LEONARDO ELECTRONICS

LeadInSky

ATM answers for demanding future Controllers

In recent years, progressive growth of air traffic, with a trend of about 3% per year, joined with challenges of reducing CO_2 emissions, call for more efficient operations and improved technology. Leonardo LeadInSky provides advanced solutions for Ground and En-Route Air Traffic Control. Those are based on the new operational concepts provided by international R&D programmes, such as the Single European Sky ATM Research (SESAR).

LeadInSky has been designed for:

- Modular architecture, achieved considering specific scenarios: from small Airports or Approach Control Units to very large nationwide ATM systems with multiple connected remote towers. The platform includes a new innovative and flexible Working Position designed for future Controllers
- Interoperability, achieved through SWIM Technical Infrastructure (SWIM-TI) capable to handle Flight, Aeronautical, and Meteo information coming from any assigned source
- Fall-Back and Disaster Recovery supporting reliable and effective continuity of operations under any outage/failure condition
- Simulator, designed for basic and advanced training of air traffic Controllers, capable to define and run multi-exercise sessions on heterogeneous operational scenarios

In detail LeadInSky functionalities grant:

- Trajectory Prediction and Conflict Detection & Resolution
- Support to new Trajectory-Based Operations and FF-ICE processes
- UTM-ATM interoperability
- Integration of Higher Airspace Operations as Suborbital, Hypersonic, and High-Altitude Platform Station (HAPS) flights
- Remotely Piloted Aircraft System (RPAS) insertion in controlled airspace
- Civil-Military Interoperability
- Digital evolution of airport integrated surface management
- Virtual centre and cloud-based ATM
- Trajectory prediction, conflict detection & resolution, speech recognition
- Cyber Security
- SWIM evolution supporting air-ground communication for ADS-C, UTM, and Micro Weather Forecasts applications
- Integrated Communication, Navigation, and Surveillance
- LDACS, multi-link capabilities
- Controller Working Position interaction modes at Tower and En-Route

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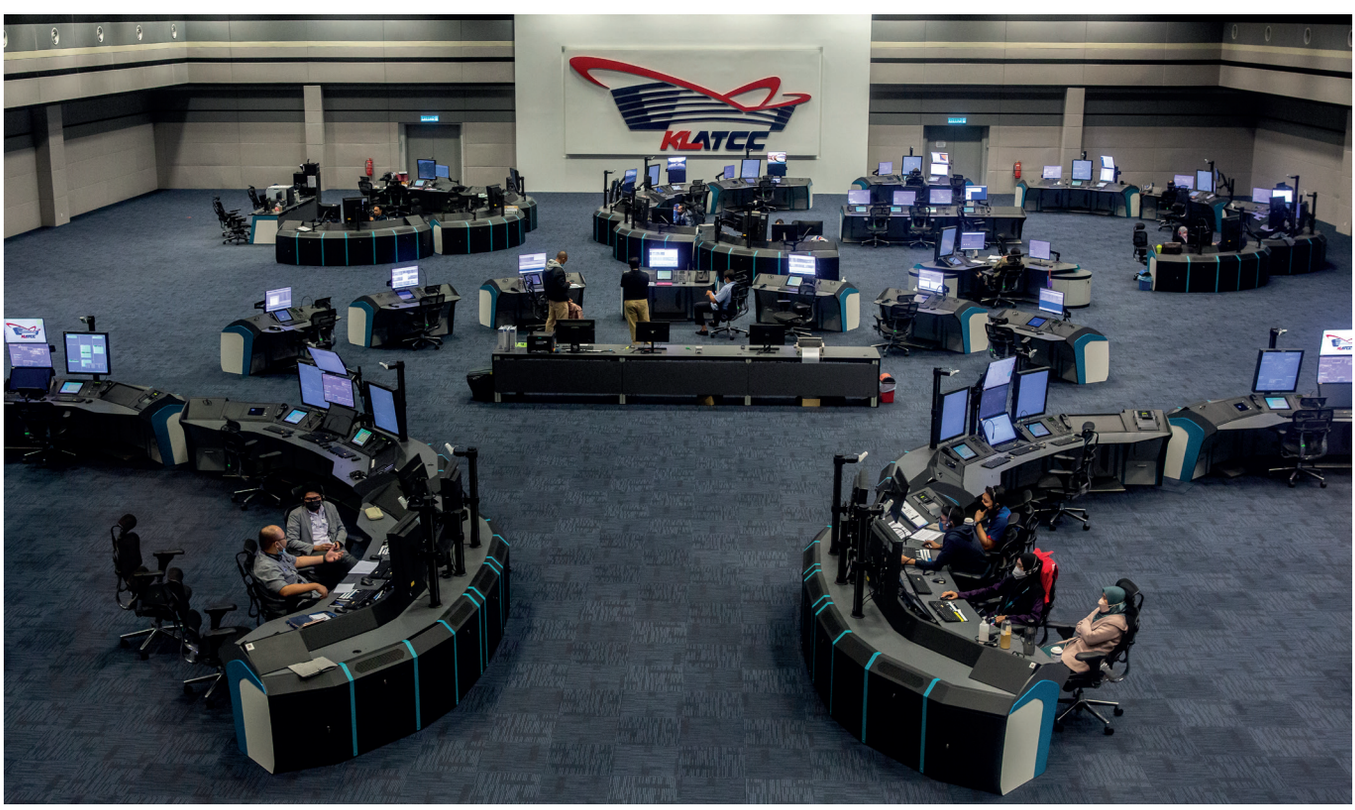
SWIM AND INTEROPERABILITY

LeadInSky can be deployed as a “SWIM-Enabled” application, supporting service-oriented and reliable information sharing to/from air transport stakeholders (Airport Operators, Airlines, Air Navigation Service Providers).
LeadInSky relies on the SWIM Technical Infrastructure (SWIM-TI), a Leonardo solution fully compliant to all applicable standards (e.g. EUROCONTROL Yellow Profile) and designed with an open modular architecture.

Modular architecture is intended to ease the introduction of different specialised data domain components (e.g. flight data, surveillance, weather, etc.) for implementing specific standards and technologies. Modularity also facilitates the transition of existing systems from “legacy” to SWIM based interactions.

SWIM-Enabled LeadInSky opens up a range of new interoperability opportunities via fully automated collaborative processes that involve heterogeneous and distributed ATM applications. For instance:

- Data distributions of different patterns via multiple technologies, each of which supported by commercial and/or open source COTS
- ATM Collaborative workflows for future concepts such as Trajectory Based Operations (TBO)
- Air/Ground data exchange uplink/downlink of safety-critical Information
- Civil-Military coordination exchange of mission trajectories and advanced flexible use of shared airspace
- ATM/UTM integration of advanced and urban mobility traffic
- FF-ICE processing for addressing highly automated flow management, flight planning, and trajectory management
- Inter-ACC coordination over SWIM to increase automation and network synchronisation



FALL-BACK & DISASTER RECOVERY

The Backup System provides high reliability during Air Traffic Management operations under any planned or unplanned outage conditions. Fall-Back is part of the flexible Air Traffic Management (ATM) platform developed to provide reliable backup solutions.

Backup System capabilities grant unnoticeable downtime to ATM operations in case of:

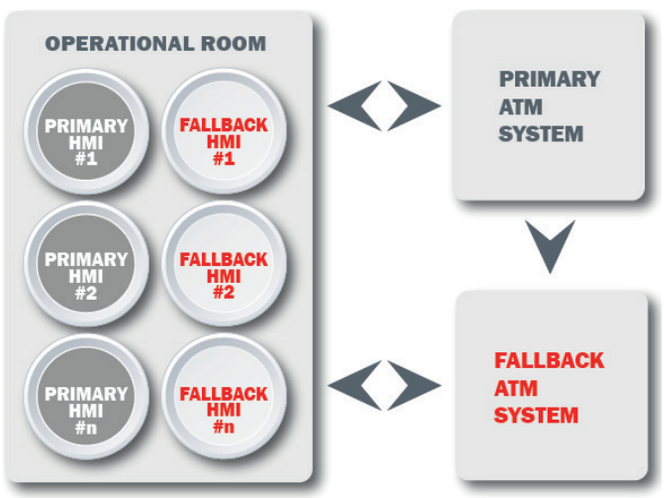
- Unexpected failure of a primary system
- Planned shutdown of a primary system
- Long-term planned or unexpected unavailability of a primary control room

Multilevel Fall-Back logics are implemented providing high availability of data processing and consistency via different levels of redundancy. Local hardware and application switch-over are managed through hot/stand-by configurations, available from any central processing unit.

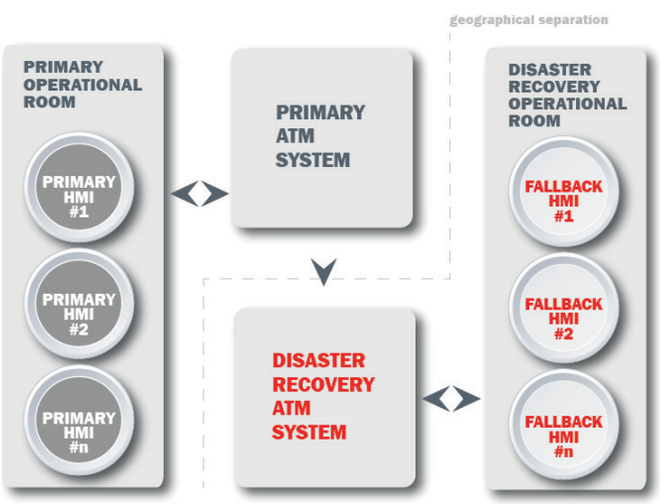
The Backup System can be deployed as:

- Fall-Back system, i.e. a backup system co-located with the primary one and sharing the operational room
- Disaster Recovery system, i.e. a geographically separated system with respect to the primary one, and possibly co-located with another primary system

Complete and immediate recovery of air traffic control is guaranteed even in case of total failure of the operational system. In case of shut-down of an operational site.
A “mirrored” structure can immediately acquire control such to grant safe and seamless operations.



LeadInSky deployed as fallback system



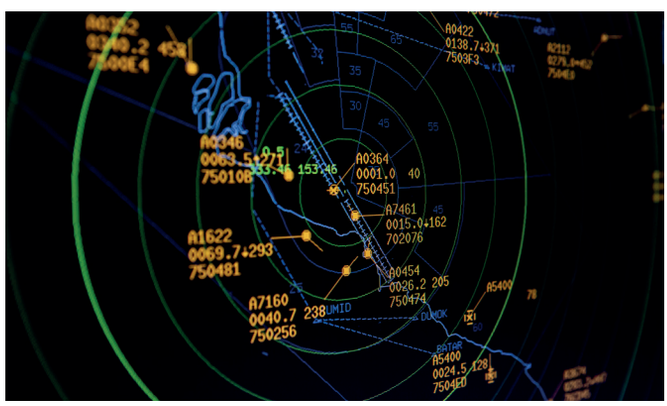
LeadInSky deployed as disaster recovery system

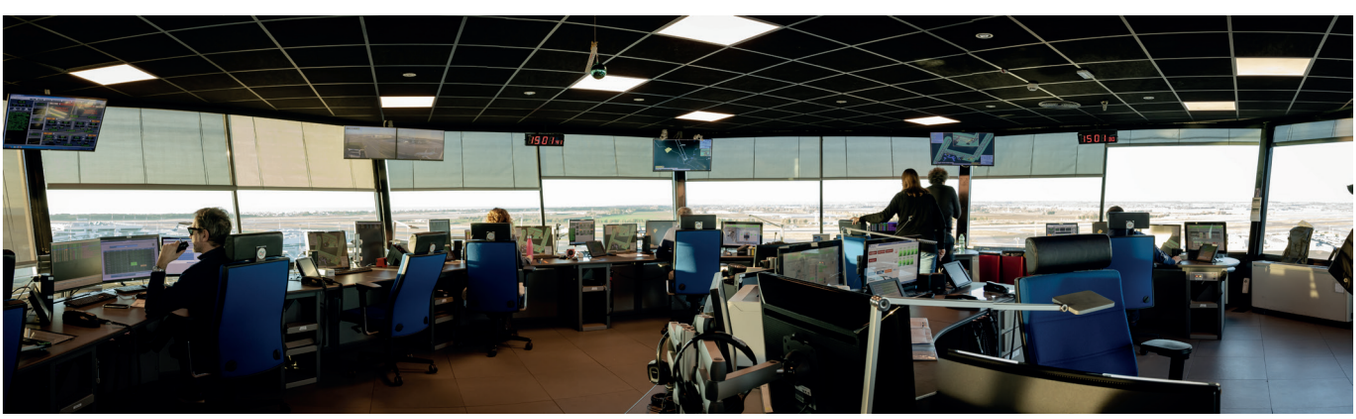
SIMULATOR AND TRAINING

LeadInSky Simulator supports executive and planner controllers training for both En-Route and Approach environments. The system also supports Air Traffic Management via evaluation of future workload, flow control, airspace configuration, and operational procedures. LeadInSky Simulator can also be used as back-up system in case of unavailability of operational workstations. LeadInSky Simulator is able to simultaneously run multiple exercises supporting student assessments by recording and playing back (at selected speed) exercise sessions.

In addition the system can restart any interactive exercise, at any time of playback, so that trainees can repeat and correct operations within the same exercise session.
Simulated targets are generated and displayed according to a given exercise. Each simulated target can be navigated either automatically or manually (i.e. following pseudo-pilot navigation).

Targets can simulate standard manoeuvres (e.g. SID, STAR, airways, holding, orbit and intercept radial) and landing procedures, following ILS. Exercises can also simulate missed approach procedures, primary/secondary radar failures, coverage losses, and variations of meteo conditions.





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MT00031-03-24

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