Civil Aviation Authority

SAFETY NOTICE

Number: SN–2021/017

Version 2 Issued: 18 January 2022

Potential Interference Risk to Radio Altimeters from 5G mobile Technology

This Safety Notice contains recommendations regarding operational safety.

Recipients must ensure that this Notice is copied to all members of their staff who need to take appropriate action or who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

Applicability:	
Aerodromes:	Certified/Licensed Aerodromes
Air Traffic:	Air Traffic Service Providers
Airspace:	Not primarily affected
Airworthiness:	All UK CAA approved organisations
Flight Operations:	All CAA Approved or Declared Organisations and Operators, including General Aviation
Licensed/Unlicensed Personnel:	ATCO and Pilots

1 Introduction

1.1 The purpose of this Safety Notice is to provide information and guidance for operators regarding potential interference to the operation of radio altimeters from 5G mobile technology. This SN has been revised to clarify the required actions when flying in areas where restrictions may be in place.

2 Background

2.1 Radio Altimeters support a range of functions on board an aircraft and provide critical data for the safe execution of aircraft operation. Globally, the roll out of 5G telecommunications networks continues to expand at a rapid pace, with many nations electing to allocate currently unused spectrum that is located closer to the Aerospace Reserved Band used by Radio Altimeters, to 5G operations. Consequently, concern has been raised by several National Aviation Authorities ("NAAs") that Radio Altimeters may be prone to interference from 5G telecommunications frequencies that could result in loss or malfunction of Radio Altimeter functionality.

2.2 The deployment of 5G mobile technology varies by state and is individually managed by state radio regulators. Deployment of 5G mobile technology is across a range of different frequency bands, output powers and other technical variables which dictate the operating environment that radio altimeters will be required to function in. In the UK 5G mobile broadband networks are being rolled out in multiple bands including networks in the 3.6-3.8GHz frequency band.

Although the CAA has no jurisdiction over radio spectrum management and the allocation of spectrum, it does have a responsibility for aviation safety in the United Kingdom. Some countries have introduced temporary technical, regulatory or operational mitigations on mobile telecommunications providers and/or aviation industry to mitigate against the potential risk of interference.

2.3 The UK CAA is working closely with other NAAs to evaluate threats associated with the various national 5G roll out plans, noting that different national mobile telecommunication strategies may mean that some states have a higher threat exposure than others. Airframe and equipment manufacturers have also been requested to supply any relevant data they may have regarding system resilience to potential 5G interference.

2.4 Depending on specific aircraft architecture, the radio altimeter is an information source for a range of avionic systems, including (but not limited to) autoland capability, terrain awareness and Ground Proximity Warning System ("GPWS") functions, Traffic Collision Avoidance System ("TCAS") modes, flight control laws and autoflight protections. Threat modelling being conducted by aircraft manufacturers has looked at worst case interference levels resulting in complete loss, erroneous signals or potential display disagreements (where more than one radio altimeter is fitted). The susceptibility for aircraft to such interference is dependent on the aircraft type and avionics systems fitted.

2.5 Conversations with other NAAs has established that there have been no confirmed instances where 5G interference has resulted in aircraft system malfunction or unexpected behaviour. It should be noted that in some states 5G infrastructure is not yet in place and that past performance is not a guarantee for future applications.

3 Operations in the USA

3.1 The UK CAA acknowledges the Federal Aviation Administration's ("FAA") assessment of the increased risk specific to the United States due to potentially higher 5G ground station power emissions and the measures required by FAA Airworthiness Directives (ADs) 2021-23-12 and 2021-23-13, which are applicable to N-registered airplanes operating in the USA. Consequently, the FAA started issuing NOTAMs on 13 January 2022, prohibiting certain operations, unless alternative methods of compliance (AMOCs) are approved by the FAA.

3.2 The ADs and NOTAMs address situations specific to operations in United States airspace. For this reason, after conferring with the FAA, the CAA did not adopt the FAA ADs. The CAA is aware that AMOCs submitted by aircraft manufacturers to the FAA are now starting to be approved. Therefore, AMOCs approved by the FAA to AD 2021-23-12 and 2021-23-13 do not require the UK CAA to adopt or approve these documents, for operators of UK registered aircraft to be permitted to use them.

4 Action to be Taken

4.1 Operators should ensure their flight crew are aware of the possible implications of radio altimeter malfunctions for the types of aircraft operated; this may be particularly relevant when conducting Low Visibility Operations.

4.2 Where a state, based on safety analysis of its own 5G roll out, has issued a NOTAM or similar directive, UK operators are required to adhere to any state operational restrictions. The absence of a NOTAM does not necessarily imply that interference will not be encountered.

4.3 Flight Crew and those involved in Operational Control/Despatch should be able to identify the AD status of each aircraft in their fleet and the relevance of any applicable AMOC to ensure correct operational restrictions are applied (if required) for the route of flight. For clarity, this

includes flights to airports, through the airspace of, or when using en-route alternates belonging to, a state that has issued 5G related NOTAMs.

4.4 Flight crew experiencing radio altimeter or autoflight malfunctions should not assume that this has been caused by 5G interference and should follow normal operating procedures for any malfunctions or failures. Although flight crew should be aware of the possibility of 5G interference, any malfunctions observed may well be caused by other factors such as radio altimeter and associated antenna technical failures.

4.5 Any flight crew observations of radio altimeter or autoflight malfunction should be reported using normal company safety reporting procedures. Flight crew should include as much detail regarding the type of malfunction, including duration and location (particularly if during an approach or departure phase), the runway in use and the height above the ground that the malfunction was observed. If the commander assesses that the malfunction resulted in a significant risk to aviation safety the report should be submitted as an MOR, in accordance with the requirements of UK Reg (EU) No. 376/2014.

4.6 Aerodromes should be cognisant of the potential risk of interference and associated trends that may emerge which could impact operations more widely.

4.7 Operators are responsible for ensuring compliance with CAT.GEN.MPA.140 regarding the use of Portable Electronic Devices on board an aircraft. This includes adherence to operator safety measures, including the deactivation of the transmitting capability by activating the so-called ‘flight mode’ or ‘flight safety mode’ on mobile devices.

5 Further Information

5.1 The CAA will continue to work internationally to gather additional data to develop its position on this issue and will continue to monitor reporting trends. The CAA also remains engaged with the radio regulator Ofcom to remain abreast of the UK roll out in the band of interest.

6 Queries

6.1 Any queries or requests for further guidance as a result of this communication should be addressed via the organisation’s operations inspector or airworthiness surveyor.

7 Cancellation

7.1 This Safety Notice will remain in force until further notice.