Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	File Nos.
Loft Orbital Solutions Inc.	)	
	)	SAT-LOA-20190807-00072
Application for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System	)	SAT-AMD-20200527-00063
	)	
	)	

OPPOSITION

Loft Orbital Solutions Inc. ("Loft Orbital") submits this Opposition to the Petition to Deny ("Petition") of Iridium Constellation LLC ("Iridium").[1] Nothing contained in the Petition provides a basis for denial or delay in the grant of the Loft Orbital application ("Application").[2] Loft Orbital's request to use certain specified Globalstar Licensee LLC ("Globalstar") frequencies in the "Big LEO" Mobile-Satellite Service ("MSS") frequency band allocation (1613.8-1626.5 MHz band and 2483.5-2495 MHz band) for inter-satellite links ("ISLs") is stated clearly and repeatedly in the Application and is accompanied by the appropriate waiver request. No reasonable reading of the Application could result in any ambiguity, contrary to Iridium's arguments. Further, Loft Orbital demonstrates in its Application that Iridium would be protected from harmful interference through a variety of techniques, including Loft Orbital's operation on adjacent-channel frequencies authorized exclusively to Globalstar and the use of closed-loop power control on the Globalstar modem. Moreover, the Bureau has already concluded, over Iridium's prior objections, that the use of this particular Globalstar modem, *i.e.*, the GSP-1720,

[1] *See* Petition to Deny of Iridium, IBFS File Nos. SAT-LOA-20190807-00072 and SAT-AMD-20200527-00063 (filed Aug. 3, 2020) ("Petition").

[2] *See* Application of Loft Orbital, IBFS File No. SAT-LOA-20190807-00072 (filed Aug. 7, 2019 ("Initial Application"); Application of Loft Orbital, IBFS File No. SAT-AMD-20200527-00063 (filed May 27, 2020).

for inter-satellite links would result in "negligible" interference to Iridium. Nothing in this case warrants a different conclusion. For these reasons, Loft Orbital requests that the Bureau deny the Petition.[3]

Loft Orbital also requests that the Bureau expeditiously grant the Application. The YAM-2 spacecraft is scheduled for launch in October 2020. Accordingly, time is of the essence. Loft Orbital seeks to bring into service a revolutionary "satellite as a service" concept that reduces the time, cost, and complexity for organizations to access space and allows those organizations to focus on developing novel payload technologies and space-based data and services. A timely authorization will validate Loft Orbital's business model and also enhance the United States' role as a leader in space.[4]

I. LOFT ORBITAL CLEARLY SPECIFIES THE EXACT GLOBALSTAR FREQUENCIES IT PROPOSES TO USE

Consistent with FCC practice, Loft Orbital specifically identifies in the Application both the relevant MSS frequency band allocation and the precise center frequency within the

[3] Loft Orbital questions the sincerity of Iridium's arguments and urges the Bureau to caution Iridium that future filings of this nature could be considered frivolous and subject to sanction. The Commission deems pleadings frivolous if they lack good grounds, rely on specific arguments the Commission previously rejected, or were interposed for delay. *See* 47 C.F.R. § 1.52; *see, e.g., Warren C. Havens*, Third Order on Reconsideration, 26 FCC Rcd 10888 ¶ 11 and nn.29-30 (2011) (finding pleadings frivolous because they were "'based on arguments that have been specifically rejected by the Commission' or otherwise have 'no plausible basis for relief'"); *Fireside Media and Jet Fuel Broadcasting*, Memorandum Opinion and Order, 28 FCC Rcd 681 ¶ 5 (2013) (warning petitioner that future filings could be subject to sanction because the pleadings were "notably repetitious and lacking in merit"). All of these elements are present here. *See* Stamp Grant, Astro Digital, IBFS File No. SAT-LOA-20170508-00071, at n.3 (granted in part Dec. 14, 2017) ("Astro Digital Grant") ("[O]ut-of-channel emission on Iridium's operations would be negligible."); Stamp Grant, Astro Digital, IBFS File No. SAT-LOA-20170508-00071, at n.4 (granted in part Aug. 1, 2018) (rejecting again Iridium's arguments regarding potential interference from ISL operations in Globalstar frequencies into adjacent-frequency Iridium operations).

[4] *See, e.g.*, Space Policy Directive-2, Streamlining Regulations on Commercial Use of Space, White House (rel. May 24, 2018), https://bit.ly/3kkJadG (urging Federal agencies to take actions that would promote "American leadership in space commerce" and economic growth).

allocation in which YAM-2 would operate and the channel bandwidth.[5] For example, in the narrative, Loft Orbital states "[t]he 1613.8-1626.5 MHz band is allocated for MSS (Earth-to-space) on a primary basis.... The 2483.5-2495 MHz band is allocated for MSS (space-to-Earth) ... on a primary basis."[6] Loft Orbital specifically identifies the center frequencies of the channels in which it will operate (*i.e.*, 1615.65 MHz and 1616.88 MHz (forward link); and 2489.31 MHz and 2490.54 MHz (return link))[7] and the bandwidth of the channels (*i.e.*, 1.23 MHz).[8] Loft Orbital also provides the frequency plan unambiguously in the Schedule S and Tables 6 and 7 of the Technical Annex labeled "Globalstar L-band Space-Space Transmit Frequency Plan" and "Globalstar S-band Space-Space Receive Frequency Plan," respectively (as shown below). As Iridium is undoubtedly aware, these two sets of links correspond exactly to Globalstar L-band channels 5 and 6.[9]

[5] *See, e.g.*, Application of HawkEye 360, IBFS File No. SAT-LOA-20190102-00001, Narrative at 10-12 and Schedule S Tech Report (filed Jan. 2, 2019); Application of Blacksky, IBFS File No. SAT-LOA-20180320-00023, Narrative at 2, Exhibit A and Schedule S Tech Report (filed Mar. 20, 2018); Application of Planet, IBFS File No. SAT-LOA-20130626-00087, Narrative at 1-4 and Schedule S Tech Report (filed June 26, 2013); *see also* Application of Momentus, IBFS File No. SAT-STA-20200609-00068, Narrative at 1, 8, 11-12 and Schedule S Tech Report (filed June 9, 2020).

[6] Initial Application, Narrative at 17-18.

[7] *See id*. at 17.

[8] *See id.* Technical Annex at 7.

[9] *See Globalstar et al.*, Order of Modifications, 23 FCC Rcd 15207 ¶¶ 1-2 (2008) (authorizing Globalstar exclusive use of the 1610-1617.775 MHz frequency band and simultaneously noting Iridium's authorized L-band frequencies); *Description of the Globalstar System*, Globalstar at Figure 3-4 (Dec. 7, 2000), https://bit.ly/33Zgzom (describing the Globalstar channel plan).

Table 6 Globalstar L-Band Space-Space Transmit Frequency Plan

Channel ID	Bandwidth (MHz)	Center Frequency (MHz)	Polarization
GT01	1.23	1615.65	LHCP
GT02	1.23	1616.88	LHCP

Table 7 Globalstar S-Band Space-Space Receive Frequency Plan

Channel ID	Bandwidth (MHz)	Center Frequency (MHz)	Polarization
GR01	1.23	2489.31	LHCP
GR02	1.23	2490.54	LHCP

Indeed, the Application is replete with examples of how the requested frequencies are stated consistently and clearly. *See, e.g.*, Initial Application, Technical Annex at 2 and Table 1 ("All YAM satellites will contain . . . a Globalstar terminal to demonstrate space-to-space communications relayed via the Globalstar constellation in the Globalstar-authorized and assigned frequencies, *i.e.*, 1615.65 MHz/1616.88 MHz[.]"); *id*. at 6-7 and Tables 6 and 7 ("The channels listed in the following two tables reflect the channels used for communications to/from the Globalstar network. This information is also provided in the accompanying Schedule S but is included here for completeness."); *id*. at 10 ("Loft Orbital will use a Globalstar terminal to demonstrate space-to-space communications relayed via the Globalstar constellation in the Globalstar-authorized and assigned frequencies, *i.e.*, 1615.65 MHz/1616.88 MHz. Given an emission bandwidth of 1.23 MHz, the top end of this emission is 1617.495 MHz, which provides 280 kHz frequency separation between this emission and the bottom end of the shared Iridium/Globalstar spectrum band: 1617.775-1618.725 MHz."); *id.* Schedule S at Transmitting Channels (listing 1615.65 MHz and 1616.88 MHz as center frequencies); *id.* Narrative at 5 ("This intersatellite link transmits in the L-band (1615.65 MHz and 1616.88 MHz center frequencies)[.]"; *id.* at 17 ("Specifically, the transceiver will operate on Globalstar-authorized

and assigned channels centered at 1615.65 MHz and 1616.88 MHz[.]"). Accordingly, no reasonable reading of the Application could result in any ambiguity, contrary to Iridium's arguments.[10]

Even if there was some doubt regarding the requested frequencies (which there could not be),[11] that is not a legitimate basis for denial of an application.[12] Bureau actions in numerous application proceedings make clear that the appropriate action and remedy, in cases where the applicant has not provided sufficient information, is simply to request and obtain the necessary information from the applicant, as Iridium is well aware,[13] rather than taking the draconian step

[10] *See* Petition at 2-3. Moreover, the fact that Iridium made no effort in the past year while the application was pending to resolve such a trivial matter further suggests that Iridium's arguments are contrived. *See supra* note 3 (requesting the Bureau to warn Iridium of potential sanctions for frivolous filings).

[11] In further support of the clarity of Loft Orbital's frequency requests, Loft Orbital has had several discussions with the Bureau, since the filing of the Application, regarding the spectrum use on YAM-2, and the Bureau never sought clarification regarding Loft Orbitals' proposed use of the Globalstar frequencies.

[12] For the same reason, there is no merit to Iridium's argument that the Application must be denied because Loft Orbital did not state that its proposed use of the Globalstar modem for ISLs would be on a non-conforming basis to the Table of Frequency Allocations. *See* Petition at 2, 6. Iridium concedes that Loft Orbital sought the requisite waiver of the Table of Frequency Allocations and cites no precedent indicating that anything else was required. *See* Petition at 6. In any event, Loft Orbital's International Telecommunication Union ("ITU") submission (USASAT-30J) makes clear that the use of the Globalstar frequencies for ISLs is pursuant to ITU Radio Regulations 4.4 and, accordingly, that Loft Orbital is fully aware of the requirement that such operations would be on a non-harmful interference and unprotected basis.

[13] *See, e.g.*, Letter from Jose Albuquerque, Chief, International Bureau Satellite Division, FCC, to Thomas Hickey, Iridium, IBFS File No. SAT-MOD-20131227-00148 (June 10, 2015) (seeking supplemental information from Iridium for, *inter alia*, orbital dwell time, on-orbit collision risk, and end-of-life disposal as required by 47 C.F.R. § 25.114(d)(14)); Letter from Jose Albuquerque, Chief, International Bureau Satellite Division, FCC, to Donna Bethea-Murphy, Iridium, IBFS File No. SAT-MOD-20131227-00148 (Apr. 15, 2014) (seeking similar supplemental information from Iridium).

of denying the application, as requested here.[14]

II. LOFT ORBITAL'S PROPOSED USE OF A GLOBALSTAR MODEM FOR INTER-SATELLITE SERVICE WILL NOT CAUSE HARMFUL INTERFERENCE TO THE IRIDIUM SYSTEM

As demonstrated in the Application, a number of factors ensure that the use of the Globalstar modem for ISLs will not cause harmful interference to Iridium. First, Globalstar uses closed-loop power control to manage the power flux density at its satellite receivers, which Iridium has not disputed.[15] Power control ensures that the impact to Iridium receivers from the use of a Globalstar modem in space is materially the same as if the Globalstar modem were transmitting from the Earth. Accordingly, there is no merit to Iridium's arguments that Loft Orbital's interference analysis is inadequate.[16]

Second, Loft Orbital will operate only on frequencies exclusively authorized to Globalstar.[17] Third, Loft Orbital intends to use the ISL modem sparingly and only for the brief transmission of text messages.[18]

Moreover, the Bureau in a recent Astro Digital application proceeding rejected the same harmful interference allegations by Iridium, concluding that:

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[14] *See* Petition at 2 ("The Commission should deny this proposal [because] Loft's application is internally inconsistent, leaving it unclear whether Loft proposes to use the entire 1613.8-1626.5 MHz band, or only 1615.65 MHz and 1616.88 MHz, for ISLs."); *see also supra* note 3 (requesting the Bureau to warn Iridium of potential sanctions for frivolous filings).

[15] *See* Initial Application, Technical Annex at 10-11. To properly demodulate the transmissions, which use code-division multiple access protocol, the signals received at the Globalstar satellite must have nearly the same approximate power level regardless of whether the signal was generated in space or at different locations on the Earth. Doing so ensures co-channel adjacent code signals do not compete with one another.

[16] *See* Petition at 3-4.

[17] *See* Initial Application, Narrative at 5, 17 and Technical Annex at 2, 10.

[18] *See id.* Narrative at 18.

> [T]here is no co-frequency sharing with Iridium. Regarding adjacent band sharing, Astro Digital will operate these links pursuant to Globalstar's authorizations. In addition, based on our analysis, Astro Digital's out-of-channel emission in the nearest Iridium channel would result in a carrier-to-interference ratio of approximately 32 dB. As a result we conclude that the impact of Astro Digital's out-of-channel emission on Iridium's operations would be negligible.[19]

Loft Orbital's case is no different, and the Bureau should accordingly reject Iridium's arguments.

Iridium counters that the Astro Digital case is unique because of the specific Globalstar modem used by Astro Digital.[20] However, a review of the Astro Digital application shows that Astro Digital analyzed the exact same Globalstar modem that Loft Orbital seeks to use for YAM-2, *i.e.*, the GSP-1720.[21] Data provided by Astro Digital in its opposition to Iridium indicates that the out-of-channel emissions ("OOCE") from the Globalstar modem is 24 to 32 dB below the OOCE levels defined in ITU-R M.1343-1 and assumed by Iridium in its I/N calculation.[22] Adjusting the Iridium I/N calculations to account for a minimum of 24 dB of additional OOCE suppression totals an I/N of approximately -20 dB, which results in interference levels that are practically immeasurable. Furthermore, an I/N of -20 dB roughly aligns with the FCC's own calculation of a C/I of 32 dB, *i.e.*, "negligible interference," as stated

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[19] Astro Digital Grant at n.3; *see also* Stamp Grant, Astro Digital, IBFS File No. SAT-LOA-20170508-00071, at n.4 (granted in part Aug. 1, 2018) (rejecting again Iridium's arguments regarding potential interference from ISL operations in Globalstar frequencies into adjacent-frequency Iridium operations).

[20] *See* Petition at 5.

[21] *See* Application of Astro Digital, IBFS File No. SAT-LOA-20170508-00071, Narrative at 16-17 (filed May 8, 2017) (stating that Astro Digital will use "a conventional (but, space-hardened) GSP-1720 Modem (FCC type-approved)").

[22] *See* Consolidated Opposition and Response of Astro Digital, IBFS File No. SAT-LOA-20170508-00071, at 5 (filed Oct. 11, 2017).

in the Astro Digital Grant.[23] Accordingly, Iridium's unsupported allegations of potential harmful interference should be rejected.

CONCLUSION

For the reasons stated above, Loft Orbital requests that the Bureau deny the Petition and expeditiously grant the Application.

Respectfully submitted,

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[23] *See* Astro Digital Grant at n.3.

Declaration

I, David Morse, hereby declare under penalty of perjury that I have reviewed the foregoing Opposition, that I am familiar with Part 25 of the Commission's Rules (47 C.F.R. Part 25), and that I have either prepared or reviewed the facts and technical information submitted in the Opposition and found it to be complete and accurate to the best of my knowledge and belief.

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CERTIFICATE OF SERVICE

I, Tony Lin, hereby certify that on August 13, 2020, a true and correct copy of this Opposition was sent via electronic mail (by agreement of the parties) to the following:

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