

# CASE STUDY



## UTILIZING SPACE-BASED ADS-B AS AN INDEPENDENT SOURCE OF SURVEILLANCE

*The Civil Aviation Authority of Singapore (CAAS) is the Air Navigation Service Provider (ANSP) for Singapore. It manages the Singapore Flight Information Region (FIR) of about 840,000 square kilometers with some 720,000 aircraft movements a year.*

### CURRENT AIR TRAFFIC SURVEILLANCE

The Singapore FIR covers a large part of the South China Sea. The South China Sea region consists of mostly oceanic airspace, with few land areas to install ground-based surveillance and communications systems. In airspace without complete and effective surveillance and communications coverage, air traffic controllers have to apply larger separations between aircraft to ensure safe operations.

The International Civil Aviation Organization (ICAO) Asia Pacific Office has been encouraging the sharing of Automatic Dependent Surveillance – Broadcast (ADS-B) data and Very High Frequency (VHF) radio facilities among States to help cover the surveillance and communications gaps. Since 2013, this initiative has helped to extend the surveillance and communications coverage to some areas of Singapore FIR beyond the range of Singapore's terrestrial surveillance sensors and VHF radio facilities. As a result, aircraft separation for some of these areas has been reduced, thereby increasing operational efficiency and airspace capacity.

Singapore is continuously working on means to further improve surveillance and communications coverage for the Singapore FIR. Aireon's space-based ADS-B provides an improvement over the existing surveillance coverage.

### FUTURE PLANS FOR SPACE-BASED ADS-B

CAAS will integrate space-based ADS-B data with those from the existing surveillance sensors. The space-based ADS-B data will serve as an independent and separate source of surveillance data over the Singapore FIR, to complement the existing data.

Space-based ADS-B enables CAAS to have surveillance over the entire Singapore FIR. For areas with existing surveillance coverage, the space-based ADS-B data will provide multiple layers of coverage for greater assurance of service. This comprehensive surveillance picture will provide controllers with additional situational awareness of aircraft movements and thus enhance safety.

In the future, when either VHF communications or reduced separation minima for satellite-based communications, including data link, become available in existing non-VHF radio coverage areas, aircraft separation in such areas can be reduced accordingly, thereby further increasing operational efficiency and airspace capacity.