



U.S. Department
of Transportation

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Washington, D.C. 20590

December 1, 2020

Adam Candeub

Deputy Assistant Secretary of Commerce for Communications and Information, Performing the Delegated Duties of the Assistant Secretary of Commerce for Communications and Information
National Telecommunications and Information Administration
1401 Constitution Ave., N.W.
Washington, D.C. 20230

**Re: *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*
FCC Docket Nos. GN 18-122, IB 20-205, GN 20-305**

Dear Mr. Candeub:

The U.S. Department of Transportation (Department or DOT) and the Federal Aviation Administration (FAA), an operating administration of DOT, respectfully request that the National Telecommunications and Information Administration (NTIA) engage with the Federal Communications Commission (FCC or Commission) to defer further action in the above-referenced proceeding, particularly with respect to the planned December 8, 2020 auction of spectrum within the 3.7–4.2 GHz spectrum band (the 3.7 GHz band). DOT recognizes the significance of this FCC proceeding, and we agree with the importance of making additional spectrum available for commercial purposes, particularly to foster the development of 5G technology. Nonetheless, as the Executive Branch expert on transportation safety, DOT is concerned about the safety impact upon aviation that may result from FCC's action. Recent testing and analyses reveal the potential for harmful interference to radar altimeters installed in thousands of commercial transport aircraft, general aviation aircraft, business jets, and helicopters. Given the potential scope and complexity of this safety issue, a deferral of the planned auction would enable the FAA to conduct a comprehensive safety risk assessment and to work with FCC and industry stakeholders to identify potential mitigations.

Harmful interference can interrupt or significantly degrade radar altimeter functions during critical phases of flight—precluding radar altimeter-based terrain alerts and low-visibility approach and landing operations. Numerous interdependent aircraft systems use radar altimeter data to reduce the risk of fatal aviation accidents. As an example, the Terrain Awareness Warning System (TAWS) has effectively eliminated controlled flight into terrain (CFIT), which occurs when an aircraft under the pilot's control is unintentionally flown into the ground, a mountain, a body of water, or other obstacles. TAWS is therefore considered to be one of the greatest commercial aviation safety improvements of the past 30 years. TAWS with radar altimeters are used in many turbine-powered aircraft operating under 14 CFR Parts 91, 121, and

135. Radar altimeters also provide input to traffic collision avoidance systems (TCAS) to preclude distractions during critical phases of flight.

There are also operational consequences at stake in this proceeding. Our Nation's air transportation system depends upon the use of radar altimeters to enable low-visibility operations that are critical to sustaining National Airspace System (NAS) capacity demands. Category II/III Instrument Landing Systems are the global standard for aircraft precision approach and landing in low-visibility operations. Aircraft use radar altimeter data to define the lowest height where the pilot must decide if the aircraft can safely land, or whether the pilot must instead initiate a missed approach. "Autoland" systems, which can fully automate an aircraft's landing phase, are a key component of Category II/III operations, and are dependent upon radar altimeter data. Furthermore, radar altimeter interference degradation can occur without pilot awareness, increasing the safety risk.

The loss of these capabilities would have significant adverse effects on the safety and efficiency of the NAS, as well as our Nation's mobility and economy. DOT is not alone in identifying these concerns, and efforts have been ongoing to raise these issues during the course of FCC's proceedings on the 3.7 GHz band:

- In October 2019, the FAA partially funded the Aerospace Vehicle Systems Institute (AVSI) to conduct preliminary bench tests to determine the interference impact from proposed 3.7-3.98 GHz 5G signals on a range of radio altimeter models. The results filed in the docket showed radar altimeter performance degradation for 5G signals, even at the 3.7 GHz band edge, with one widely deployed altimeter performing significantly worse than most others.
- In May 2020, the Aerospace Industries Association (AIA) formally notified FCC of aviation safety issues associated with the Commission's decision in a Petition for Reconsideration.
- In July 2020, an industry report entitled "Helicopter Air Ambulance RF Interference Report" was submitted to FCC. The study used actual heliport locations, published 5G characteristics, and FCC-specified power limits to demonstrate that harmful interference to radar altimeters can be expected to occur as a result of FCC's decision.
- In October 2020, RTCA published a technical report developed by aviation experts, including representatives from the FAA, concluding that 5G operations in the 3.7–3.98 GHz band may create harmful interference to radar altimeters that would significantly degrade or completely interrupt their operation during critical phases of flight. The report also notes that this could potentially affect tens of thousands of aircraft. The report based its conclusions on the comprehensive interference testing done by AVSI, which clearly demonstrated that the allocated 220 MHz guard band is insufficient. This is the same critical issue identified recently in France, where the auctioned frequencies are only up to 3.8 GHz, and where the 400 MHz guard band was nevertheless determined to be insufficient, and required further federal action to impose mitigations.
- As recently as November 17, 2020, numerous key aviation stakeholders, including the Aerospace Industries Association, Airlines for America, National Business Aviation Association, and Helicopter Association International, sent a joint letter to the Chairmen and Ranking Members of both the House Committee on Transportation and Infrastructure (House T&I Committee) and Senate Committee on Commerce, Science, and Transportation, expressing their concerns with the potential safety impact of this upcoming auction.

We recognize that FCC Chairman Pai, in a January 14, 2020 letter, assured House T&I Committee Chairman Peter A. Defazio that “[a]ny actions the Commission takes regarding [the 3.7 GHz] band will be carefully designed so that aircraft are able to use altimeters in a continuous and uninterrupted manner.” DOT appreciates and agrees with Chairman Pai’s aims in ensuring transportation safety. Nonetheless, FCC’s path in this proceeding is insufficient to address our concerns. In the Department’s view, a comprehensive risk assessment and an analysis of potential mitigation options are needed to understand the safety and economic ramifications of 5G network operation for these aircraft systems and for aviation operations. The risk assessment should consider factors such as:

- The specific number of and type of aircraft potentially affected;
- The make(s) and model(s) of radar altimeters installed in aircraft, and their susceptibility to this new interference source;
- The steps needed to train flight crews to recognize risk indications, and to take proper corrective action when a radar altimeter’s function is misleading or inhibited;
- The operating limitations that could be imposed on these spectrum deployments to prevent or to mitigate interference; and
- Information based on mitigations that other regulators and industries have assessed and planned regarding potential wireless provider antenna, power, and siting mitigations, as well as radar altimeter standards to improve spectrum usage over the long term.

Of course, it is also important to ensure that the consideration of these issues includes the input of the wireless industry. In particular, the FAA requires information about where and when 5G networks will be installed, including specific transmitter locations before they are installed and operational, to assess the effects and corresponding mitigations.

DOT has already begun to assess the safety implications of this proceeding, but in light of the complex technical issues and critical safety concerns involved here, additional time is needed. We therefore believe that the Commission should pause this proceeding, and defer the upcoming auction, until we fully understand the safety implications, and how those implications can be addressed. This would also help to provide additional certainty to the wireless industry; currently, without an adequate understanding of the risk, they could make investments without knowing if additional operational constraints may need to be imposed to ensure aviation safety. As noted above, the French National Frequency Agency is imposing retroactive restrictions upon their already-auctioned 5G spectrum based on the concerns raised by the October RTCA Report, even though they are implementing 5G only up to 3800 MHz. Such retroactive restrictions are highly disruptive and inefficient.

We understand that new commercial deployment in the 3.7 GHz band could occur as early as 2022. In the event that 5G network implementation moves forward without addressing these safety issues, the aviation industry needs a considerable transition period to develop updated radar altimeter performance standards; to design, manufacture, and certify new avionics; and then to integrate and install that equipment into aircraft and helicopters. Given the scope of the safety risk, and based upon our current knowledge, it is unclear what measures will be necessary to ensure safe operations in the NAS, or how long it will take to implement such measures. Depending upon the results of further analysis, it may be appropriate to place restrictions on

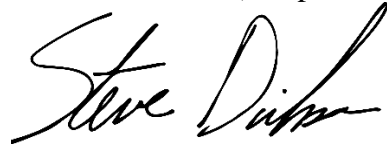
certain types of operations, which would reduce access to core airports in the U.S. and, thus, reduce the capacity and efficiency of the NAS. We also expect that the cost of replacement or retrofit of radar altimeters will be substantial. The Commission does not appear to have taken these factors into account in its decision-making process.

We appreciate your assistance in this matter and ask that NTIA submit this letter for filing on FCC's public docket. We look forward to the opportunity to reengage with FCC, NTIA, and other key stakeholders on the issues in this proceeding and to develop a workable solution.

Sincerely,



Steven G. Bradbury
General Counsel (and performing the functions and duties of Deputy Secretary)



Steve Dickson
Administrator
Federal Aviation Administration