

ADVANCED AIRPORT MOVEMENT MANAGEMENT

A-AMMAS™ is the solution that makes available and integrates several information relevant to the movement areas, in order to improve operational efficiency and situational awareness at airport. Within the Air Traffic Management network, airports are turning out to be the main bottlenecks; the capacity crunch at airports poses to all stakeholders a threat to safety, efficiency, and competitiveness in the air transport domain.

The predicted increase in the global air traffic demand will be met only if radical changes are introduced in the airport management tasks, as their efficiency depends on the cooperation of several actors, whose tasks are currently executed on different separate systems even if they are strictly inter-dependent. As a consequence, airport stakeholders are nowadays requiring integrated systems enabling a higher degree of automation and interoperability with respect to current scenarios.

THE SOLUTION

Within this context, Leonardo has developed an integrated solution for Airport Movement management, as well as to be part of the APP/TWR segment, that exchanges airport operational information quickly and reliably and shares it consistently among all stakeholders, by means of user tailored representations of airport processes.

Based on a System-of-Systems approach, the Leonardo solution integrates the Rheinmetall DEB-RA® Hazard Management System to detect the presence of FOD on airport layout.

A-AMMAS™ has been developed to be part of the A-SMGCS Leonardo solution, as well as to be utilize to support the APP/TWR ATCO's, integrating actual and predicted traffic information from air-side and land-side sources and to improve operational efficiency and situational awareness at airport, in order to increase punctuality and throughput.

Rheinmetall's DEB-RA® is a multi-functional system for airport safety and security, designed for automated Foreign Object Debris (FOD), wildlife and Automatic Runway Incursion detection and classification at airports.

The system is capable to detect, recognize/identify, perform a risk assessment in a very short time; assist the FOD/wildlife removal and support the airport stakeholders with a reporting storage and analysis. DEB-RA® is designed to monitor aircraft and vehicle movements on airfield surface in all-weather conditions.

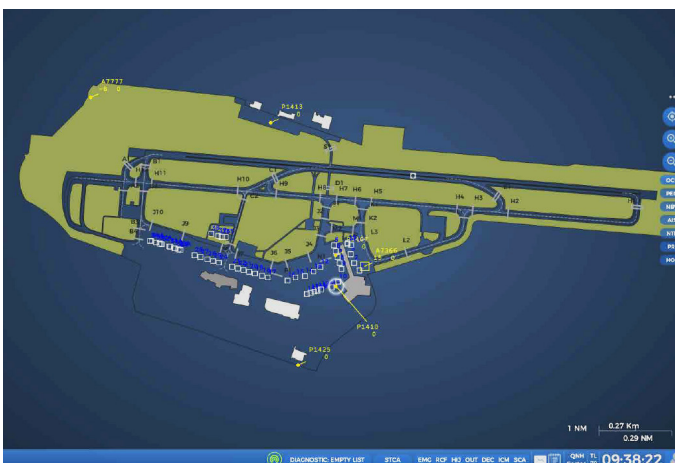


INTEGRATED A-SMGCS/TWR SERVICES

A suite of products and tools provides the following A-SMGCS/TWR services in full compliance with ICAO, Eurocontrol and EUROCAE standards/recommendations:

- > Integrated Ground/Air Surveillance
- > Integrated Ground Safety Nets
- > Ground Route, Pre and Departure Planning
- > Aircraft and Vehicles Management/Guidance.

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INTEGRATED GROUND/AIR SURVEILLANCE

Ground Surveillance services are based on highperformance multi-sensor fusion algorithms providing targets with reliable positions and unambiguous identifications, as well as typology (i.e. aircrafts, RPASs and vehicles); track/call sign association is based on multilateration data (thus allowing association already at the gates), Mode-S data as well as traditional SSR code.

They can integrate sensor data from:

- > ADAM - Advanced Airport Multilateration
- > WAM - Wide Area Multilateration
- > SMR - Surface Movement Radars
- > MXC - ADS-B Ground stations network
- > APP - Approach Radars
- > ENR - En Route Surveillance Sensors, including Mode-S Radars.
- > DEB-RA® - SMR with Runway Hazard Management Capability.



INTEGRATED GROUND SAFETY NETS

The purpose of the Ground Safety Nets is to support tower and ground controllers in the prevention of hazardous situations during the taxi, take-off and landing phases, monitoring actual aircraft positions, as reported by the Ground Surveillance, against a set of predefined rules characterizing the operations at the given aerodrome.

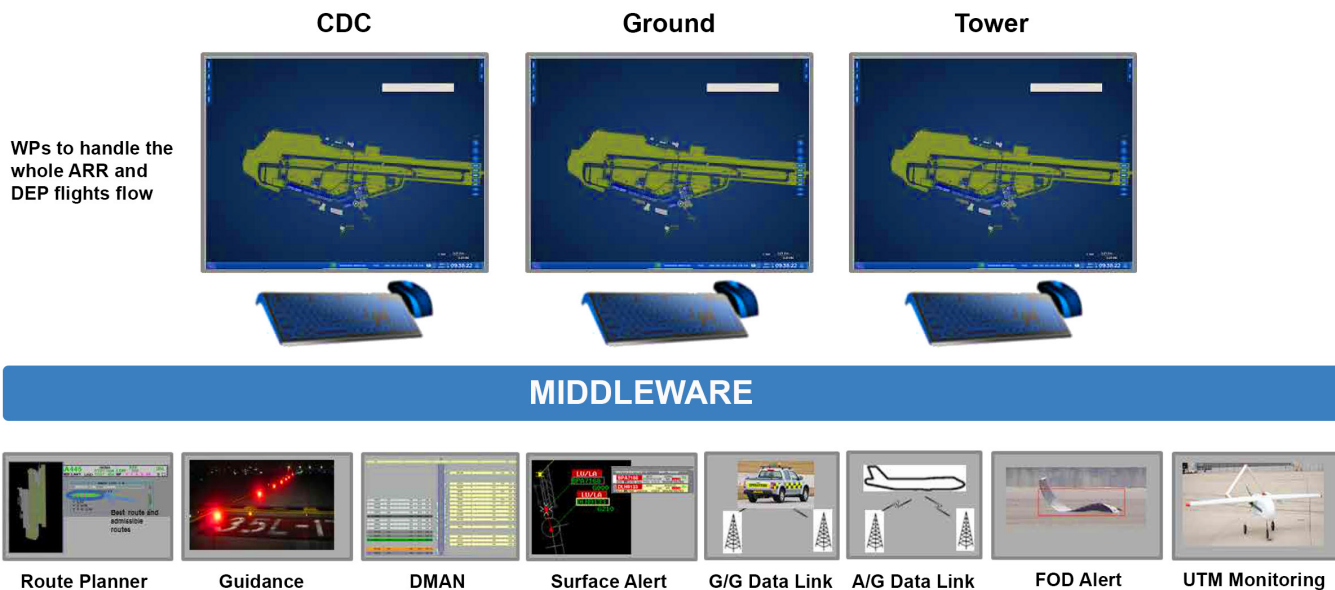
A-AMMAS™ is able to automatically detect all major types of conflicts, or risks of conflict, on runways and taxiways (e.g.: Runway incursion, FOD and Wildlife presence, Restricted area infringement, etc.). Ground Safety Nets also provide a Path Monitoring service, which periodically checks the actual mobiles positions against their cleared ground paths (assigned taxi routes); in case of detected deviations, it distributes warnings/alarms to the controllers and support ATCO in the automatic re-planning of ground routes.

GROUND ROUTE, PRE AND DEPARTURE PLANNING

Ground Route Planning services goal is to bridge runway operations and turnaround processes, typically administrated by different airport authorities through separate tools, thus improving the efficiency of airport traffic flows. In case of hazardous situations detected by the Ground Safety Nets, the Ground Route Planning service supports the controllers by automatically proposing an updating of the aircraft traffic flow at the airport. Ground Route Planning is also integrated with Pre and Departure planning service which, in turn aims to schedule departure flights reducing as much as possible in taxi-path conflicts and waiting time on runway.

AIRCRAFT AND VEHICLES MANAGEMENT/ GUIDANCE

The Guidance services support aircraft pilots in safely complying to “follow-the-green” clearances, translating cleared ground routes into visual instructions for pilots taxiing from gate to runway and vice versa.



BENEFIT OF THE A – AMMAS™ APPROACH

REAL TIME SITUATION AWARENESS

- › Seamless Surveillance Picture
- › Gate-to-Gate Surveillance (one HMI to be used for ground, approach and control surveillance)

INTEGRATION AND SENSOR FUSION

- › Integrated tower approach system capable to exchange data with A-CDM, Met information, Surveillance, Airport Lights, Radios, Nav aids and En-Route Centre Stakeholders
- › integration of heterogeneous surveillance sources, including already existing surveillance systems
- › Comprehensive and extended coverage using integration of different surveillance sensors to cover all the area of interest and responsibility
- › Multi-sensor processing to maximize service availability
- › Standard and Legacy protocols management

CONTROL AND GUIDANCE

- › Automatic Identification and Correlation
- › Conflict prediction and detection
- › Silent coordination and transfer of control
- › Integration of any Airport Ground Lighting System
- › Statistics and diagnostics/controls data logging

SECURITY, SAFETY AND RELIABILITY

- › Secure System Architecture and Network Management through Cyber Protection System Design
- › Secure identification and access to the system
- › Fully virtualized hardware infrastructure to extend lifetime of ATM application, increase uptime, and provide energy efficiency
- › Enhanced Safety Management on the ground through the improved runway incursion functionality extended to detecting FOD, animals, and persons at the same time; ideally via one single system

CATER FOR FUTURE GROWTH

- › Expandable architecture with the capability to integrate future needs, such as UAV management systems.

For more information:
infomarketing@leonardocompany.com



Electronics Division
Via Tiburtina
Km 12,400
00131 Rome - Italy
T +39 06 41501
F +39 06 4131133

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