

CASE STUDY



UTILIZING SPACE-BASED ADS-B TO ENHANCE SITUATIONAL AWARENESS AND INCREASE OPERATIONAL EFFICIENCIES

The Air Traffic and Navigation Service Company Limited (ATNS) is a State-Owned Company (SOC), established in 1993 to provide air traffic management solutions and associated services on behalf of the State. ATNS provides air traffic, navigation, training and associated services within South Africa and a large part of the Southern Indian and Atlantic Ocean, comprising approximately 10% of the world's airspace (See Figure 1). These services accord with International Civil Aviation Organization (ICAO) standards and recommended practices, and the South African Civil Aviation Regulations and Technical Standards. As an air navigation services provider (ANSP), ATNS is governed by the nation's legislative and administrative framework.

CURRENT AIR TRAFFIC SURVEILLANCE LIMITATIONS

The majority of the existing surveillance infrastructure in the region is aimed at supporting the local international airports and existing fixed route structures (upper airspace).

The challenges associated with the deployment and maintenance of these ground based systems to the required operational standards are related to:

- Capital investment requirements to replace systems;
- Operational cost to maintain systems;
- Availability of supporting infrastructure (electricity and telecommunications);
- Remote areas;
- Low levels of integration and interoperability;
- Increasing requirements on preventative and corrective maintenance as terrestrial equipment ages.

FUTURE PLANS FOR SPACE-BASED ADS-B

Once the AireonSM space-based Automatic Dependant Surveillance-Broadcast (ADS-B) service is operational, the data can be distributed through the region on the existing Southern African Development

Community (SADC) and NAFISAT (VSAT-based connection among Southern African ANSPs) networks, from where the data could be merged with the legacy, ground-based surveillance and air traffic management systems. ATNS (and other ANSPs) can apply the data either as an independent autonomous or complementary contributing or redundant source of surveillance, to mitigate issues that may arise with existing ground based surveillance systems such as ground-based ADS-B sensors, rotating radars and telecommunications lines.

THE BENEFITS

The aviation community within the African and surrounding regions could expect substantial benefits from space-based ADS-B. These potential benefits are:

- Introduction of homogeneous and reduced separation standards on major routes;
- Greater access to preferred flight levels as a result of reduced separation between aircraft and subsequent reduction in fuel burn and GHG emissions;
- Improved monitoring of the RVSM flight levels and as a consequence reporting of large height deviations by aircraft;
- Continuous service delivery;
- Improved operational efficiency;
- Enhanced safety;
- Improved situational awareness, conflict detection and reaction/resolution;
- Enhanced search and rescue capabilities in remote areas;
- More complete and accurate reporting;
- Better support of the Safety Management System;
- Potential for savings from a reduction in ground-based surveillance investments and maintenance;
- Lay the foundation for the region towards the introduction of performance-based surveillance.