

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of)	
)	
Astro Digital U.S., Inc.)	SAT-LOA-20170508-00071
)	Call Sign S3014
Application for Authority to Launch and)	
Operate a Non-Geostationary Satellite Orbit)	
System in the Earth-Exploration Satellite)	
Service)	

CONSOLIDATED OPPOSITION AND RESPONSE

Astro Digital U.S., Inc. (“Astro Digital”) submits this Consolidated Opposition and Response (“Consolidated Opposition”) to the Petition to Deny of Telesat Canada (“Telesat”) and the Comments of Iridium Constellation LLC (“Iridium”).¹ Neither pleading provides a basis for denial or delay in the grant of the Astro Digital application, and accordingly, Astro Digital requests that the International Bureau (“Bureau”) deny the pleadings and expeditiously grant the Astro Digital application to launch and operate its Landmapper satellite constellation.²

The first commercial Landmapper satellite is scheduled for launch on December 15, 2017 onboard a PSLV rocket and the remaining satellites in the constellation will be deployed during the following two years. Grant of the application will allow Astro Digital to bring into service a satellite system capable of providing state-of-the-art scientific quality, multi-spectral data with an unprecedented refresh rate over the global landmass. Deployment of the system would serve the public interest by fostering competition for satellite imaging services and enhancing the role of the United States as a leader in space.

¹ Petition to Deny of Telesat Canada (filed Sept. 25, 2017) (“Telesat Petition”); Comments of Iridium Constellation LLC (filed Sept. 25, 2017) (“Iridium Comments”).

² Application of Astro Digital U.S., Inc., File No. SAT-LOA-20170508-00071 (filed May 8, 2017) (“Application”).

I. ASTRO DIGITAL’S WAIVER REQUEST TO USE THE 29.9-30.0 GHZ BAND IS PROCEDURALLY SUFFICIENT

Astro Digital specifically requested in its application a waiver of the U.S. Table of Frequency Allocations to use the 29.9-30.0 GHz band as an uplink for its Earth-exploration satellite service (“EESS”) system.³ Telesat’s argument that this request is inadequate as a procedural matter is baseless.⁴ Telesat provides no support for its contention that Astro Digital was required to request a separate waiver of the Commission’s “Ka-Band Plan” and provides no explanation how such a waiver request would be different from the waiver that Telesat concedes Astro Digital requested.⁵ Indeed, Bureau practice suggests that a waiver of the Ka-Band Plan is necessary and appropriate only when an entity seeks to provide a service allocated under the U.S. Table of Frequency Allocations for the Ka-band frequencies but not authorized under the Ka-Band Plan.⁶ Here, as Telesat is aware, EESS is not a U.S. allocated service in the Ka-band frequencies, and Astro Digital, accordingly, sought waiver of the U.S. Table of Frequency Allocations.⁷

³ Application at 20.

⁴ Telesat Petition at 2.

⁵ *Id.* at 3.

⁶ *See, e.g.* Letter from Jose Albuquerque, FCC, to Kalpak S. Gude, WorldVu Satellites Limited, IBFS File No. SAT-LOI-20160428-00041 (June 10, 2016) (seeking confirmation, *inter alia*, that OneWeb sought a waiver of the U.S. Table of Frequency Allocations for non-geostationary orbit (“NGSO”) fixed satellite service (“FSS”) use of the 17.8-18.3 GHz band, which is not allocated to FSS, and a waiver of the Ka-Band Plan for NGSO FSS use of the 18.3-18.6 GHz band, which is allocated to FSS for GSO systems only); Letter from Jose Albuquerque, FCC, to Ronald Center, The Boeing Company, IBFS File No. SAT-LOA-20161115-00109 (Mar. 10, 2017) (requesting, *inter alia*, that Boeing clarify that it sought a waiver of the Ka-Band Plan to allow NGSO FSS use of the 19.7-20.2 GHz band, which is allocated to FSS for GSO systems only).

⁷ Internationally, the 29.9-30.0 GHz band is allocated on a secondary basis to EESS in all ITU regions. *See* 47 C.F.R. § 2.106.

But, even if a waiver request of the Ka-Band Plan were required, the Bureau has in numerous situations, including with respect to recent applications and market access requests filed in the Ku-band/Ka-band processing round, waived its rules on its own motion or requested additional information from an applicant,⁸ rather than taking the draconian step of denying an application on procedural grounds, as Telesat requests here.⁹ For these reasons, the Bureau should reject Telesat’s argument that the Astro Digital application is facially defective.

II. ASTRO DIGITAL’S PROPOSED USE OF THE 29.9-30.0 GHZ BAND WILL NOT CAUSE HARMFUL INTERFERENCE TO OTHER AUTHORIZED USERS

Telesat’s alleged concerns about potential harmful interference (to its non-operational system) are without merit and should be rejected by the Bureau. Astro Digital requested authority to use only a 30 MHz channel in the 29.9-30.0 GHz band as an uplink from a single leased Kongsberg Satellite Services (“KSAT”) facility in Svalbard, Norway communicating with

⁸ See, e.g., Letter from Jose Albuquerque, FCC, to Elisabeth Neasmith, Telesat Canada, IBFS File No. SAT-LOI-20161115-00108 (Mar. 15, 2017) (requesting that Telesat Canada provide, *inter alia*, a narrative description of how Telesat’s uplink frequency bands would be connected to downlink bands as required by 47 C.F.R. § 25.114(d)(1) and additional information regarding the system design and operational strategies used to mitigate orbital debris as required by 47 C.F.R. § 25.114(d)(14)); see also *supra* note 6.

⁹ Telesat’s Petition is comparable in spirit to numerous other petitions to deny that Telesat has recently submitted against other parties proposing to use the Ka-band frequencies for which Telesat seeks exclusive use. See, e.g., Telesat Canada, Petition to Deny, SAT-LOI-20161115-00113 (June 26, 2017); Telesat Canada, Petition to Deny, SAT-LOA-20160428-00041 (Aug. 15, 2016); Telesat Canada, Petition to Deny, SAT-LOA-20161115-00109 (June 26, 2017); see also *WorldVu Satellites Limited, Petition for a Declaratory Ruling Granting Access to the U.S. Market for the OneWeb NGSO FSS System*, Order and Declaratory Ruling, 32 FCC Rcd 5366 ¶ 9 (2017) (denying Telesat’s petition to deny and rejecting arguments that alleged interference and spectrum sharing concerns are a valid basis for denial of the OneWeb market access request); *Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 16-408, FCC 17-122 ¶ 50 (Sept. 27, 2017) (denying Telesat’s request to pick Telesat as the single spectrum “winner” with an exclusive right to use the majority of the Ka-band frequencies and stating that such a “regime could unduly chill investments” in other systems).

its thirty-satellite Landmapper constellation.¹⁰ As a result, Telesat could only experience interference in the extraordinary and unlikely event that at exactly the same time:

- (i) the KSAT facility is pointing at and transmitting to one of the Landmapper satellites;
- (ii) a Telesat satellite is within the highly directive KSAT transmit beam (which has a half-power beamwidth of 0.250 degrees);¹¹
- (iii) the victim Telesat satellite has its receiver (with a gain of 31 dBi and a beamwidth of approximately 4.7 degrees) turned on and directed at a Telesat ground station at or near the KSAT facility in Svalbard, Norway; and
- (iv) both users are operating on overlapping frequencies using the same polarization.

Even if such an event occurred, the conjunction event would be very brief, *i.e.* seconds, because the satellites are in different orbits, and the interference could be readily avoided by Astro Digital turning off its earth station transmissions during conjunction events or by the parties coordinating their transmissions in advance.

III. ASTRO DIGITAL'S PROPOSED USE OF GLOBALSTAR MODEMS FOR INTER-SATELLITE SERVICE WILL NOT CAUSE HARMFUL INTERFERENCE TO THE IRIDIUM SYSTEM

A number of factors ensure that use of the Globalstar modems for inter-satellite links ("ISLs") will not cause harmful interference to Iridium. First, Globalstar uses closed-loop power control for ISLs to manage the power flux density at its satellite receivers.¹² Second, Astro

¹⁰ See Application at 13. During "Phase 2" of the satellite system deployment, Astro Digital would use only a 15 MHz channel in this band. *Id.*

¹¹ In other words, the victim Telesat satellite would have to be at precisely the same point in the sky as the target Landmapper satellite and at the same instant in time (as seen by the transmitting earth station).

¹² In order to properly demodulate the transmissions, which use the CDMA 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. This is so that co-channel adjacent code signals do not compete with one another.

Digital will operate only on frequencies exclusively authorized to Globalstar.¹³ Third, the Globalstar modem out-of-channel emission power levels have been demonstrated by the modem manufacturer to be at least 24 to 32 dB¹⁴ (depending on out-of-band frequency offset) below the international standards governing the out-of-channel emissions mask.¹⁵ As a result, there is a large margin against interference from a Globalstar modem operating on a Landmapper satellite to an Iridium satellite operating on an adjacent channel, including the shared Globalstar/Iridium channel. Moreover, Astro Digital intends to use the ISL modem sparingly as a tertiary backup link for telemetry and command.¹⁶ For these reasons, Astro Digital's proposed use of the Globalstar modems for ISLs will not cause harmful interference to the Iridium system.

¹³ See Iridium Comments at 1 (“The service links for Iridium’s constellation are . . . adjacent to the band Astro Digital proposes to use.”); see also Letter from Jan A. King, Chief Technical Officer, Astro Digital, to Marlene H. Dortch, Secretary, FCC (July 27, 2017).

¹⁴ This information is based on proprietary technical information from Qualcomm Incorporated, the manufacturer of the Globalstar modem.

¹⁵ See Rec. ITU-R M. 1343-1 (2005), at Table 8 p. 10, available at https://www.itu.int/dms_pubrec/itu-r/rec/m/R-REC-M.1343-1-200506-I!!PDF-E.pdf.

¹⁶ See Application at 16-17.

CONCLUSION

For the reasons stated above, Astro Digital requests that the Bureau deny the Telesat Petition and Iridium Comments and expeditiously grant the Astro Digital application.

Respectfully submitted,

/s/ Tony Lin

Tony Lin
Hogan Lovells US LLP
555 13th Street, N.W.
Washington, DC 20004

Counsel for Astro Digital U.S., Inc.

Dated: October 11, 2017

Declaration

I, Jan A. King, hereby declare under penalty of perjury that I have reviewed the foregoing Consolidated 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 Consolidated Opposition and found it to be complete and accurate to the best of my knowledge and belief.

/s/ Jan A. King

Jan A. King

Chief Technical Officer

Astro Digital U.S., Inc.

CERTIFICATE OF SERVICE

I, Sarah Leggin, hereby certify that on October 11, 2017, a true and correct copy of this letter was sent by United States mail, first class postage prepaid, to the following:

Joseph A. Godles
GOLDBERG GODLES WIENER & WRIGHT LLP
1025 Connecticut Avenue, Suite 1000
Washington, DC 20036-2413
Counsel to Iridium Constellation LLC

Maureen C. McLaughlin
Vice President, Public Policy
IRIDIUM SATELLITE LLC
IRIDIUM CARRIER SERVICES, LLC
1750 Tysons Boulevard, Suite 1400
McLean, VA 22102

Henry Goldberg
Joseph A. Godles
Jonathan L. Wiener
GOLDBERG GODLES WIENER & WRIGHT LLP
1025 Connecticut Avenue, Suite 1000
Washington, DC 20036-2413
Counsel to Telesat Canada

Elisabeth Neasmith
Director, Spectrum Management and
Development
TELESAT CANADA
1601 Telesat Court
Ottawa, Ontario
Canada, K1B 5P4

/s/ Sarah Leggin

Sarah Leggin