LEONARDO ELECTRONICS

ADAM

MULTILATERATION SYSTEM

ADAM (ADAptive Multilateration) is the Leonardo Multirateration system, providing a high performance and accurate all-weather Surveillance for Airport and Wide Area applications.

The Sensor design is such to allow very accurate Time of Arrival computation at receiver level. Sensor hardware architecture is completely modular, allowing to meet any customer specific system topology.

OPERATIONAL CONTEXT

ADAM is the best solution to provide an intrinsic level of modularity meeting the advanced requirements of a modern Air Traffic Control system.

ADAM exploits outstanding advanced sensors design and innovative target processing in a flexible and redundant architecture tailored for co-operative targets moving at airport surface as well as in TMA/En-route airspace.

ADAM complies with the latest international standards, such as EUROCAE ED-117/A, ED-129/A/B and ED-142 and RTCA DO-260/A/B and applicable ETSI HS.
ADAM is based on a network of receivers and/or receivers-interrogators positioned in strategic locations such to provide the required coverage, accuracy and continuity of service.

ADAM employs spontaneous Mode-S "squitter" transmission and asynchronous transponder replies.
It also manages DF17/DF18/DF19 ADS-B Extended Squitter messages.

PERFORMANCE OUTLINES

AIRPORT

- Improved accuracy and update rate
- Surface Movement Applications
- Runway Incursion Monitoring
- Situational Awareness through aircraft derived data
- Extended Arrival and Departure Procedures
- Closely Spaced Parallel Runway Operations
- Routing efficiency increase

WIDE AREA

- Complementary or alternative to radar surveillance
- Fully adaptable to specific environment
- Low and easy maintenance
- Reduced infrastructure costs in airspace
- Support in advanced/complex approaches

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ARCHITECTURE

The multilateration principle requires a distributed system in order to enable the simultaneous reception of signals at different locations on the airport and in TMA/ En-Route. ADAM consists of:

- a Network of Sensors,
- receivers
- receivers-interrogators
- receivers-synchronizers, positioned in strategic locations and providing required coverage, accuracy and continuity of service.

Each sensor has its specific antenna type, depending on the specific role and position:

- a Central Processing Facility (CPF) which collects extracted data and computes precise position of target
- a technical monitoring facility.

The ADAM CPF performs the functions here below:

- Target Location and Plot Extraction
- System Time Synchronization and Check
- Interrogation scheduling and Target Identification
- Target Tracking
- ADS-B Data Extraction
- ADS-B Data Integrity Check

Handling of Output Data Formats:
ASTERIX CAT10,19,20,21,23,25 and 247

KEY FEATURES

Time Synchronization is the core algorithm in TDOA multilateration system.
ADAM exploits two different time synchronization methods to meet the most stringent requirements.
Those depend on the coverage volume to be surveyed.

AIRPORT

- Squitter Transponder Based synchronization method which uses reference transmissions from a Squitter Generator Unit to tie up clocks at each Receiver unit site.

WIDE AREA

- Extended Area Time Based synchronization method which exploits GNSS timing receivers or ad-hoc equipment, embedded in each Receiver unit, to have a common timing reference for the In-Field section.

The in-field deployment is supported by Leonardo Engineering staff, either locally or remotely, during all phases of the project.

From design and configuration, supported by sophisticated modelling tools, to delivery and validation, ensuring efficient exploitation and best operational results.

TECHNICAL SPECIFICATIONS

1090/1030 MHz 3/6 dBi	Gain for short range
DME dBs 620	(3 dBi) omnidirectional
DME dBs 610	(6 dBi) omnidirectional
DME dBs 510A	(8 dBi) omnidirectional
DME dBs 5100A	(9.5 dBi) High Gain Omnidirectional
Kathrein Vpol 1087-1093 MHz	(11.5 dBi)
	Hgh gain omnidirectional
DME dBs 540	(12 dBi)
	High gain omnidirectional

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