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ICAO EMERGING SURVEILLANCE TECHNOLOGIES SYMPOSIUM

Use of ADS-B in GNSS RFI Monitoring

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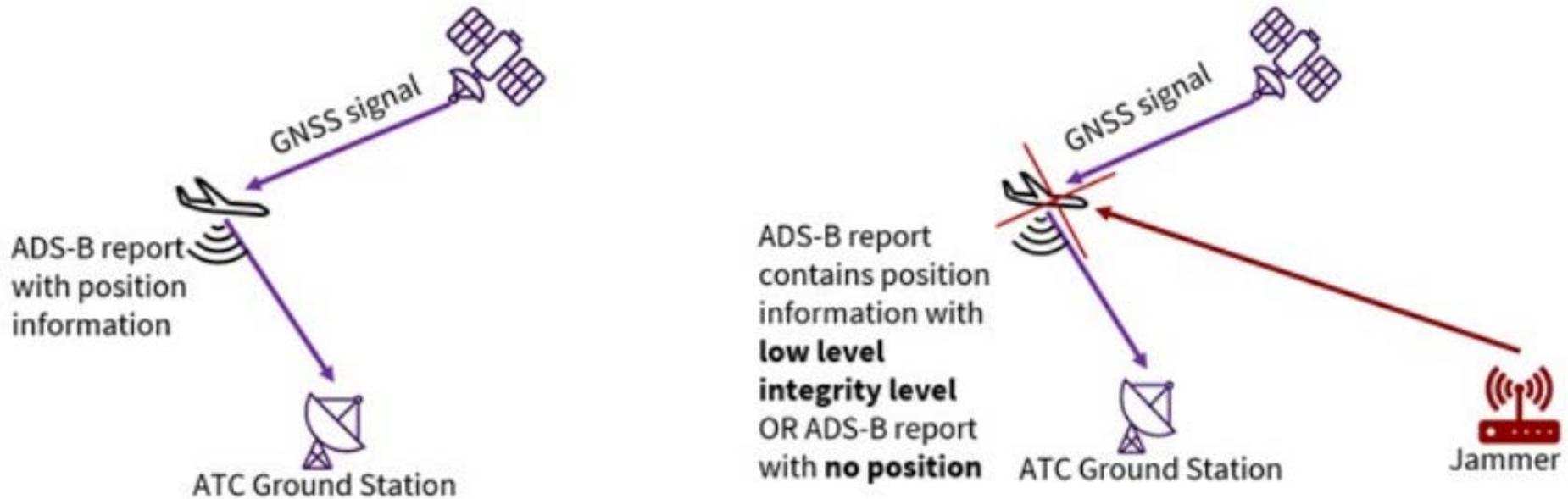
General

- ADS-B is a surveillance system used by commercial aircraft and was made mandatory in Europe and the U.S.A. by 2020
- It broadcasts position and velocity messages based on positions from certified GNSS based position estimates. These messages are transmitted every 0.4 – 0.6 sec through Mode-S Extended Squitter on the 1090 MHz frequency
- Radio-frequency Interference (RFI) source can disrupt aircraft operations and result in unavailability of GNSS service.
- This sudden loss of navigation can be monitored through ADS-B reports on the ground side.

Application to GNSS interference detection

- Radio-frequency interference (RFI) sources can cause denial of GNSS-based landings for aircraft
- The sudden loss of navigation is a safety issue
- Due to the growing dependence of critical and safety-of-life systems on GNSS in aviation, it is important to be able to localize the RFI source as well so that it can be removed as quickly as possible

How interference event can affect ADS-B Output



Application to GNSS interference detection

- Aircraft broadcast their GNSS-derived position information through the Automatic Dependent Surveillance– Broadcast (ADS-B) system to the ground station.
- Therefore, by monitoring the ADS-B outputs (e.g., NIC/NAC parameters) on the ground side, we can identify instances when interference impacts an aircraft's positioning and navigation capabilities.
- Similarly, the system can offer positive evidence when GPS is currently functioning well within an area providing ground personnel better situational awareness.

Some ongoing initiatives

- Several Project/Groups have already investigated the use of ADS-B to localize GNSS interference
- Aireon: to provide alerts of potential GPS interference events by monitoring change of Navigation Accuracy Category–Position (NACp) parameter from ADS-B message
- EUROCONTROL: use of ADS-B to determine GNSS affected regions in the eastern Mediterranean
- ENJOY (EgNos based flight Operations) Project started in 2021

THANK YOU

