



ICAO

*International Civil Aviation Organization***Ninth Meeting of the Surveillance Implementation
Coordination Group (SURICG/10)***Bangkok, Thailand, 21 - 23 April 2025***Agenda Item 8:** Update on surveillance activities and explore potential cooperation opportunity

a) States/Administrations

**GNSS VULNERABILITIES AND
THE SIGNIFICANCE OF ADS-B CENTRAL DATA PROCESSOR**

(Presented by Hong Kong, China)

SUMMARY

This paper presents the important role that ADS-B Central Data Processor System (CPS) plays in enhancing air traffic surveillance. ADS-B CPS collects, processes and analyzes the aircraft surveillance data received from ADS-B ground stations, and disseminates the processed data to air traffic management systems. It provides trustworthy ADS-B data to air traffic management systems for precise presentation of aircraft positions and movements, and thus enhancing safety and efficiency of air traffic operations.

1. INTRODUCTION

1.1 Since ADS-B implementation in Hong Kong in 2016, ADS-B CPS has been serving as a core component in the ADS-B system. It is deployed to collect, process and analyze aircraft surveillance data received from ADS-B ground stations, and then disseminates the processed data to air traffic management systems to facilitate air traffic operations.

1.2 ADS-B CPS plays an important role in ensuring reliability and integrity of ADS-B data utilized for air traffic operations, particularly in presence of GNSS vulnerabilities, including GNSS spoofing and interference.

1.3 In the context of GNSS spoofing, which poses a threat to the integrity of ADS-B data, ADS-B CPS plays a crucial role in safeguarding civil aviation safety by preventing false location data from being propagated to air traffic management systems.

2. DISCUSSION

2.1 ADS-B data received from ADS-B ground stations could be susceptible to errors, inaccuracies and inconsistencies. ADS-B CPS processes and validates the data to ensure ADS-B data utilized for air traffic management remains accurate, trustworthy, and conducive to safe and efficient air traffic operations.

2.2 The sheer volume of ADS-B data generated by numbers of aircraft transmitting signals simultaneously could be overwhelming for air traffic management systems to handle efficiently. It is more efficient and cost effective for ADS-B CPS to process the large volume of ADS-B data in real-time before disseminating to air traffic management systems.

GNSS Spoofing

2.3 For GNSS spoofing, the affected area is usual rather local. When it occurs, various aircraft at different locations within the area are GNSS spoofed to be located at the false location. Depending on the fusion algorithm of the air traffic management systems, they might not be capable to identify the circumstance, but display the false location of the aircraft on the air situation display. This falsified targets can potentially trigger false conflict alerts, leading to situational confusion while increasing workload on manually verifying with the pilots on the actual aircraft positions. All of these poses risk to air traffic safety.

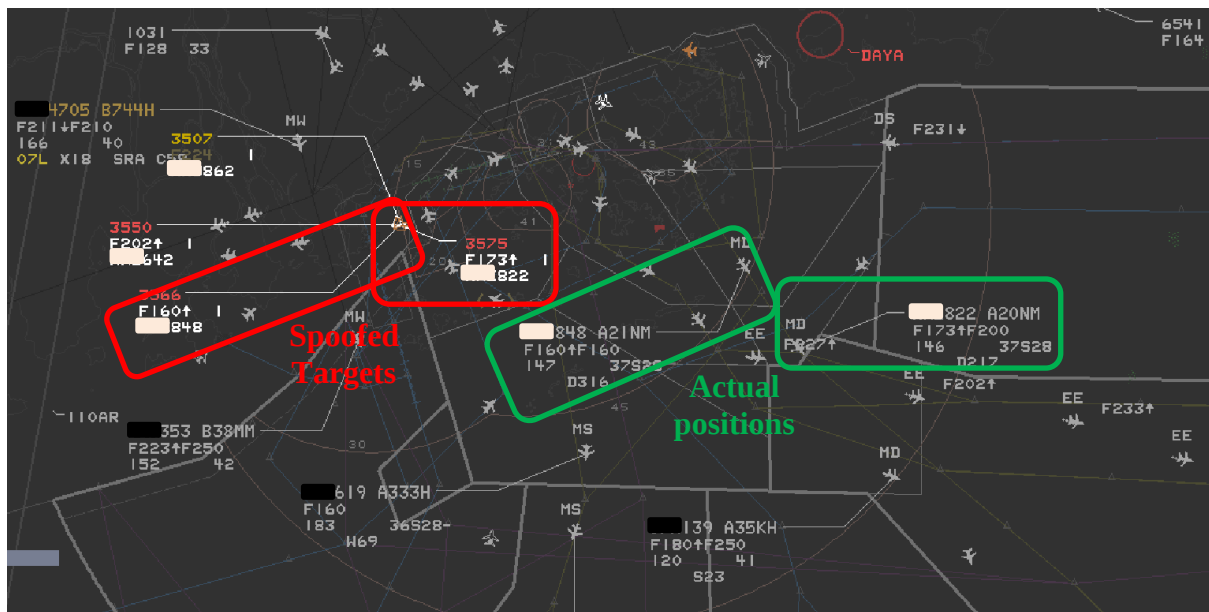


Figure 1 – Spoofed Targets versus Actual Positions shown on Air Situation Display

2.4 With provision of ADS-B CPS, it can conveniently filter out a geographical area of ADS-B data, where spoofed location of aircraft is detected, especially when the concerned area is covered by other surveillance sources, such as secondary radars. By filtering out the geographical area where there are compromised ADS-B data, it can ensure that the air traffic management systems can receive accurate and trustworthy data for safe air traffic operations.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) appreciate the usefulness of ADS-B CPS in enhancing air traffic surveillance and overall safety and efficiency of civil aviation;
- b) encourage States/Administrations to consider implementation of ADS-B CPS in accordance with the AIGD; and
- c) discuss any relevant matter as appropriate.
