OneControl MLAT

Provide ground surveillance at airports

ADB SAFEGATE

With global air traffic increasing at an exponential pace, airports and airport navigation service providers (ANSPs) have realized that radar alone is not enough to ensure end-to-end approach and on-ground surveillance. Multilateration (MLAT) technology is an optimal solution to extend coverage with higher accuracy and reliability.

The ADB SAFEGATE Solution

OneControl MLAT- ADB SAFEGATE's latest addition to its Tower ATM portfolio is the answer to airports' growing needs for secondary ground surveillance especially during low visibility conditions. It helps streamline operations, minimize costs and most importantly improve safety.

The OneControl MLAT is the most accurate and high precision multilateration product available in the market. It is a critical component of ADB SAFEGATE's OneControl solution for airports and guarantees a full and easy integration with the Advanced Surface Movement and Guidance Control System (A-SMGCS).

The OneControl MLAT is based on the proven time difference of arrival and time sum of arrival multilateration principles. Multilateration employs a number of ground stations or remote units, which are placed in strategic locations around an airport, its local terminal area or a wider area that covers the larger surrounding airspace.

The OneControl MLAT is a scalable, modular and independent system which can be adapted to every airport layout and coverage requirement by adding or removing the remote units.

The new state-of-the-art remote unit design exploits the latest technologies available - Artix®-7 FPGA and Software Defined Radio (SDR) - making it the most advanced and cost-effective solution for airports today.

ONE CONTROL

OneControl MLAT consists of the following components

Remote unit (RU) equipped with receiver and transmitter

The receiver of the RU receives, decodes and estimates the time-of-arrival (ToA) of secondary surveillance radar (SSR) signals. The transmitter is able to interrogate transponders and to transmit SSR signals. The RU can also be installed without transmitter and/or in redundant configuration.

Reference Position Validation

The unit performs continuous system validation and system integrity checks so that the required accuracy can be guaranteed.

Central processing and control unit (CPCU)

The CPCU is the central node of the multilateration system. All RU data is received and processed at the CPCU to generate the system output.

Data links between RUs and CPCU

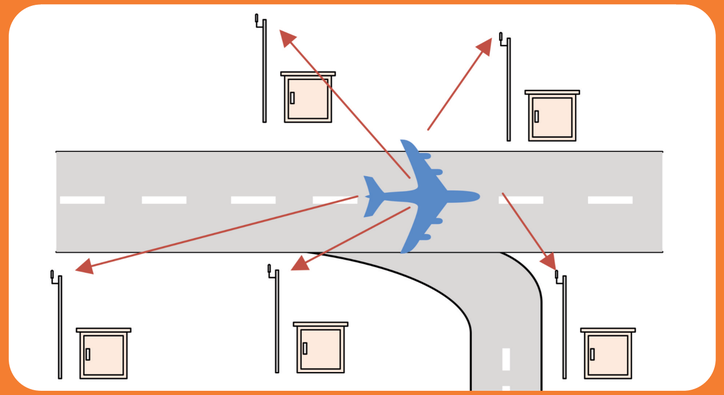
SYSTEM KEY FEATURES

- Fully standardized and fulfilling EUROCAE minimum operational performance specifications ED-117 and ED-117A
- Modularity and expandability
- Independence of GNSS systems
- COTS CPCU hardware
- Support of various data link types between CPCU and RUs
- Automatic Dependent Surveillance - Broadcast (ADS-B) data extraction and integrity check
- MLAT position tracking
- EUROCONTROL ASTERIX data output:
  - Category 010 Surveillance data exchange
  - Category 020 MLAT position reports
  - Category 019 MLAT status
  - Category 021 ADS-B position reports

KEY PERFORMANCE PARAMETERS

- Update rate is at least once per second, configurable, periodic and data driven
- Ground accuracy of less than 7.5 meters with a confidence level of 95%
- Capacity of at least 350 simultaneous targets
- Temperature range of -40°C to +55°C and relative humidity up to 100% non-condensing
- Supported downlink formats (DF) 4,5,11,17,18,20 and 21
- Decentralized time-synchronisation system using transmitter synchronization
- Cabinet version for outdoor usage and rack version for indoor
- Mode S implementation in line with new EU transponder regulation
- EU directive 2014/53/EU certified
- Remote monitoring using SNMP

What is unique to the **OneControl MLAT** is its ability to substantially reduce the multipath effect which in turn decreases the reflection of neighboring surfaces such as buildings or aircraft. This helps guarantee a higher number of aircraft movements even in low visibility conditions.



What is Multilateration?

Multilateration (MLAT) is a technology for accurately detecting the position of aircraft and ground-based vehicles using a method called 'Time Difference of Arrival' (TDOA). This technology uses several distributed ground-based stations listening to Secondary Surveillance Radar (SSR) transponder signals. Such signals are emitted by aircraft which are required to be equipped with an SSR transponder and by vehicles that can also be equipped with transmitter devices emitting such signals. The ground stations, also called remote stations (RS), are accurately time synchronized and assign a timestamp, the so-called Time of Arrival (TOA), to each SSR message they receive. The decoded and timestamped messages are then transmitted to a central processing unit called the Target Processor (TP).

The TP is able to calculate aircraft or vehicle positions from the timestamp differences of SSR messages which are received at distinct RS. Furthermore, the TP also decodes and forwards Automatic Dependent Surveillance - Broadcast (ADS-B) information sent by aircraft. ADS-B provides the possibility for aircraft transponders to downlink information such as their GNSS position, speed and emergency information.

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