Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Ligado Networks Subsidiary LLC,	)	SAT-MOD-20251206-00374
Debtor-in-Possession: Application	)	S2358
to Modify L-Band Space Station Authority	)	
	)	

REPLY COMMENTS OF THE AEROSPACE AND FLIGHT TEST RADIO COORDINATING COUNCIL, INC.

Aerospace and Flight Test Radio Coordinating Council, Inc. ("AFTRCC") hereby submits its Reply to the Consolidated Opposition of Ligado Networks Subsidiary LLC, Debtor-in-Possession ("Ligado") in connection with the above-referenced (the "Application").[1] Ligado, in response to AFTRCC's initial Comments[2] expressing concerns about the absence of technical information in the Application regarding compatibility of Ligado's proposed direct-to-device mobile satellite service ("D2D MSS") on AST Space Mobile's 96-satellite non-geostationary orbit ("non-GSO") constellation ("SkyTerra Next"), has now provided rudimentary analysis performed by RKF Engineering Solutions ("RKF") purporting to show that its D2D MSS will be compatible with adjacent-band aeronautical mobile telemetry ("AMT").[3]

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1 *See* Consolidated Opposition of Ligado Networks Subsidiary LLC, ICFS File No. SAT-MOD-20251206-00374 (filed Mar. 17, 2026) ("Ligado Opposition"). Ligado's partner in its SkyTerra Next endeavor, AST & Science, LLC, and its affiliates ("AST Space Mobile") also filed a Consolidated Opposition but did not address AFTRCC's comments or AMT. *See* Consolidated Opposition of AST Space Mobile, ICFS File No. SAT-MOD-20251206-00374 (filed Mar. 17, 2026). Accordingly, the subject of AFTRCC's response is limited to the Ligado Opposition.

2 Comments of AFTRCC, ICFS File No. SAT-MOD-20251206-00374 (filed Mar. 2, 2026) ("AFTRCC Comments").

3 Ligado Opposition, Technical Exhibit, pp. 3, 13-17 (Addendum B: AMT Compatibility Study) ("Addendum B"). *See also* Ligado Opposition, pp. 10-11.

Based upon AFTRCC's initial review of the RKF analysis a number of outstanding questions remain regarding compatibility of the SkyTerra Next proposal with AMT. AFTRCC's concerns with the RKF analysis are discussed below in more detail. Meanwhile, AFTRCC is working to conduct a more thorough review and critique of the RKF analysis provided in the record only four business days ago and Ligado's corresponding claims of compatibility. AFTRCC also is moving forward with its plans to conduct an independent analysis of the compatibility of the proposed SkyTerra Next with AMT once sufficient technical information is available.

AFTRCC is pleased both that Ligado has signaled a "commit[ment] to working with GPS and AMT stakeholders to ensure their systems are protected,"[4] and that RKF notes that "Ligado will coordinate with [AFTRCC]."[5] RKF also claims that SkyTerra Next intends to utilize "[g]uard-band filtering and waveform shaping" to protect AMT consistent with the well-established standards of Recommendation ITU-R M.1459.[6] However, more detail from Ligado (and RKF) regarding the use of these methods to enhance compatibility with AMT is needed to draw assurances from these statements.[7] AFTRCC encourages the Commission to defer action

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4 Ligado Opposition, Summary, at ii. The Ligado Opposition states that Ligado has "engaged" with AFTRCC "to address concerns regarding any potential impact on adjacent band AMT operations below 1525 MHz and will continue to do so." *Id.* at 10. To date, the parties have had a single virtual meeting where no consensus was reached although the groundwork has been laid for future conversations among AFTRCC, its members, Ligado, and AST to work toward any solutions following the completion of robust compatibility analyses and review of the results.

5 Addendum B, p. 3.

6 *Id.*

7 The Technical Exhibit to the Ligado Opposition also states that "[t]he [AST] system design further incorporates advanced interference management features, including real-time beam steering, adaptive power allocation, digital predistortion linearization of high-power amplifiers, and steep out-of-band filtering." *Id.*, p. 4. But, again, no details are provided as to how these would be employed to protect AMT operations. AFTRCC looks forward to discussions with Ligado to better understand the Ligado Opposition's claims.

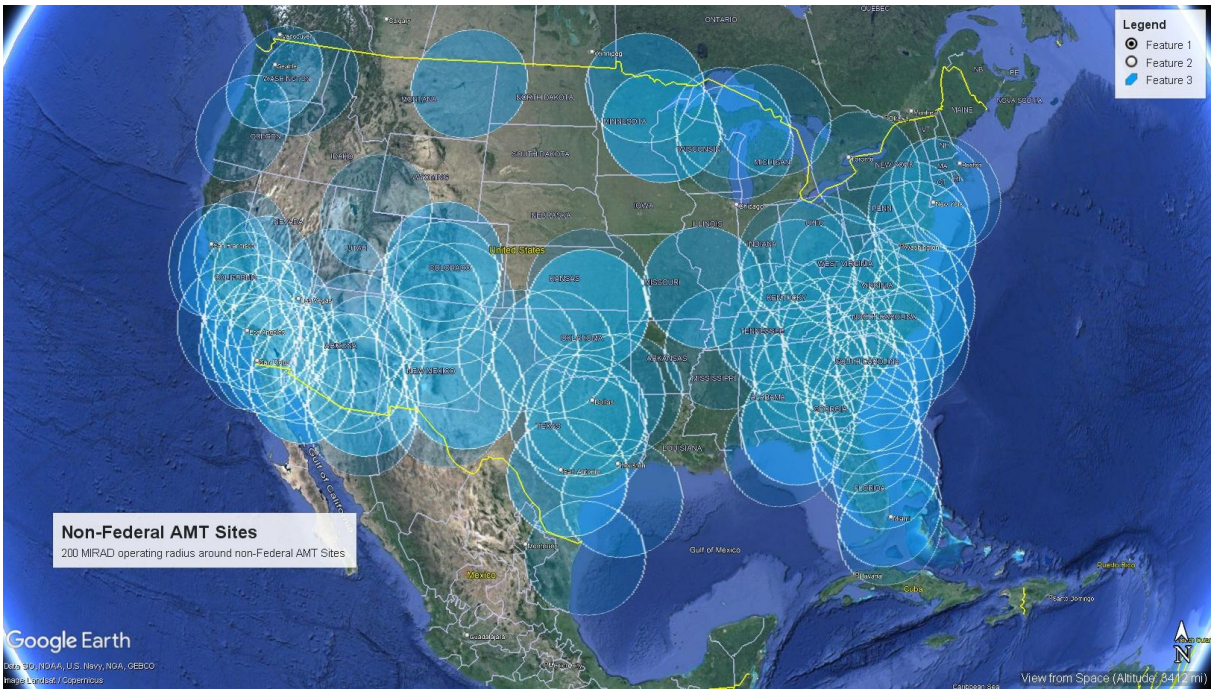
on the Application until the RKF analysis is supplemented to address the concerns below, AFTRCC completes an independent study, and more discussions can be had between AMT stakeholders and Ligado and AST Space Mobile regarding the claims of compatibility of SkyTerra Next and non-Federal AMT flight testing operations.

DISCUSSION OF RKF ANALYSIS

Based on AFTRCC's initial review of the RKF analysis provided with the Ligado Opposition, AFTRCC has the following observations, concerns, and questions:

1. The RKF analysis's description of the spread and distribution of AMT sites, based on a 12-year-old NTIA document describing Federal sites, is very incomplete. Approximately 150 non-Federal AMT sites are located in over thirty states with considerable concentrations in Washington State, Southern California, Arizona, Texas, Kansas, the Southeastern United States, and the mid-Atlantic States. See Figure 1 below. There are even more Federal AMT sites based on the AMT database maintained by AFTRCC. The RKF analysis looks at only a small number of Federal AMT sites, but offers no explanation why or how these sites were chosen for the analysis.

Figure 1: Non-Federal AMT Site Locations in the Continental U.S. as of November 2023 (200-mile radius circle shown around each site – potential area of flight test operation)



2. The RKF analysis claims an effort to model certain AMT receive sites "track[ing] an aircraft travelling at 650 km/hour at an altitude of 15 km on an ellipse, with a semi-major axis of 320 km and semi-minor axis of 5 km."[8] While the RKF analysis appropriately uses the Rec. ITU-R M.1459 INR AMT protection criterion and claims to use the Recommendation's percentage-of-*time* AMT protection criteria,[9] the RKF analysis makes no effort to simulate flight test activity or, indeed, inject any temporal element into its investigation. Rather, it randomly points the AMT antenna in different directions for each of 99,999 randomized static samples while, as best AFTRCC can tell, the AST NGSO constellation remains static: "for each AMT earth station, a pointing direction is selected randomly from the distribution and one of the three AMT frequency channels (with equal probability) is assigned."[10] In addition, the RKF analysis freezes the AST satellite constellation into a static configuration at a randomly chosen "time instance," rather than simulating the satellites' orbits over a period of time.[11] As a result of this randomized pointing and static satellite configuration, the RKF analysis fails to capture what would be the dynamic interactions between AMT operations and the AST satellite constellation. Because of this, the RKF analysis fails to capture any clustering of exceedances of the INR criterion that could occur as the tracking of a test article by an AMT site is, for a time, coincidentally synchronized or correlated with the orbit of a transmitting AST satellite, whether on a boresight-to-boresight basis, sidelobe-to-sidelobe basis, or a combination of boresight and sidelobe. Such clustering, when it occurs during a flight test, increases the potential for serious impacts from the degradation of real-time data necessary for a safe and successful flight test, which is unrecoverable; this circumstance could also result in a loss of lock, which the flight test ground crew may determine requires the termination of the test flight (and require it to be reflown), or lead to a catastrophe endangering the pilot, crew, and persons on the ground. Therefore, an analysis simulating both the dynamic operations of AMT receive sites and the AST NGSO constellation is needed to understand the potential impacts of SkyTerra Next on AMT flight tests.

3. The RKF "simulation" consists of 99,999 discrete geometrically randomized samples of AMT antenna pointing at each location with, as discussed above, no obvious temporal element. In addition to the flaws discussed herein, it is noteworthy that there is no operationally relevant dynamic simulation of the AMT operations or the AST constellation, as mentioned earlier. For flight testing to be safe and productive, telemetry streams to AMT receive sites must be protected for the duration of each and every flight test 99.5% of the time. Flight tests conducted by AFTRCC Members, as well as Federal government flight test operators, are almost always on the order of a few hours, most commonly around two hours. 99,999 samples, assuming each is one second long (unclear from the RKF analysis), would represent 27 hours and 46

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8 Addendum B, p. 14.

9 *Id.* p. 15, Table 5, and p. 16.

10 *Id.* p. 16.

11 *Id.* p. 6.

minutes. Thus, the RKF analysis (assuming it has a temporal element) offers no insights as to the impacts that might occur during representative flight test periods. As discussed in the next paragraph, RKF's results are highly variable, and more analysis is needed to understand the range of variability, relative to the Rec. ITU-R M.1459 AMT protection criteria, if a *sufficient number of simulations* were conducted (using appropriate parameters) over operationally relevant time periods representative of real-world flight tests, for example two-hour periods or 7200 seconds. The RKF analysis also does not address the natural question, assuming its goal is to show that flight tests would be protected consistent with the Rec. ITU-R M.1459 criteria, whether its use of 99,999 samples results average out impacts on real-world individual flight test operations that use of 7200-second periods would reveal.

4. Moreover, the RKF analysis offers no explanation why there is such variability of results from site to site, as reflected in Figure 4 and Table 6 of Addendum B. Per the description, the same conditions occurred at all AMT sites, the same Rec. ITU-R M.1459 antenna pattern was used, the same AMT antenna characteristics, etc. AFTRCC expects that any AMT site in CONUS would "see" a generally similar array of AST satellites overhead as the 96 satellites orbit via inclined planes over a 27-hour, 46-period. Is the variability of results at the different sites introduced by freezing the AST satellite constellation in a single time instance or discrete time-instances? Is it a result of only doing one 99,999 randomize-sample "run" at each AMT site? The high degree of variability needs to be better understood. In a related vein, the amount of variability between the limited number of "simulations" – nine, one at each selected AMT site – is sufficient to raise significant questions about the statistical confidence in the results, separate and apart from the concerns about the simulation period length described above.

5. By distributing the results of each AMT-antenna pointing sample to only one of the three different AMT receive channels RKF considered, rather than capturing "snapshots" on all three AMT channels for the "duration" of the "simulation," the RKF analysis dilutes the results in the favor of a finding non-interference relative to the Rec. ITU-R M.1459 criteria. One of the three channels used by the RKF analysis is 18 to 29 megahertz removed from the band edge.[12] One-third of the results at each AMT site are associated with that channel.[13] The roll-off of the AST signal and OOBE into that channel may be materially greater, on the order of 10-20 dB, than for the other two channels closer to the band edge. To the extent that is the case (unclear from the information the Ligado Application and RKF have provided), the inclusion of one out of three results experienced by the channel furthest from the 1525 MHz band edge will, by itself, lead to a material understatement of the percentage of samples the INR criterion from Rec. ITU-R M.1459 is exceeded.[14] The RKF analysis potentially would be more useful if it were to look at the results for all 99,999

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12 *See id.* p. 15, Table 4.

13 *See id.* p. 16 ("each AMT earth station is assigned one of the three frequency channels in 1/3 of the iterations").

14 *See id.* p. 17, Table 6.

samples in each of the channels, subject to and in addition to addressing the other concerns raised herein.

6. The RKF analysis fails to describe how much aggregation occurs in its results or whether one AST satellite, if more than one is in view at a given location, dominates the amount of interfering signal that is received (or even how often more than one satellite is in view and is transmitting) at that AMT site locations. The size of the low-earth orbit NGSO constellation, 96 satellites, is such that AFTRCC expects that typically no more than one or two satellites would likely be in view of an AMT site in any given time instance. This is confirmed by the spacing of the satellites shown in the frozen "time instance" in the RKF analysis.[15]

7. The Technical Exhibit does not explain what antenna pattern is used for the AST transmitting satellites in the RKF analysis. Knowing this will be important for understanding the interaction of the AST transmissions with the sidelobes of AMT receiver antennas, and for AFTRCC to conduct its own simulations and analysis.

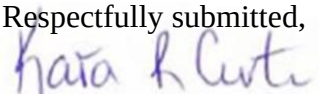
CONCLUSION

For the foregoing reasons, the RKF analysis included with the Ligado Opposition is insufficient to form any conclusions, as the Application claims, that no new interference threats to AMT operations would be created by SkyTerra Next. Before the Commission acts on the Application, AFTRCC requests that it direct Ligado (and AST Space Mobile) to provide a more robust compatibility analysis for Commission and interested stakeholder review that addresses AFTRCC's concerns described above. AFTRCC intends to provide results of its own,

[15] *See id.* p. 7, Figure 1.

independent analysis to the Commission, Ligado, and AST Space Mobile as soon as it is completed. AFTRCC looks forward to working with Ligado and AST Space Mobile to explore potential solutions to address any interference concerns identified by robust analyses.

Respectfully submitted,



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March 23, 2026

CERTIFICATE OF SERVICE

I, Jennifer Wainwright, hereby certify that on March 23, 2026, a copy of the foregoing Response was sent to the following recipients via electronic mail (pursuant to pre-arrangement with outside counsel for Applicant that service via electronic mail will be accepted in lieu of mailed or couriered paper copies):

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