ERIS-A

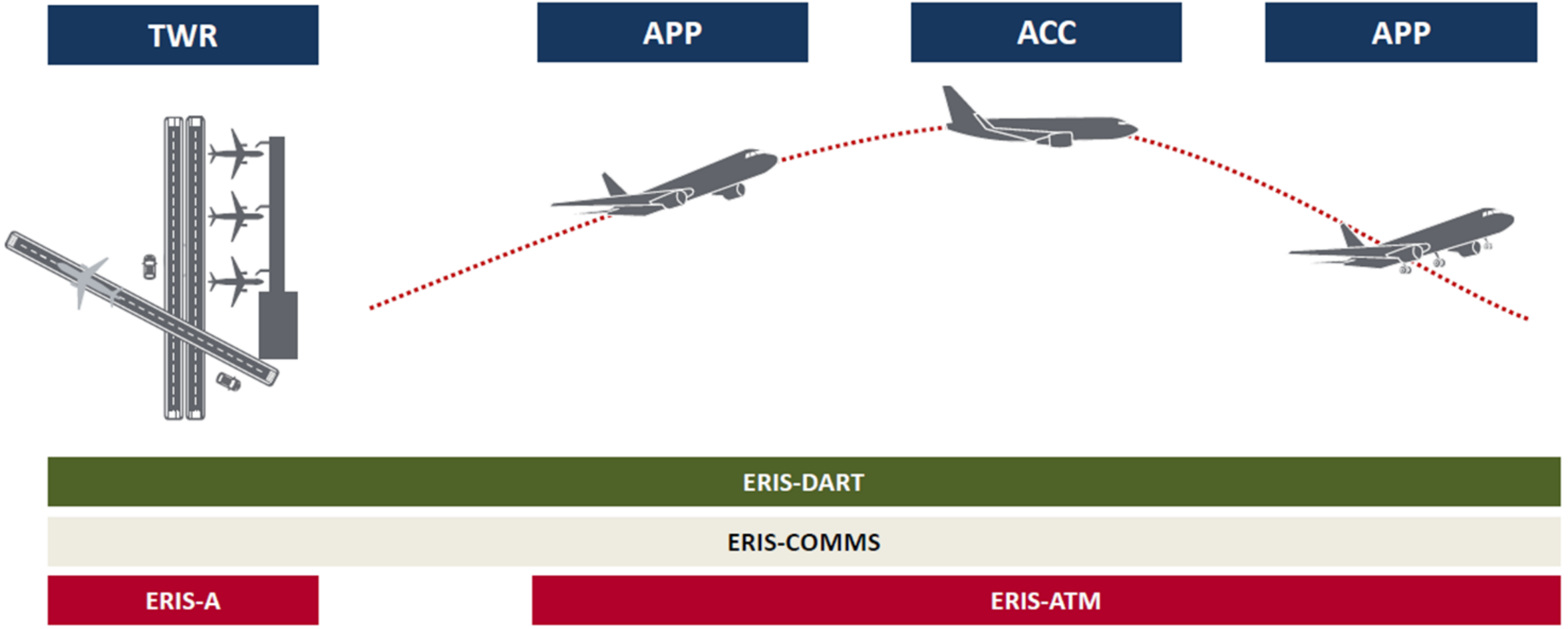
Airport ATC System

- Purpose, Capabilities, Objectives
- Key Features
- MST - Multi-sensor Data Fusion Unit
- FPL Processing and presentation
- Airport Safety Nets
- Collaborative Workstation
- Recording and replay
- DART - Surveillance Data Analyzer
- Common Ground Surveillance and Control System
- Detection and Tracking of Non-cooperative Targets
- EHF radars network
- Video supplementary surveillance information
- Interoperability with Concepts and Standards

ERIS-A | ATM/ATC SYSTEM

ERIS | ERA Information and Control System

ERIS is a system that is capable of integrate different types of sensors, even of the latest generation. The system is capable of generating and presenting a complex air picture resulting in system tracks correlated with planning information. Capable of computing and generating different types of alerts that are part of the Safety Nets package.



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Purpose

Provision of airport control service on operational and maneuvering surfaces by use AlternativeSurveillance Systems,

Airport Safety Nets – RMCA, CTAC, CMAC - automatic generation of warnings and alerts in case of potential collision,

Presentation of surveillance data output and aeronautical information coming from available data sources

Capabilities to contribute to an increase of traffic safety at small/middle-sized airports through:

Aircraft take-off/landing control even at very low visibility and/or unbalanced increase of traffic density,

Safety risks mitigation caused by an incursion of operational airport areas and/or failure to keep a required separation between mobiles,

Control of aircraft/vehicle's ground movement - warning upon a path deviation.

Objective:

To get performance parameters comparable with that of A-SMGSC, Level 2 under the conditions of alternativesurveillance capability with acceptable false alarm rate

ERIS-A | KEY FEATURES

System designed to provide airport management service (civil, military)

Possibility to use the system to detect the movement of non-cooperative targets on taxiways, but also to protect the perimeter of the airport

Highly scalable system (modular solution)

Easy integration into the existing environment

Central and dynamic configuration

Collaborative Workstation
Integrated Situational Data Display

Surveillance Subsystem
Sensor Data Processing
Multisensor Data Fusion
Video SupportingSurveillance

FDP Subsystem
FPL Data And Status Processing
AFTN / AHMS Data
OLDI / ICAO

ATC Subsystem
Safety Nets And Monitoring Aids
FPL Correlation

Record & Playback & Analysis
Voice, Video, Data

Technical Management & Control

Central & Dynamic Configuration

External System Interfaces
(AWOS, AGL, NAVAID, AIM)

ERIS-A | MST – MULTI-SENSOR DATA FUSION UNIT

Multi-sensor Tracking and Data Fusion is key capabilities of ERA-A system provided by MST

MST key features:

Multi-channels, -types surveillance data processing and fusion (TAR, MLAT, ADS-B, SMR, ENR)

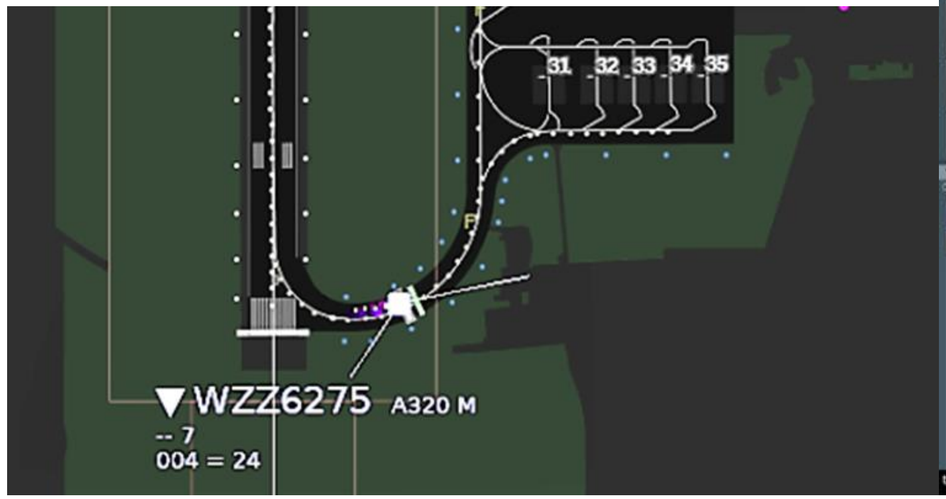
Continuous check of input data integrity and data quality

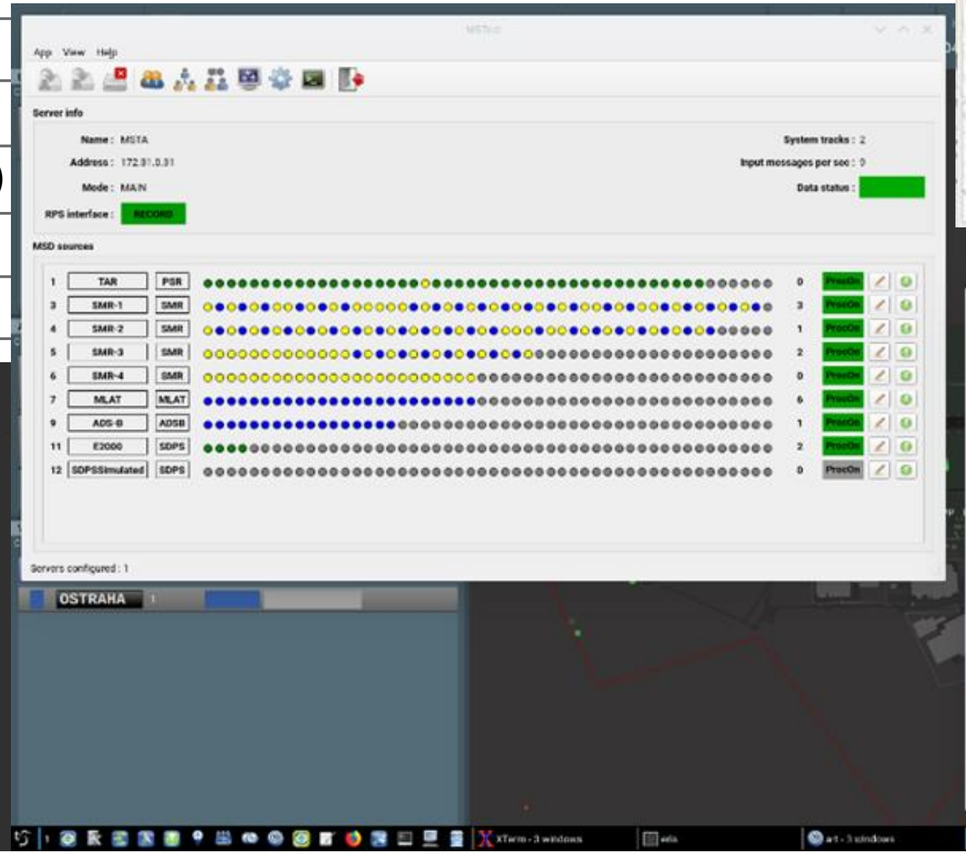
Non-intrusive input data splitting

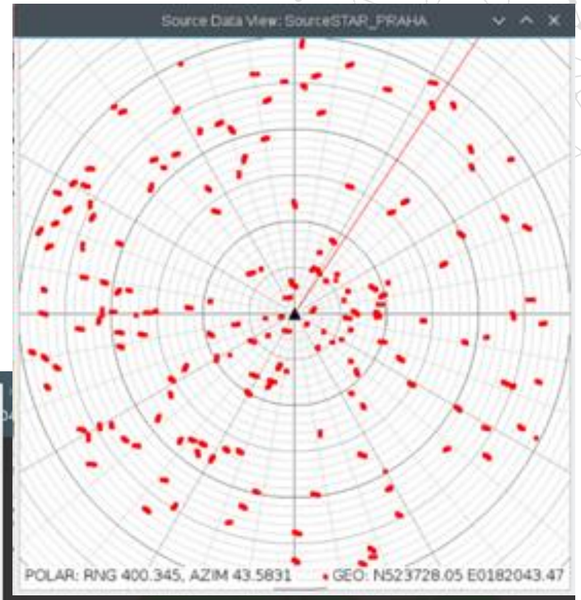
Mono-sensor tracking (sensor output by pass function provision)

Multi-sensor data fusion – output ASTERIX CAT 062, (011)

Full- redundancy support







FPL PROCESSING AND PRESENTATION

FPL data processing and presentation

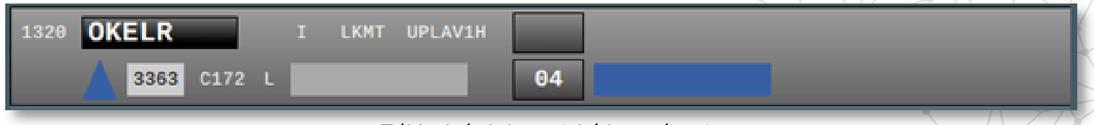
Correlation of system flight plan with system track

Electronic Flight Strips (EFS)

- Flight plans and their status presentation in flight strip form
- Various options for sorting flight plans into groups and issuing and checking clearances

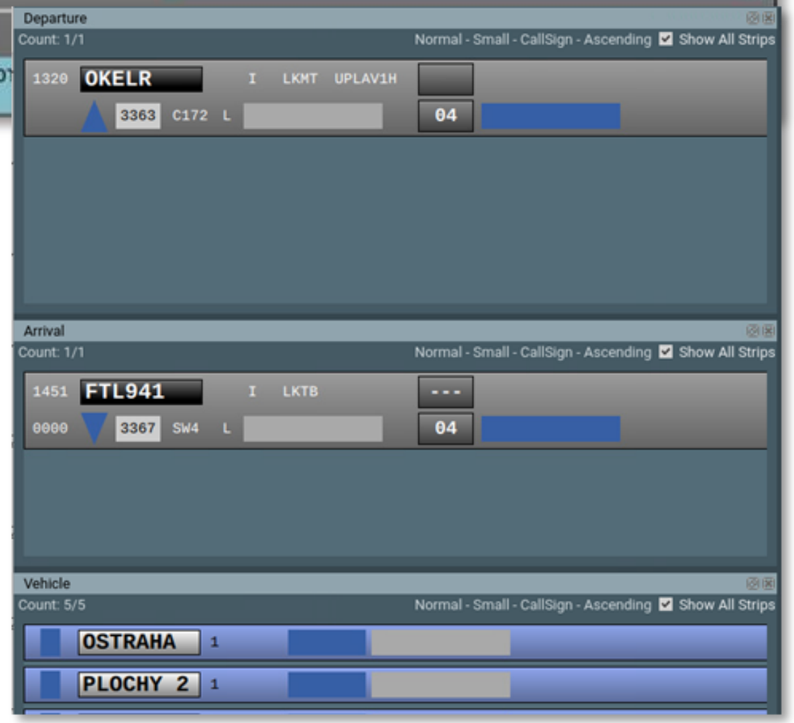
Example of flight strip groups for an airport

- Pendign Arrivals
- Pendig Departures
- Cleared
- On TWY
- On RWY
- Other
- Vehicles



Základní elektronický letový strip

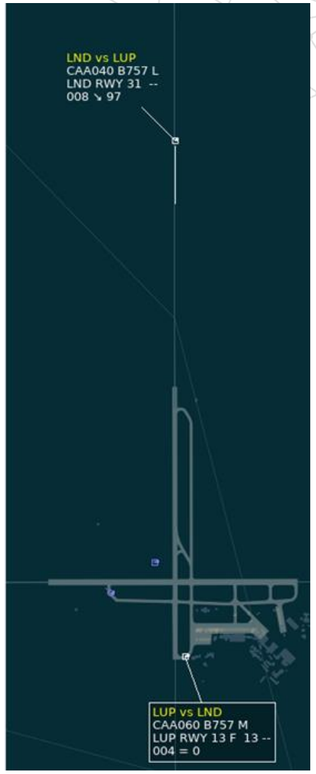
Rozšírený elektronický letový strip



Elektronické letové stripy a ich rozdelení do FPL skupín

RMCA - Runway Monitoring and Conflict Alerting	
APP/ARR Aircraft - Obstacle on RWY	
Stop bar/Holding point crosses	
Mobile on RWY or Safety strip	
Arrival/Departure Opposite Traffic Allert	
CATC - Conflicting ATC Clearances	
Line up vs. Take-off	
Take-off vs. Landing	
Line up vs. Landing	
Entering RWY vs. Closed RWY	
CMAC - Conformance Monitoring Alerts for Controllers	
No Push-back	
No Start-up approval	
Runway Incursion	
Landing on wrong RWY	

Predictive Clearances provides limited set of optional clearances according to a set of locally agreed rules permitted from an operational and safety point of view when compared to previously input electronic clearance



Information about the potential conflict is displayed in the trace form, corresponding to the electronic strip and the conflict table.

ERIS-A | COLLABORATIVE WORKSTATION

Map layout

Pre-prepared and user maintainable maps, airport layout according to AIP or ADS, AIXM data

Surveillance Data

Multi-sensor data fusion output - system tracks

Track/Plot/E-scan from connected sensors

FPL Data

Integrated electronic flight strips

Airport status / Meteo / NAVAIDS information

Airport Safety Net

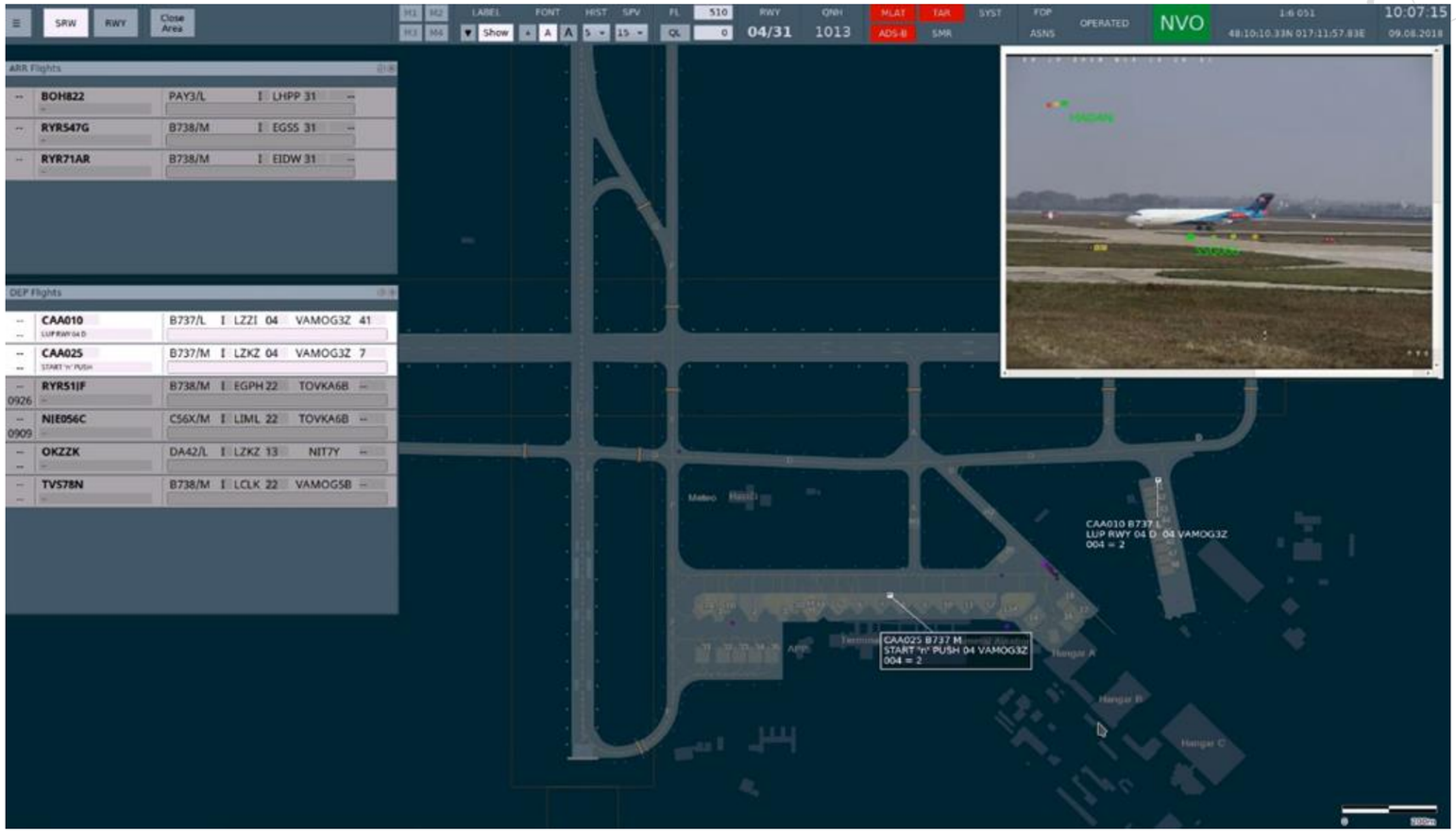
RMCA/ CATC/ CATC Alerts / Warning presentation

Predictive electronic clearences

Entering electronic clearances

User preferences

Multilayer / Multirole user preferences configuration



**ECI – Electronic Clearance Input*

Pracovná stanica ERIS-A s modulom pre TWR a Ground Control

ERIS-A | RECORDING AND REPLAY

Investigation-oriented replay tools - persistence of all actions performed by the investigator

Automatic quarantine of all recordings used for analysis and investigation by the user

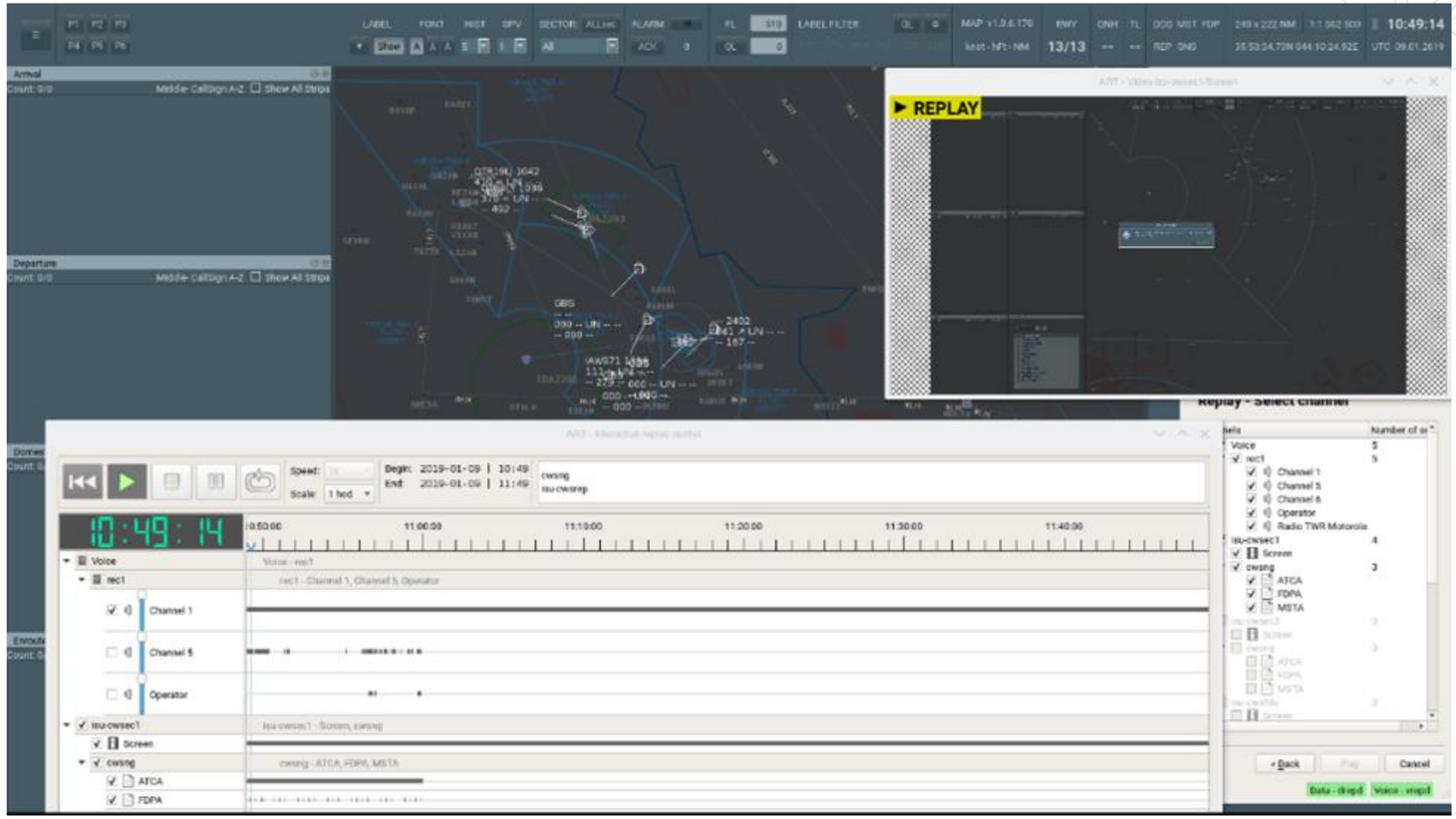
"One Click Replay" of all types of recordings

Export to self-extract file - recording time preservation, transcription, and recording metadata with the possibility of replay it on external computer

Radar Data Display as a part of replay system - independent and interactive data replay application including analysis tools "**Trajectory Manager**" and "**Pair Inspector**"

Modular and fully scalable system with open API

Type of channels: Ambient, RDX, ED137 B/C vol. 4, Analogue, E1,ISDN, SIP/SAP RTP, Independent RTP stream voice / VGA/DVI/HDMI/DP up 4K IP, CCTV cameras, VNC stream video / UDP data stream ... channels recording files



ERIS-A | DART – SURVEILLANCE DATA ANALYZER

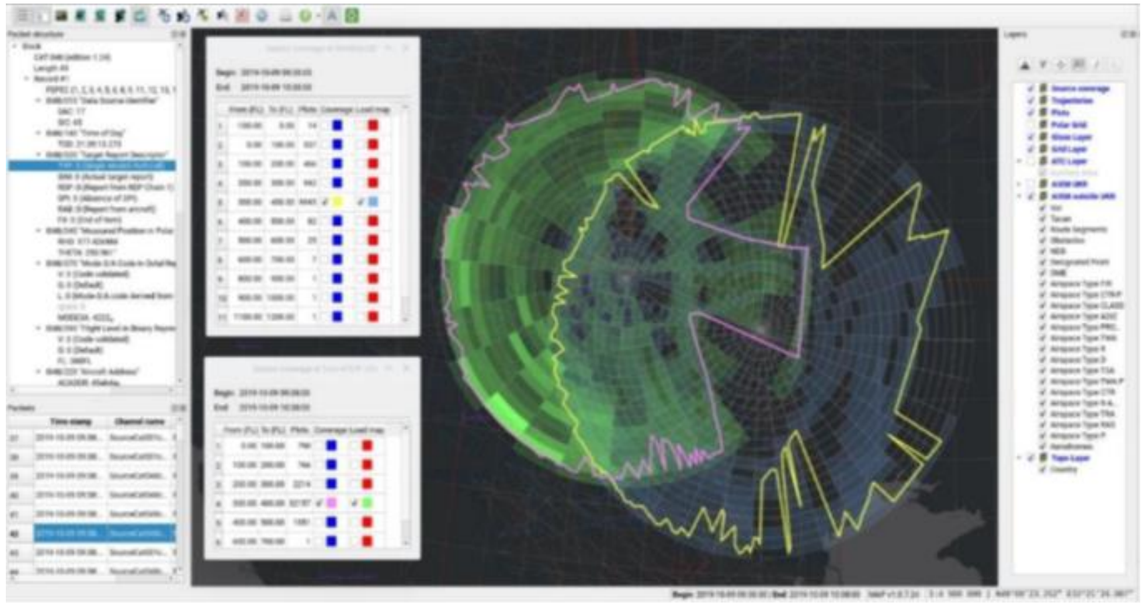
Analysis of ASTERIX overview data from the record

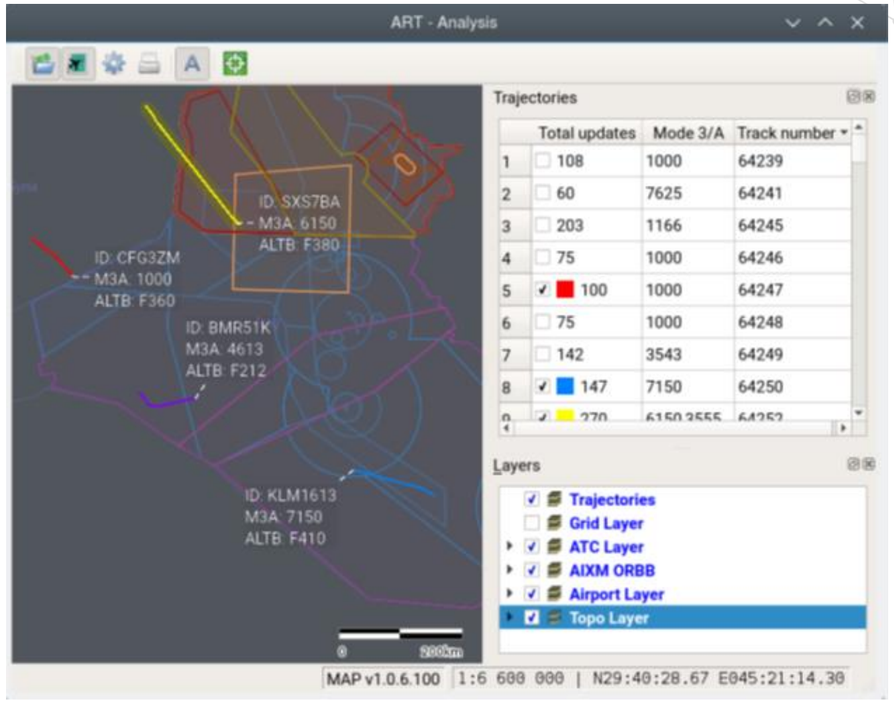
View both plots and complete trajectories

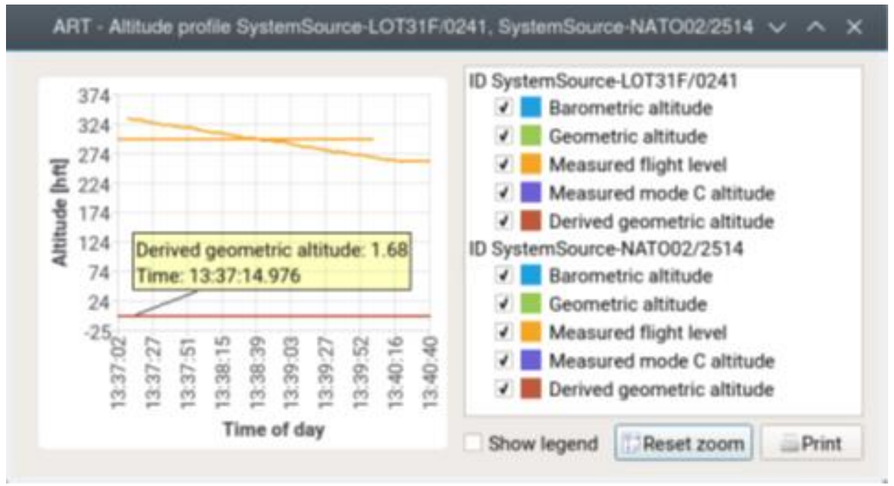
Export to CSV, HTML, PDF, PNG, etc.

Printed outputs results

Statistics for operational reports and billing







Example of ERIS-A Analysis windows

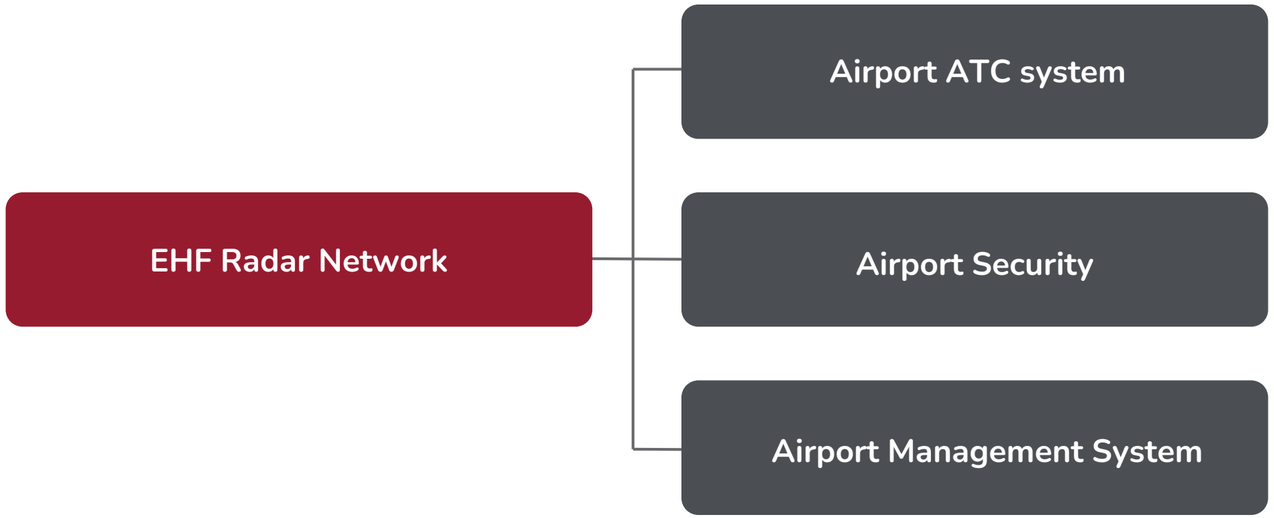
ERIS-A | COMMON GROUND SURVEILLANCE AND CONTROL SYSTEM

Alternative solution of surveillance for non-cooperative targets detection designed for regional and/or middle-sized airports:

(1) non-cooperative ground surveillance data for ATC purposes as SMR or as suplementary SMR gap filler system and concurrently,

(2) surveillance data for airport perimeter protection systems, and

(3) additional data for airport management systems.



ONE RADAR NETWORK

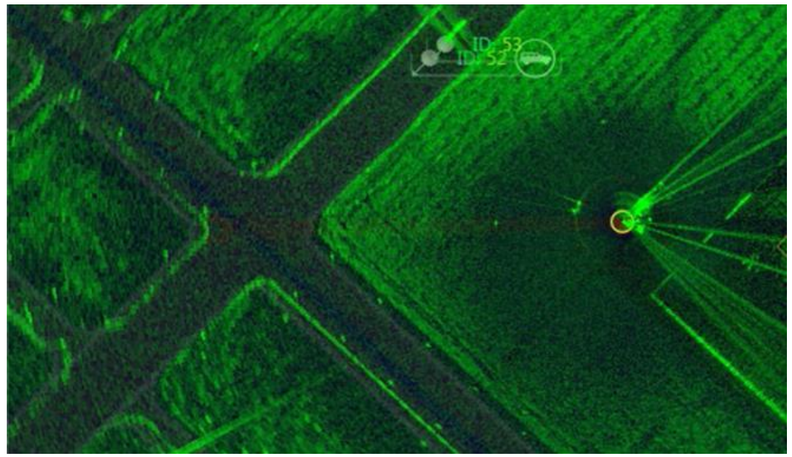
THREE INDEPENDENT
DATA PROCESSING SYSTEMS

THREE PURPOSES AND USERS

ERIS-A | DETECTION AND TRACKING OF NON-COOPERATIVE TARGETS

EHF FMCW Radar Operational band 76-77.5 GHz

Scalable detection range	Vehicle up to 2,200 m Human up to 1,500 m
Resolution	25 – 50 cm
Radar pattern	Azimuth 1° Elevation 3°
Data update	360°up to 1 sec
Consumption	18 W
Weight	17 kg



ERIS-A | EHF RADARS NETWORK

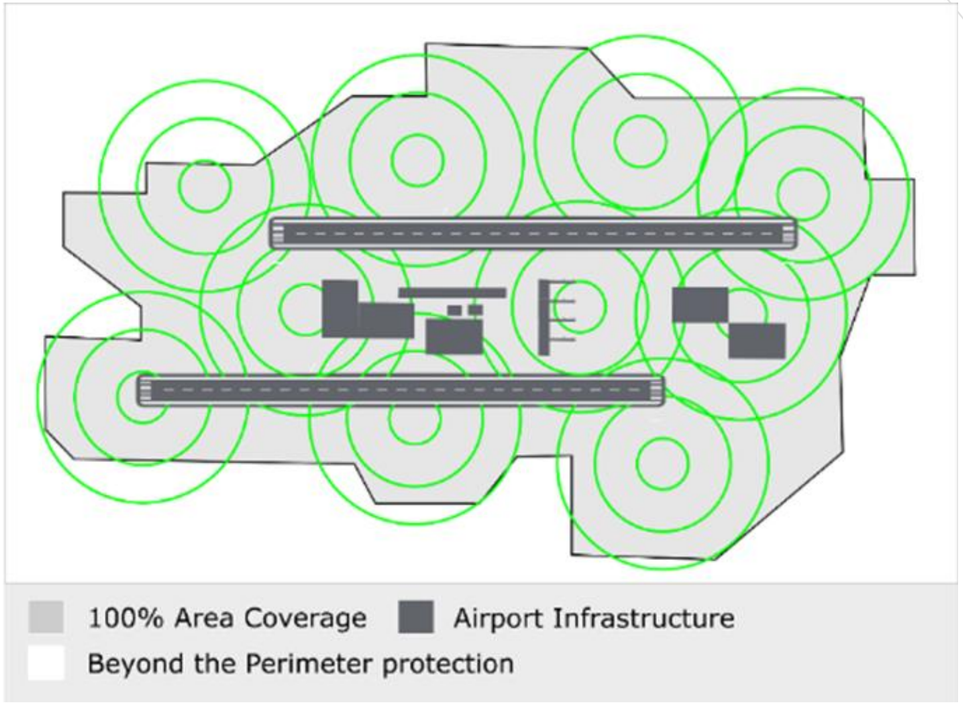
Cost effective solution intended for non-cooperative targets detection and tracking

Main or supplementary source of ground surveillance data, gap filler

Extra High Frequency (EHF) high-precision short-range radar network (ENR) and advanced SW processing system providing key information on targets - position, size, speed and direction of movements.

The number and a deployment of radars depend on geographical conditions of the controlled airport area.

Plot/Track ASTERIX CAT 10 output information

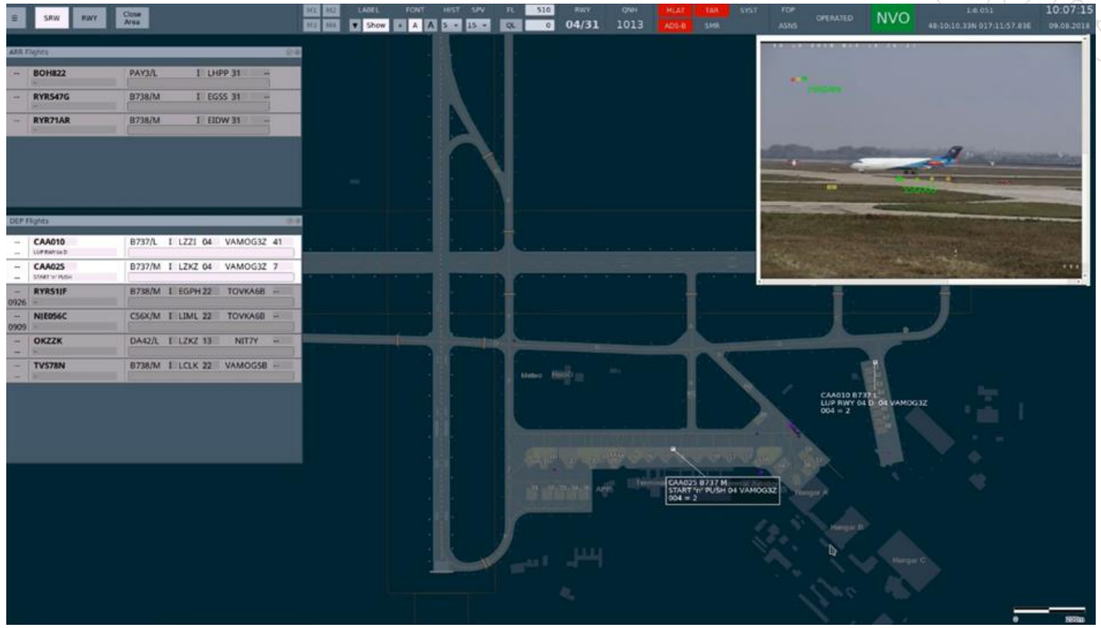


Airport EHF Radar Network

ERIS-A | VIDEO SUPPLEMENTARY SURVEILLANCE INFORMATION

Video overview - source for additional overview information

Controled video - provides support to ATC by reducing ATCO response time in the event of safety alerts being issued



Combination of functions and capabilities of the Video Server and connected cameras

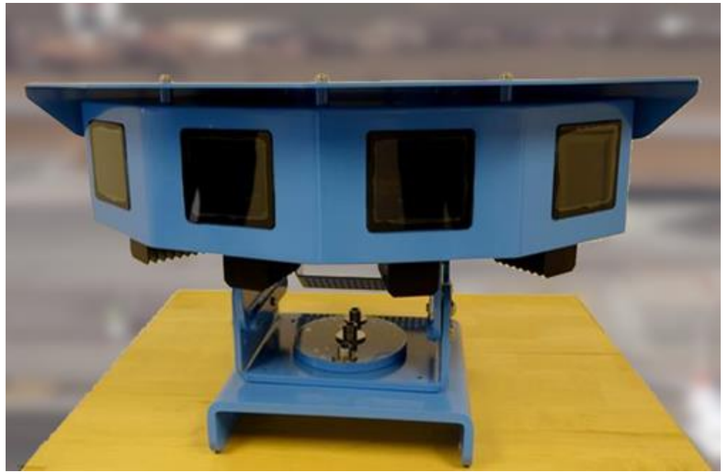
ASTERIX CAT 062, 11 processing

Follow Up Target, Follow Up Target in Conflict, Look At [position]

Combination of Fix/Hot-spot PTZ cameras

Video stream recording

Video Surveillance "Wall" and Video Clients



INTEROPERABILITY WITH CONCEPTS AND STANDARDS

SESAR 2020

Safety Nets for Airport with Limited Surveillance Capability - SESAR Projects PJ03B

Software Specification

ED-87D MINIMUM AVIATION SYSTEM PERFORMANCE SPECIFICATION FOR ADVANCED SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEMS (A-SMGCS)

EUROCONTROL – SPEC-171 Specification for Advanced Surface Movement Guidance and Control System (A-SMGCS) Services

ICAO DOC 9830-AN/452 Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual, First Edition – 2004

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)

Software Development

ED-153 GUIDELINES FOR ANS SOFTWARE SAFETY ASSURANCE

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