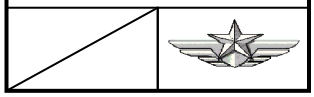
No. 3754-S-34

# SAFETY INFORMATION NOTICE

**SUBJECT: NAVIGATION**

**Potential interference of Radar-Altimeter (RA) by with wireless broadband operations (5G)**

**For the attention of**



| AIRCRAFT CONCERNED | Version(s) | |
|---|---|---|
| | Civil | Military |
| EC120 | B | |
| AS350 | B, BA, BB, B1, B2, B3, D | L1 |
| AS550 | | A2, C2, C3, U2 |
| AS355 | E, F, F1, F2, N, NP | |
| AS555 | | AF, AN, SN, UF, UN, AP |
| EC130 | B4, T2 | |
| SA365 / AS365 | C1, C2, C3, N, N1, N2, N3 | F, Fs, Fi, K, K2 |
| AS565 | | MA, MB, SA, SB, UB, MBe |
| SA366 | | GA |
| EC155 | B, B1 | |
| SA330 | J | Ba, L, Jm, S1, Sm |
| SA341 | G | B, C, D, E, F, H |
| SA342 | J | L, L1, M, M1, Ma |
| ALOUETTE II | 313B, 3130, 318B, 318C, 3180 | |
| ALOUETTE III | 316B, 316C, 3160, 319B | |
| LAMA | 315B | |
| EC225 | LP | |
| EC725 | | AP |
| AS332 | C, C1, L, L1, L2 | B, B1, F1, M, M1 |
| AS532 | | A2, U2, AC, AL, SC, UE, UL |
| EC175 | B | |
| H160 | B | |
| BO105 | C (C23, CB, CB-4, CB-5), D (DB, DBS, DB-4, DBS-4, DBS-5), S (CS, CBS, CBS-4, CBS-5), LS A-3 | CBS-5 KLH, E-4 |
| MBB-BK117 | A-1, A-3, A-4, B-1, B-2, C-1, C-2, C-2e, D-2, D-2m, D-3, D-3m | D-2m, D-3m |
| EC135 | T1, T2, T2+, T3, P1, P2, P2+, P3, EC635 T1, EC635 T2+, EC635 T3, EC635 P2+, EC635 P3, T3H, P3H, EC635 T3H, EC635 P3H | |

At the end of 2021, FAA published two Airworthiness Directives (2021-01170-R-D for rotary-wing and AD-2021-1169-T-D for fixed-wing concerning potential interference of Radar-Altimeters (also named Rad**io** Altimeter) from wireless broadband antennas operating in frequencies from 3.7GHz to 3.98 GHz (5G C-band). Both AD's therefore limit certain aircraft operations when Radar-Altimeter data are required.
On its side the EASA did not consider the FAA AD eligible for adoption. However, EASA has published a Safety Information Bulletin dealing with the same technical topic (EASA_SIB_2021-16, dated 17th December 2021).
**All aircraft fitted with one or more Radar-Altimeter system are affected by the FAA AD's, EASA SIB's and so by the present document.**
The target of this document is to provide customers with information on the topic, status of ongoing investigations by rotorcraft manufacturer(s) and recommendations to the flight crew for operations where the use or Radar-Altimeter may be used in the presence of 5G C-Band interference.

**Background information, issue description:**

The Federal Communications Commission (FCC) reallocated a portion of the 3.7–4.2 GHz frequency band, making the frequency spectrum from 3.7–3.98 GHz available for 5G wireless applications. This frequency band may introduce harmful radio frequency (RF) interference to Radar-Altimeters s currently operating in the globally-allocated 4.2–4.4 GHz aeronautical band. Radar-Altimeters are the only sensor onboard civil aircraft which provides a direct measurement of the clearance height of the aircraft over the surface or other obstacles. A Special Committee (RTCA SC-239) formed a 5G Task Force to lead an investigation in the matter. Using technical information supplied by the mobile wireless industry and Radar-Altimeter manufacturers, the conclusion of the research effort revealed a risk that 5G telecommunications systems in the 3.7–3.98 GHz frequency band may cause interference to Radar-Altimeters on all types of civil aircraft—including commercial transport airplanes; business, regional, and general aviation airplanes; and transport and general aviation helicopters.
This conclusion led the FAA to release the AD's mentioned above and the NOTAMs addressed below.
Early in January 2022, telecommunication industry agreed to delay the activation of the 5G C-Band. It is now planned for deployment on the 19th of January.
Preliminary feedback from our Radar-Altimeters suppliers indicates that 5G interference with Radar Altimeters may be manifested in many ways, including Radar-Altimeter failure; freezing of the Radar Altimeter display; erratic Radar Altimeter behavior; Radar Altimeter incorrectly displaying height (under/overestimated height…); etc.
Note that the Radar-Altimeter is often linked to other aircraft systems that rely on height-above –surface (Auto-Pilot, TCAS, and other alerting systems such as landing gear non-extension warning, etc.). Therefore, these systems may also be affected (loss of warning or spurious warning) by the 5G cellular interference which may reduce their safety benefit.

**Current Status:**

According to the latest information available to the aeronautic industry, the United States 5G C-Band technical characteristics is the more likely to create interferences than 5G C-Band network deployed elsewhere. This situation may evolve according to future deployment planning in other countries and their 5G C-Band characteristics. Therefore, the aeronautic industry may expect that 5G interferences may be possible in other areas of the world.
For operations in U.S. airspace, the AD states that the FAA has published NOTAMs (Notice to Air Mission) detailing specific areas in which the AD is applicable. In general, the NOTAM's are issued for areas surrounding major airports. In the future new NOTAMs may be published as new 5G C-Band networks are deployed and current NOTAM may be also revised to reflect changes in the cellular transmission characteristics, refer to https://notams.aim.faa.gov/notamSearch/nsapp.html#/results.
Note that the FAA AD and the FAA NOTAMs only restrict operations requiring the use of Radar-Altimeter data. Thus, if procedures do not require the use of Radar-Altimeter data, the AD and NOTAM do not apply to that operation.
Nevertheless, since helicopters frequently operate at lower altitudes and in areas where 5G C-Band has been deployed and where no airport exists, 5G C-Band interference may still impact Radar-Altimeter performance. The absence of a NOTAM for a particular area does not necessarily imply that Radar-Altimeter interference will not be encountered. Flight crews experiencing Radar-Altimeter malfunctions should not assume that this has been systematically caused by 5G interference and should follow normal operating procedures for any malfunctions or failures, as they may be caused by other factors.

Airbus Helicopters is working jointly with the other aircraft manufacturers, the FAA and EASA, and with several Radar-Altimeter manufacturers to evaluate the operational impact of 5G on Radar-Altimeters.
As of today, no occurrences have been reported to Airbus Helicopters which have been attributed to aircraft operations within a 5G environment around the world.
Please note that Radar-Altimeter installations and STC's not developed by Airbus Helicopters or its subsidiaries are not covered under the scope of this investigation. The investigation will assess the nature of Radar-Altimeter interference (if any).
Airbus Helicopters will inform you as soon as possible regarding the results of our investigation. Depending on the results of our investigation, Airbus Helicopters will assess which protective or corrective measures, if any, may be appropriate.

**Feedback Request:**

To support our investigation, Airbus Helicopters kindly invites you to forward the following information associated with possible Radar-Altimeter malfunction or erratic behavior experienced on your aircraft in the vicinity of 5G antennas:

- Aircraft type and S/N
- Radar-Altimeter information:
  - P/N
  - S/N
  - System Configuration (1x or 2x Radar-Altimeter)
- Flight Phase (Hovering, Approaching, En-Route.)
- Estimated distance altitude and bearing from the 5G antenna (if known)
- Country, town and Position (area, lat/long)
- Height of the aircraft (MSL and AGL)
- Type of terrain
- Duration of the phenomenon
- Brief description of anomaly and aircraft / system behavior
  - Nature of Radar Altimeter interference:
    - Frozen display
    - Failed Radar Altimeter
    - Erratic display
    - Under- or over-estimation of height
  - AFCS (please detail AFCS status: upper mode(s) engaged / Armed, etc.)
  - Displayed Radar Altitude, associated caution/warning
  - Other Systems
  - Etc.

On Airbus portal AirbusWorld. In AirbusWorld the service to place TE is named 'Technical Request'.

The direct link to Technical Request / WebTEK is: https://keycopter.airbushelicopters.com/webtek

Airbus Helicopters will monitor in service findings and will continue investigation/analysis.

**OEM position** and rationale is based on the following elements

The Radar-Altimeter system has been certified on our helicopters considering the risk of failures of the system. Erroneous Radar-Altimeter information is always considered, and the associated consequences remain acceptable for the operation for which the helicopter is certified for.
In general, there is a minimum altitude where the visual references are required to be acquired (Operational Regulations - Rotorcraft Flight Manual).
For operation to/from an airport the minimum visual conditions are specified in Airport procedures.
For operation to/from helipads inside cities, the use of barometric altitude is already the basis for the crew to cross-check the Radar Altimeter decision height. Indeed Radar Altimeter height is often not consistent in this context due to the terrain profile (buildings, streets, trees, etc) the helicopter is flying over.
Finally, SAR and offshore operations are often conducted away from the coast-line (far away from 5G antennas).

**AMOC Process and recommendation:**

In the meantime, Airbus Helicopters is thinking to develop an AMOC (Alternative Means of compliance) as described in “Background“§ page 6 of the AD, which will be submitted to the FAA. The aim of this AMOC would be to provide compensating feature that will remove the operational restrictions detailed in § (g) of the AD, which requires the following limitations be included in the Rotorcraft Flight Manual (RFM) as follows:

> “When operating in U.S. airspace, the following operations requiring radio altimeter are prohibited in the presence of 5G C-Band wireless broadband interference as identified by NOTAM (NOTAMs will be issued to state the specific areas where the radio altimeter is unreliable due to the presence of 5G C-Band wireless broadband interference):
> - Performing approaches that require radio altimeter minimums for rotorcraft offshore operations. Barometric minimums must be used for these operation instead.
> - Engaging hover autopilot modes that require radio altimeter data.
> - Engaging Search and Rescue (SAR) autopilot modes that require radioaltimeter data.
> - Performing takeoffs and landings in accordance with any procedure (Category A, Category B, or by Performance Class in the Rotorcraft Flight Manual or Operations Specification) that requires the use of radio altimeter data.”

Customers that are impacted by the FAA AD’s as they are used to fly such AFCS HOVER mode, AFCS SAR modes, Take Off and Landing (CATegory A or B or other performance class) are invited to contact Airbus Helicopters to assess if an AMOC is suitable for their operations.
If AMOC is approved by the FAA, these RFM limitations would no longer be required.
The rotorcraft industry position (Leonardo Helicopters, Airbus Helicopters, etc.) will be shared with the FAA, proposing measures to alleviate the restrictions detailed in the FAA AD’s. These measures are intended to be applicable to all rotorcraft and radar altimeter models. Further communication will be made available later on to operators regarding the AMOC process result. This process could take several weeks to analyze the data and develop appropriate mitigations to include in the AMOC.
Until the AMOC process is completed the recommendations below are for the help of operators and do not supersede the above mentioned FAA AD restrictions. As the investigation results are not yet available the only possible recommendations are based on Operational Approach only.

**Airbus Helicopters concurs that the first restriction provided in the AD is applicable** and therefore barometric minimums must be also used for those phases of the Off-shore approaches which require or are predicted on Radar-Altimeter, where notified by NOTAMs.

**NOTE**: for operations far offshore or in very remote locations (e.g., desert or mountainous terrain) far away from any wireless broadband operations (5G) antennas the risk to have the Radar-Altimeter malfunction is extremely unlikely. As of today industry is not aware of 5G C-Band antennas installed on oil rigs or offshore platforms, this situation may evolve in the future.

Helicopter Industry joint position and recommendation to flight crews for the 3 other points:
For any operations that require Radar-Altimeter information as mentioned in the AD: AFCS HOVER mode, AFCS SAR modes, Take-off and Landing (CATegory A or B or other performance class):

A. Prefer using barometric altitude rather than Radar-Altimeter data is recommended
B. If not possible, before engaging the intended maneuver:
   - Check appropriately the barometric altimeter setting (Reference Pressure – QNH/QFE (Hpal or Hg),
   - Respect the minimum altitude as provided in the RFM (visual references need to be acquired before this minimal altitude),
   - During the flight/manoeuver cross check Radar-Altimeter data with barometric altitude,
   - Be ready for possible failure/degradation annunciations, altitude and attitude of the aircraft and its environment,
   - If erratic behavior is detected or suspected, RFM procedures relevant to failure/loss of Radar-Altimeter must be applied.

In any condition, if possible, an over fly / reconnaissance is recommended before engaging such sensitive manoeuvers (e.g. hover, SAR, approach, landing).
At this stage, it is also required that Transmitting Portable Devices (T-PEDs) with 5G capabilities and taken onboard the aircraft are switched OFF during flight operations. The clearance to use other T-PEDs services remains as per the extant aircraft / operator obtained clearance.
NOTAM evaluation is mandatory and remains under the responsibility of the Pilot-in-command.
Airbus Helicopters also encourages each operator in considering in its operational risk assessment the potential interference from 5G ground stations that might impair the reliable functioning of Radar-Altimeters. Among the possible mitigations, operators should:

- For all phases of flight and particularly for the approach and take-off phases and overwater operations: consider exposing flight crews to unreliable Radar-Altimeter scenarios in reccuring flight training sessions conducted in the Flight Simulation Training Devices. Such mitigation is particularly relevant in case flight crews undergo Low Visibility Operations training.
- Whatever the type of approach conducted, ensure awareness of the crews of the potential degradation in the performance of installed Radar-Altimeters and of other systems dependent on data from Radar-Altimeters.

The above recommendation are valid for any type of helicopters and any Radar-Altimeter model.

**Summary:**

5G wireless telecommunication network deployment may affect the Radar-Altimeter and systems linked to it on helicopters. Up to now the worst case situation seems to be in the US and starting on 19th January. Misleading/Erroneous data may be experienced by the crew, Radar-Altimeter malfunction could not be excluded also. On aeronautic industry side, the investigations are ongoing to better understand the possible behavior, further communication will done on time. Customers are asked to report any strange functioning linked to 5G interference to OEM.
FAA AD's limit the helicopters operations thanks to the AD's. Airbus Helicopters and other OEM will apply for AMOC to alleviate the restrictions provided in the AD's. EASA will be in the loop of such AMOC discussion and process.
In the meantime Airbus Helicopters provides recommendation to the crew regarding this possible risk of interferences.