

LEONARDO ELECTRONICS

GAINS™

GROUND-AIR INTEGRATED SOLUTION



GAINS™ is the Leonardo solution that integrates actual and predicted traffic information from air-side and land-side sources, such to improve operational efficiency and situational awareness at airport.

OPERATIONAL CONTEXT

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 although 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.

Within this context, Leonardo has developed an integrated solution for Air to Land management. This exchanges airport operational information quickly and reliably sharing data among stakeholders, by means of user-tailored representations of airport processes.

Based on a System-of-Systems approach aimed to a seamless ATM, the GAINS solution integrates A-SMGCS services, on field and communication infrastructures, interoperability services and integrated tower working positions.

PERFORMANCE OUTLINES

- Fully compliance with safety and security standards
- Sustainability achieved by limiting environmental impacts
- Enhanced airport situational awareness by means of integrated traffic picture
- Safe movements on airport surface through automated guidance information for pilots and drivers
- Protection against a wide set of critical scenarios based on reliable control functions
- Optimised routing and runway occupancy, determined by sophisticated algorithms
- Improved airport efficiency based on collaborative planning of shared resources

INTEROPERABILITY SERVICES

Interoperability services allow real-time information sharing among Air Traffic Service Provider, Aircraft Crews, Airport Operators and Airlines, enabling Collaborative Decision Making (CDM) process through exchange of flight, surveillance and operational information among the different airport stakeholders.

ATM systems cover different phases of flight controlling bordering airspaces usually under control of different ATM centres. In detail Ground-to-Ground interoperability guarantees, in a unique ATM System:

- Seamless gate-to-gate ATM
- Full integration of ground and air surveillance
- Flight plan availability
- Silent tower coordination with Approach and Area Control Centres
- Transfer of Control (TOC) among tower controllers
- Shared and consistent use of the exchanged information, enabling interoperability among airport
- Operators' and Stakeholders' processes
- Coordinated planning of airport resources, facilities, and services for the end-users
- Faster reaction to critical traffic situations
- Integration of different communication systems facilitating the overall coordination of airport activities
- Stand and Gate management for Airport Operators
- Planning and control of handling services for turnaround
- Vehicle fleet management



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INTEGRATED TOWER WORKING POSITION

The Integrated Tower Working Position (ITWP) provides a fully integrated presentation of airport traffic, encompassing surrounding airspace and surface movements, through an innovative Human Machine Interface. Human factors are taken into account in the HMI design to allow Controllers for performing each operational task in a user-friendly and efficient way.

Flight data are displayed by means of flight lists and electronic flight strips, organized in configurable bays and sub-bays arranging strips depending on their state (pending bay, transfer bay, taxi bay, etc.).

This event-driven presentation guides Controllers on performing the correct sequence of operations through an intuitive interface in which automatic strips movements are driven by configurable system events (transfer procedures, clearances, etc.) while manual strip movements (drag and drop) allow for configurable system actions.

Major features provided by the ITWP are:

- Flexibility for different operational sectors layouts (Clearance Delivery, Ground, Tower, etc.)
- Presentation of surveillance and flight plan data in a seamless ATM scenario (e.g. labelling continuity)
- Integrated operational procedures like silent coordination between Tower and APP/ACC centres
- Availability of Departure Clearance (DCL) via air/ground data-link
- Support for ground procedures (start up, push back, taxi, line up, take off, landing clearance, on block, etc.)
- Provision of free handwriting notes, actualising the replacement of paper strips with electronic strips
- Enhanced configuration capabilities of screen layout and Controllers' action flow

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