



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON, DC**

22 December 2021

MEMORANDUM FOR MAJCOM A3/A8s, DRU Commanders

FROM: HAF/A3

SUBJECT: HAF SII 21-01: Airworthiness Advisory: Potential 5G Radar Altimeter (RADALT) Interference

United States Air Force (USAF) Airworthiness Advisory (AA) AA-21-04 informs program offices and operators of the planned deployment of wireless broadband networks in the 3.7- 4.2 GHz bands. This advisory applies to all air systems in the USAF inventory.

BACKGROUND

Worldwide, countries have begun allocating radio-frequency spectrum to support new 5G terrestrial wireless services. These countries include: Australia, France, Japan, Qatar, South Korea, and the United States (Available December 5, 2021, expected deployment 5 January, 2022). Most 5G services operate between 3.4 - 3.8 GHz, although several countries have allocated bands higher than 3.8 GHz, up to 4.2 GHz. In the United States, the Federal Communications Commission (FCC) has auctioned frequencies in the 3.7-3.98 GHz band with initial deployment to occur in the 3.7 - 3.8 GHz band beginning 5 December 2021 in 46 markets. Radio or radar altimeters (RADALTs) operate between 4.2 - 4.4 GHz but can be susceptible to interference from emissions outside that frequency band.

When installed, RADALTs may feed critical data to a wide range of automated safety-critical functions and systems. Systems of concern include Terrain Awareness Warning Systems (TAWS), Enhanced Ground Proximity Warning Systems (EGPWS), Traffic Collision Avoidance Systems (TCAS), and auto-land systems. Current testing for civil systems indicates a potential for major risk exists with 5G systems in the 3.7- 3.98 GHz band.

Expected Commercial 5G Deployment Timeline in the United States:

- Between January 2022 and December 2023, telecommunications providers will roll 5G infrastructure out to all US markets. The telecommunications industry has not published public Partial Economic Areas (PEAs) 5G deployment schedules.
- Starting in January 2022 telecommunications providers will deploy 5G systems into PEAs. While there is not a clear timeline on the deployment order, it is likely large metro areas will be first.
- By December 2023, all existing C-Band licensees (mainly SATCOM) must vacate the spectrum. However, the FCC incentivized early exits. From December 2023, expect 5G to be the standard across all markets and PEAs.
- The telecommunications industry offered a moratorium on power output between January 22 and June 22 while the FAA collects data and makes operational restriction decisions

beyond the one published this week. After this date the telecommunications industry will use the spectrum as licensed.

The Office of the Secretary of Defense has established a Joint/Interagency Five-G Radio Altimeter Interference (JI-FRAI) task force to conduct bench and flight testing to characterize 5G interference on commercial and military radar altimeters. Testing will continue through August 2022, and will inform development of solutions for RADALT sensors to mitigate the risk.


RECOMMENDATIONS

MAJCOMs and DRUs should work with their respective units to ensure pilots are aware interference may present as inoperative or erroneous data. Pilots need to monitor their automation, as well as their RADALTs for discrepancies, and be prepared to take action. Pilots encountering RADALT anomalies should transition to procedures that do not require radio altimeter.

MAJCOMs should work with their respective Program Offices to provide detailed reports of radio altimeter disruptions or interference events as soon as practical (post flight) to responsible Program Office Chief Engineers. Chief Engineers will pass these reports on to the USAF Airworthiness Office (USAF.Airworthiness.Office@us.af.mil). Reports of RADALT anomalies should contain as much of the following as applicable:

- Date and time the anomaly was observed
- Location of the aircraft at the time the anomaly started and ended (e.g. latitude, longitude or bearing/distance from a reference point)
- Magnetic heading
- Altitude
- Aircraft type (make/model)
- RADALT equipment in use (make/model/software series or version)
- Duration of the event
- Consequences/operational impact(s)
- Symptoms of event (e.g., creeping altimeter indications, failed off, wrong indication)
- Impacted equipment, systems, functions, capabilities, tactics, techniques, and procedures
- Actions taken to mitigate the disruption

This is an AF/A3 directive. Recommend each MAJCOM use existing Flight Crew Information File (FCIF) procedures to manage the implementation of this SII guidance, effective 22 December 2021. The USAF Airworthiness Office is the POC for the Airworthiness Advisory (USAF.Airworthiness.Office@us.af.mil). The AF/A3 POC is HQ Air Force Flight Standards Agency, hqaffsa.a3o@us.af.mil.



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