2004

EUROCAE ED-87

Minimum Aviation System Performance Specification For Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Levels 1 And 2

EUROCAE ED-116

Minimum Operational Performance Specification for Surface Movement Radar sensor systems for use in advanced surface movement guidance and Control systems (A-SMGCS)

EUROCAE ED-153

Guidelines For ANS Software Safety Assurance

EUROCONTROL SPEC-171

Specification for Advanced Surface Movement Guidance and Control System (A-SMGCS) Services

SESAR PROJECTS PJ03B

SESAR 2020 Safety Nets for Airport with Limited Surveillance Capability

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