



THE HONOURABLE COMPANY OF
AIR PILOTS

incorporating Air Navigators

AUSTRALIAN REGION

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By Email

29 April 2022

Ms Nerida O'Loughlin PSM
Chair and Agency Head
Australian Communications and Media Authority
PO Box 78
BELCONNEN ACT 2616

Email: authority.secretariat@acma.gov.au

Dear Ms O'Loughlin,

Protecting Radio Altimeters from Potential 5G Radio Frequency Interference.

The Honourable Company of Air Pilots (HCAP) was established as the Guild of Air Pilots and Air Navigators in 1929. It is based in London but has an internationally based membership of professional and private pilots, including the Australian Region (HCAPA). The principal activities of the organisation are centred on developing action and activities to ensure that aircraft are piloted and navigated safely by aviators who are highly competent, self-reliant, dependable and respected.

Through its charitable activities, education and training, technical committees, aircrew selection, scholarships and sponsorships, advice and recognition of the achievements of fellow aviators worldwide, the Honourable Company keeps itself at the forefront of the aviation world.

The Honourable Company also provides expert, impartial input to regulators, government and media on areas including current safety and technical issues, aviation and the environment, airport capacity, aircrew flight time limitations and the maintenance of piloting skills in increasingly automated aircraft.

The HCAPA thanks you for the opportunity to comment on the proposals by the Australian Communications and Media Authority (ACMA) for the allocation, by auction, of the 5G spectrum to telecommunications companies/corporations.

The HCAPA shares the concerns with other aviation stakeholders that frequency bands close to that used by the Radio Altimeters (RADALTS) namely 4200-4400MHz has potentially serious safety consequences for aircraft operating in the vicinity of the 5G transmitters.

The risk to aviation safety

Aircraft radio altimeters are a key component in many aircraft systems. Radio altimeter data feeds many of the complex systems that were developed to improve safety, particularly in challenging weather conditions. Radio altimeter data is a key input to systems such as Terrain Awareness Warning Systems (TAWS), Traffic Alert and Collision Avoidance Systems (TCAS) and Airborne Collision Avoidance Systems (ACAS), Wind Shear detection systems, flight control systems, autoland systems (including auto-throttle and automated landing flare and rollout) and helicopter autohover systems. Erroneous radio altimeter inputs to these systems can result in misleading instrument displays or software protective shutdowns. Unexpected systems behaviour may also cause the pilots to lose situational awareness at critical junctures in the operations. Corrupting the radio altimeter data through Radio Frequency Interference (RFI) compromises the systems that have allowed us to now classify aviation as an ultra-safe industry.

Mitigating the risk

Radio altimeters are typically designed for 20-year life cycles and many in service today were designed before any frequency band was close to the radio altimeter band of 4.2-4.4GHz. The HCAP believes that the suggested guard band of 200MHz will not be a sufficient mitigation measure based on RTCA and other expert advice.

While new design Minimum Operations Performance Standards (MOPS) from the RTCA and EUROCAE are expected to be agreed by December 2022, the timeframe for equipment to be designed and manufactured to those standards is expected to take about six years from now. While some existing systems have been cleared for unrestricted flight operations, those systems are not readily transferable to other aircraft either physically or electronically due to system compatibility issues.

To protect airports for both Australian and foreign carriers, the HCAPA believes ACMA should adopt the "Canadian Approach" taken by Innovation, Science and Economic Development Canada (ISED) in recognising and mitigating the risk to aviation. This provides a conservative approach, until such time as more information and data is available. To do otherwise has the potential to compromise safety and perhaps to cause a fatal accident, such as the one involving the Turkish Airlines 737 in 2009.

The Canadian Approach

ISED issued a decision on 06 August 2021 in relation to the roll-out of 5G operations in the 3450-3650MHz ("3.5GHz") band, which clearly respected the primacy of aviation safety and included the following:

"Given that radio altimeters are critical in aeronautical services, the amendments proposed to the SRSP were based on protecting the safety of Canadians while still allowing the deployment of 5G operations in the 3500 MHz band.

The main protection measures included:

- "exclusion and protection zones to mitigate interference to aircraft around certain airport runways where automated landing is authorized
- a national antenna down-tilt requirement to protect aircraft used in low altitude military operations, search and rescue operations and medical evacuations all over the country"

Furthermore, the decision is an interim decision:

"ISED will continue to study whether allowing antenna up-tilted base stations at a specific power level could be feasible, while still protecting radio altimeters. Based on further investigation, ISED will also consider whether different mitigation measures could be imposed in urban, rural, and remote areas. At this time, ISED considers that the national antenna down-tilt requirement is necessary until more information is available on the types of radio altimeters in use on helicopters in Canada."

and

"ISED will continue its internal studies, lab testing of radio altimeters, and discussions with other regulators."

Importantly, the Canadian transmitted power limit is far less than that implemented or proposed in the US."

Protection of Emergency Services aircraft

The HCAPA is also extremely concerned about protecting Emergency Services aircraft from 5G RFI in areas remote from major airports. Recent natural disasters in various parts of Australia have emphasised the importance of Emergency Services aircraft, particularly in remote and regional areas. ACMA, in cooperation with the stakeholders, needs to consider a range of mitigations that may be necessary to cater for our national circumstances. However, we cannot emphasise enough that Emergency Services aircraft must be adequately protected before higher band 5G is rolled out.

Conclusions

The HCAPA believes that there is sufficient evidence to identify a real risk to the safe operation of aircraft due to RFI affecting radio altimeters, a key component of many safety-critical aircraft systems.

While the effects of 5G RFI are currently being researched to better define the risks, the RFI protection standards for many radio altimeters in service are inadequate and not fit for purpose. The HCAPA believes that ACMA needs to act now to prevent 5G implementation in the 3.4-4.0GHz bands of the spectrum from causing hazardous or catastrophic 'safety of life' outcomes for Australian aviation operations.

Australia's Emergency Services aviation operations must also be protected against the identified risks. The solution must cover the airports and heliports from which those operations originate as well as the regional and remote areas where they operate.

The HCAPA believes that mitigation and/or elimination of the risks requires appropriate exclusion zones, protection zones, antennae down-tilt requirements and radiated power limits. These licence conditions must be imposed before the spectrum is allocated.

Recommendations

The HCAPA strongly recommends that ACMA should follow the lead of the Canadian ISED and impose exclusion zones, protection zones and antennae down-tilt requirements for base stations, as well as limiting radiated power.

Yours sincerely,

P.P. 

Mr Spencer Ferrier
Chairman, Australian Region
The Honourable Company of Air Pilots,