Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Astranis Bermuda Ltd.	)	
	)	
Petition for Declaratory Ruling for	)	File No.:
the Arcturus Satellite to Access the	)	
U.S. Market and to Be Added to the	)	Call Sign:
Permitted Space Station List at the	)	
163° W.L. Orbital Location in	)	
Ka-band Frequencies	)	

PETITON FOR DECLARATORY RULING

Astranis Bermuda Ltd. ("Astranis Bermuda"), a wholly owned subsidiary of U.S.-based Astranis Space Technologies Corp. ("Astranis"), respectfully files this Petition for Declaratory Ruling (the "Petition") pursuant to Section 25.137(a) of the Commission's rules, 47 C.F.R § 25.137(a), to access the U.S. market using the Arcturus satellite[1] and to add the satellite to the Permitted Space Station List ("Permitted List").

Arcturus is a small geostationary orbit ("GSO") fixed-satellite service ("FSS") satellite that is being manufactured by Astranis and will be owned and operated by Astranis Bermuda. The satellite will provide satellite-based broadband connectivity to Alaska and the surrounding region in Ka-band frequencies from the 163° W.L. orbital location pursuant to authority from the governments of Bermuda and the United Kingdom.[2] Arcturus will provide service to Alaska and the surrounding region beginning in early 2022.

[1] The Arcturus satellite is also known as the Aurora 4A satellite.

[2] Operations are authorized under the United Kingdom's Outer Space Act 1986, as extended to Bermuda. Accordingly, the Arcturus satellite will be registered as a United Kingdom space object and operates under the United Kingdom's UN Space Liability Convention Treaty commitments.

As set forth herein, the Ka-band satellite operations proposed herein are consistent with the Commission's rules and policies and would strongly serve the public interest. Therefore, Astranis Bermuda respectfully seeks grant of this Petition to permit the Arcturus satellite to serve the U.S. market at the earliest practicable time.

I. INTRODUCTION

Astranis and Astranis Bermuda have partnered with Pacific Dataport, Inc. ("PDI")[3] to bring dedicated satellite connectivity to Alaska and the surrounding region. Arcturus represents a quantum leap in satellite broadband services in Alaska:

- Up to 10 Gbps of capacity available anywhere in Alaska and beyond, including western Canada and adjacent Pacific Ocean areas;
- Earth station elevation angles of 10°+ to the 163° W.L. orbital location;
- Ka-band fixed and mobility (earth stations in motion or "ESIM") terminals for consumer, commercial, and government use;
- A dedicated Ka-band gateway located in the contiguous United States ("CONUS") that provides backhaul and on-station TT&C communications; and
- Reliable, cost-effective satellite-based broadband connectivity at a fraction of the cost per bit of existing connectivity offerings.

The Arcturus satellite employs Astranis' MicroGEO bus, an efficient, small-GSO satellite design (approximately 350 to 400 kg) that supports regional and gap-filler satellite missions at a fraction of the cost of traditional GSO satellites. Arcturus will be launched as a secondary payload on a SpaceX Falcon Heavy mission and will begin providing satellite-based broadband connectivity throughout the Alaska region by early 2022.

Astranis Bermuda will operate the Arcturus satellite pursuant to authority from Bermuda and under an International Telecommunication Union ("ITU") satellite network filing submitted

[3] PDI, a Delaware corporation headquartered in Alaska, was established to provide satellite broadband connectivity to Alaska and the surrounding region. The principal investor in PDI is Microcom, the largest provider of satellite systems and services in Alaska.

by the United Kingdom on behalf of Bermuda.[4] PDI will be the exclusive distributor of broadband capacity and services provided by the Arcturus satellite.

Astranis Bermuda seeks authority for the Arcturus satellite to access the U.S. market in the 18.2-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth) and 28.0-29.1 GHz and 29.3-30.0 GHz bands (Earth-to-space), and the addition of Arcturus to the Permitted List in eligible Ka-band frequencies.[5] From the 163°W.L. orbital location, Arcturus is ideally positioned to provide high-speed, Ka-band satellite connectivity to consumers, businesses, and government customers throughout Alaska, Western Canada, and the surrounding Pacific Ocean regions.

Astranis and PDI are working closely with Bermuda and the United Kingdom to ensure that final launch and operating authority for the Arcturus satellite are granted consistent with the satellite's deployment schedule. Of course, the Arcturus satellite cannot be launched without such authority and Astranis Bermuda will update the record of this proceeding when such authority is in place. Astranis Bermuda acknowledges that any grant of this Petition would be conditioned on grant of final authority to launch and operate the satellite.

In this Petition, Astranis Bermuda demonstrates that it is legally, technically, and otherwise qualified to hold the requested authority and that the proposed operations of the Arcturus satellite are compliant with Commission rules and policies. In addition, consistent with the Commission's broadband access initiatives, the Arcturus satellite will bring high-speed Ka-band satellite connectivity to unserved and underserved areas of Alaska and will allow rural and remote communities to enjoy the same benefits of broadband access available in most other

[4] *See* UK Satellite Network Filing for AURORA-IV-163W; *see also* 47 C.F.R § 25.137(c) (a non-U.S.-licensed application is considered when the applicant either (1) is in orbit and operating; (2) has a license from another administration; (3) or has been submitted for coordination to the ITU).

[5] *See* 47 C.F.R. § 25.103 (defining "Permitted Space Station List" and eligible Ka-band frequencies as the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.25-30.0 GHz bands).

regions of the United States. Accordingly, expeditious grant of the Petition will further the public interest.

II. DISCUSSION

The Commission allows non-U.S. licensed satellites to access the U.S. market and includes them on the Permitted List upon their establishing compliance with Sections 25.114 and 25.137 of the Commission's Rules,[6] and demonstrating that the public interest would be served by such inclusion. The information set forth in FCC Form 312 and Schedule S, the Technical Description, and this narrative Petition establish that Astranis Bermuda's proposed operation of the Arcturus satellite would be consistent with the Commission's rules and policies, and that permitting the Arcturus satellite to serve the U.S. market and including the satellite on the Permitted List (for eligible frequencies) would serve the public interest.

A. Legal Qualifications

Astranis Bermuda provides information regarding its legal qualifications in FCC Form 312 and an attachment to this Petition.[7] The Arcturus satellite will be authorized by Bermuda, an overseas territory of the United Kingdom which itself is a member country of the World Trade Organization ("WTO"). Satellites licensed by WTO-member countries seeking to provide services covered by the WTO Basic Telecommunications Agreement are presumed to promote competition in the United States.[8] Accordingly, Astranis Bermuda need not make the effective competitive opportunities showing set out in Section 25.137 of the Commission's rules.

---

[6] 47 C.F.R. §§ 25.114, 25.137; *see also* Amendment of the Commission's Space Station Licensing Rules and Policies, 18 FCC Rcd 10760, ¶ 288 (2003).

[7] *See, e.g.,* Attachment B, Ownership Exhibit.

[8] *See* 47 C.F.R. § 25.137(a)(2); *see also* Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed satellites Providing Domestic and International Service in the United States, *Report and Order*, IB Docket No. 96-111, 12 FCC Rcd 24094, ¶ 39 (1997) ("We adopt our proposal to apply a

In addition, Astranis Bermuda hereby confirms that it will (i) post a surety bond as required under Section 25.165 of the Commission's rules, to the extent necessary;[9] (ii) comply with the Commission's milestone requirements under Section 25.164;[10] (iii) comply with all applicable Commission reporting requirements related to the satellite;[11] and (iv) comply with all other rules applicable to Astranis Bermuda's operation of the Arcturus satellite.

B. Technical Qualifications

Pursuant to Commission rule 47 C.F.R. § 25.137(d), Astranis Bermuda demonstrates in this Petition that the proposed operations of the Arcturus satellite comply with applicable Commission rules for non-U.S. licensed satellites to operate in the United States. Astranis Bermuda provides the attached Technical Description, Schedule S, and associated materials containing information relating to the technical and operational characteristics of the Arcturus satellite.

1. Spectrum Compatibility

Astranis Bermuda seeks authority to serve the U.S. market using the 18.2-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth) and 28.0-29.1 and 29.3-30.0 GHz bands (Earth-to-space). In these frequency ranges, the 18.3-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.3-30.0 GHz bands are included in the Ka-band frequencies eligible for Permitted List authority. Earth station operators seeking to communicate with Arcturus satellite in the 18.2-18.3 GHz, 18.6-19.3

---

presumption in favor of entry in considering applications to access non-U.S. satellites licensed by WTO members to provide services covered by the U.S. commitments under the WTO Basic Telecom Agreement."); *Id.*, ¶ 64 ("[W]e will not evaluate the effective competitive opportunities in the route market for non-U.S. satellites licensed by a WTO Member providing WTO covered services").

[9] *See* 47 C.F.R. § 25.165(a)(2).

[10] *See id.*, § 25.164(a).

[11] *See id.*, §§ 25.171, 25.172.

GHz, 28.0-28.35 GHz, and 28.6-29.1 GHz bands must add the satellite as an authorized point of communication in these bands.

The Arcturus satellite will support Ka-band user terminal operations in Alaska, western Canada, and the adjacent Pacific Ocean region. A gateway earth station for the Arcturus satellite will be located within CONUS.[12] Given the large geographic separation between user beams and gateway beams, all Ka-band uplink and downlink spectrum can be used for both user terminal and gateway operations.[13]

The United States Table of Frequency Allocations ("Table of Allocations"), Commission rule 47 C.F.R. § 2.106, identifies conditions for spectrum use by FSS networks in the relevant frequency bands. Astranis Bermuda summarizes below material issues associated with compliance with the Table of Allocations and related Commission rules.

a. Permitted List Bands

1. 18.3-18.6 GHz

In the 18.3-18.6 GHz band, GSO FSS downlink operations are considered primary, and access to the band has been permitted for terrestrial fixed operations under certain conditions, as well as certain Federal uses on a primary basis.[14] Because Arcturus' gateway and user downlink

[12] *See* File No. SES-LIC-20200925-01038, Call Sign E202162 (grant Nov. 16, 2020). Astranis Bermuda understands that a license modification application will be filed to add the Arcturus satellite as an authorized point of communication for non-Permitted List bands.

[13] PDI will be responsible for licensing user terminals operating with the Arcturus satellite. The Commission will have an opportunity to fully examine compliance of proposed user terminal operations in the context of a blanket earth station license application.

[14] *See id.*, footnotes US 139 ("Fixed stations authorized in the band 18.3-19.3 GHz under the provisions of 47 CFR 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r) may continue operations consistent with the provisions of those sections"), US 334, and NG527A ("In the bands…18.3-18.8 GHz…ESIMs may be authorized to communicate with geostationary satellites on a primary basis").

operations will be consistent with applicable operational requirements and power limits, they can be conducted under Permitted List authority.

As demonstrated in the Technical Description, Astranis Bermuda will comply with applicable PFD, EIRP, and power limits in the Commission's rules (including the U.S. the Table of Allocations) to protect co-frequency systems and services from harmful interference.[15] Nonetheless, Astranis Bermuda will coordinate with Federal users, as necessary or appropriate.

2. 19.7-20.2 GHz and 29.5-30.0 GHz

In the 19.7-20.2 GHz, and 29.5-30.0 GHz bands, FSS operations are co-primary with mobile-satellite service ("MSS") operations.[16] Arcturus' gateway and user downlink and uplink operations, respectively, will be conducted in these bands consistent with applicable operational requirements and power limits.

The Arcturus satellite will comply with the Commission's two-degree spacing policies, including downlink PDF levels and earth station uplink EIRP levels and antenna performance, so coordination with co-frequency FSS and ESIM operations is not anticipated. Furthermore, there are no co-frequency GSO satellites operating within +/- 6° of the satellite's planned location. Nonetheless, Astranis Bermuda will coordinate, as necessary or appropriate, with FSS and MSS operations in these bands.

[15] *See* Attachment A, Technical Description, §§ A.7, A.8.

[16] 47 C.F.R. §2.106, footnote 5.529. Networks that are in both the FSS and MSS may provide MSS services in the 19.7-20.1 GHz and 29.5-29.9 GHz bands.

3. 28.35-28.6 GHz and 29.3-29.5 GHz

In the 28.35-28.6 GHz and 29.3-29.5 GHz bands, FSS is primary under the Commission's rules.[17] Nevertheless, between 28.5-28.6 GHz and 29.3-29.5 GHz, the Table of Allocations prohibits such systems from causing harmful interference to, or claiming protection from, fixed operations under the call signs listed in footnote NG62 in the U.S. Table of Allocations.[18] Astranis Bermuda affirms that it will protect the listed terrestrial fixed call signs as contemplated by the Commission's rules.

Astranis Bermuda notes that the 29.3-29.5 GHz band is allocated for MSS feeder links, although it is not presently used in Alaska or the surrounding region for such operations. Astranis Bermuda will coordinate, as necessary or appropriate, with future MSS feeder link operations and will comply with other applicable rules in both bands included in the U.S. Table of Allocations.[19]

b. Non-Permitted List Bands

1. 18.2-18.3 GHz Band Segment

Arcturus gateway and user downlink operations will be conducted in the 18.2-18.3 GHz band. Federal uses and fixed services are primary in that band and FSS is considered

[17] *Id.*, footnote NG527A ("In the bands … 29.25-30.0 GHz (Earth-to-space), ESIMs may be authorized to communicate with geostationary satellites on a primary basis"). To the extent such systems are authorized, Astranis shall seek to coordinate appropriately.

[18] *Id.*, footnote NG62 (prohibiting FSS systems from causing harmful interference to, or claiming protection from, fixed service stations operating under the following Call Signs: KEB35, KGB72, KGC79, KIL20, KME49, KQG58, KQH74, KSA96, KSE73, KVH83, KYJ33, KZS88, WAX78, WLT380, WMK817, WML443, WMP367, and WSL69).

[19] *Id.*, footnotes NG527A, NG535A.

secondary.[20] Stations operating in a secondary service cannot cause harmful interference to or claim protection from harmful interference from stations of a primary service.

Astranis Bermuda affirms that it will accept interference from, and not cause interference to Federal systems and authorized fixed service operations in the 18.2-18.3 GHz band. In addition, as demonstrated in the Technical Description, Astranis Bermuda will comply with applicable PFD, EIRP, and power limits in the Commission's rules (including the U.S. the Table of Allocations) to protect co-frequency systems and services from harmful interference.[21]

2. 18.6-18.8 GHz

FSS operations in the 18.6-18.8 GHz band are considered co-primary with both the Earth Exploration Satellite Service ("EESS") and Space Research Service ("SRS"), and are subject to certain technical limits.[22] Arcturus gateway and user downlink operations will be conducted in the 18.6-18.8 GHz band.

As demonstrated in the Technical Description, Astranis Bermuda will comply with these limits and other applicable PFD, EIRP, and power limits in the Commission's rules (including the U.S. the Table of Allocations). Astranis Bermuda also will seek to coordinate with EESS and SRS operations, as necessary or appropriate.

[20] *See id.*, footnote US334 ("Federal space stations in both geostationary (GSO) … and associated earth stations in the fixed-satellite service (FSS) (space-to-Earth) may be authorized on a primary basis.")

[21] *See* Attachment A, Technical Description, § A.7.

[22] *Id.*, footnotes US 254 ("fixed and mobile services shall be limited to a maximum [EIRP] of +35 dBW and the power delivered to the antenna shall not exceed -3 dBW."), and US255 (the PFD "across…18.6-18.8 GHz produced at the surface of the Earth by emissions from a space station under assumed free-space propagation conditions shall not exceed -95 dB(W/m²) for all angles of arrival.").

3. 18.8-19.3 GHz and 28.6-29.1 GHz

Arcturus gateway and user terminal uplinks and downlinks will operate in the 28.6-29.1 GHz and 18.8-19.3 GHz bands, respectively. These bands are allocated to NGSO FSS (space-to-earth) (both Federal and non-Federal) on a co-primary basis, and GSO FSS operations are considered secondary.[23] As demonstrated in the Technical Description, Astranis Bermuda will comply with applicable PFD, EIRP, and power limits in the Commission's rules (including the U.S. the Table of Allocations) to protect co-frequency systems and services from harmful interference.

Astranis Bermuda's commitment to protect U.S. operations of existing and future NGSO systems in the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands is consistent with Commission rules and with other GSO FSS applications for approval to operate in the bands, and allows GSO and NGSO operators to co-exist.[24] Astranis Bermuda will coordinate with primary users of the 18.8-19.3 GHz and 28.6-29.1 GHz bands to ensure that its operations in these bands will not interfere with NGSO FSS operations. If Astranis Bermuda learns that its operations are causing interference into existing authorized operations, it will immediately cease operations until such interference is resolved.[25]

---

[23] *Id.*, footnote NG62, NG165 (In the band 28.6-29.1 GHz, geostationary-satellite networks in the fixed satellite service shall not cause harmful interference to, or claim protection from, non-geostationary-satellite systems in the fixed-satellite service).

[24] *See* In the Matter of 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*, 32 FCC Rcd 7809, ¶ 14 (2017); *see also* In the Matter of Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters, *Notice of Proposed Rulemaking*, 31 FCC Rcd 13651, ¶ 11 (2016).

[25] *See, e.g.*, Intelsat License LLC, Application for Satellite Space Station Authorization, Grant Stamp, File No. SAT-LOA-20170524-00078 (granted May 10, 2018) (GSO operations in the 18.8-19.3 GHz and 28.6-29.1 GHz bands "must not cause harmful interference to, or claim interference protection from,

4. 28.0-28.35 GHz Band

Astranis Bermuda also seeks to make use of the 28.0-28.35 GHz band to support its gateway and user uplink operations. The 28.0-28.35 GHz band is allocated to the FSS, fixed, and mobile terrestrial services on a co-primary basis, and the Commission has designated FSS as secondary to Upper Microwave Flexible Use Service ("UMFUS"), but with protection for FSS earth station operations in accordance with the conditions set forth in Section 25.136(a).[26] If an earth station applicant can meet the criteria under Section 25.136, then it can operate without providing interference protection to UMFUS stations.[27] Alternatively, other approaches, including presumably waiver of the rule in appropriate circumstances, may be considered by the Commission in licensing earth station operations in the public interest.

Gateway earth stations seeking to communicate with Arcturus will meet these requirements, as they will demonstrate in their corresponding applications, or they will otherwise seek to protect UMFUS operations under the rule. Astranis Bermuda will coordinate with fixed and mobile terrestrial services, to the extent required. User terminal operations in Alaska will be addressed, as appropriate, by blanket earth station applicants.

2. Two-Degree Spacing

Astranis Bermuda's operations will be fully compliant with the Commission's two-degree spacing policies including operating consistent with the power flux-density limit of −118 dBW/m2/MHz and associated EIRP density envelopes in §25.218(i),[28] will not cause harmful

primary NGSO FSS systems. Intelsat must terminate operations immediately upon notification of harmful interference").

[26] 47 C.F.R. §§ 25.202(a)(1); 25.136(a).

[27] *Id.*, § 25.136(a).

[28] *See* Attachment A, Technical Description, § A.8.

interference to any other authorized user of the spectrum, and otherwise will be consistent with Commission precedent.[29] Arcturus will also be operated consistent with applicable existing and future coordination agreements. For these reasons, this Petition fully complies with the policies articulated in the Space Station Licensing Reform Order regarding processing of applications for GSO-like spacecraft.[30]

3. Space Debris Mitigation

The Arcturus satellite operates at the 163°W.L. orbital location and Astranis Bermuda anticipates the satellite's end-of-life to be no earlier than 2031. Astranis Bermuda has provided an Orbital Debris Mitigation Plan to demonstrate compliance with the Commission's orbital debris mitigation and satellite end-of-life rules and policies.[31] Out of an abundance of caution, Astranis Bermuda is requesting a waiver of 47 C.F.R. § 25.283(c), as discussed below.

C. Public Interest Considerations

The Commission has established a public interest framework for considering requests for non-U.S. licensed space stations to access the U.S. market. The applicant must demonstrate that grant of its request would serve the public interest, including: (i) the effect on competition in the United States; (ii) spectrum availability; (iii) national security, law enforcement, foreign policy, and trade considerations; and (iv) eligibility and operational requirements.[32] Authorizing

---

[29] *See* 47 C.F.R. § 25.103 ("A GSO FSS space station operating in the … conventional or extended Ku-bands, or the conventional Ka-band within the limits on downlink EIRP density or PFD specified in §25.140(a)(3) and communicating only with earth stations operating in conformance with routine uplink parameters specified in §25.211(d), §25.212(c), (d), (e), or (f), or §25.218").

[30] *See* Amendment of the Commission's Space Station Licensing Rules and Policies, 18 FCC Rcd 10760, ¶ 113 (2003).

[31] *See* Arcturus Space Debris Mitigation Plan ("ODMP").

[32] *See* Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States, 12 FCC Rcd 24094, ¶ 29 (1997) ("*DISCO II*"), on reconsideration, 15 FCC Rcd 7207, ¶ 5 (1999).

Astranis Bermuda to serve the U.S. market with the Arcturus satellite satisfies the Commission's public interest assessment.

Effect on competition in the United States. Because the Arcturus will be authorized through a WTO member country, Astranis Bermuda is entitled to a presumption in favor of entry under the competition component of the public interest analysis. In addition, authorizing a new, purpose-built broadband satellite system to serve Alaska would greatly enhance competition and consumer choices. Demand for broadband access far outstrips the limited satellite, wireless, and wireline alternatives currently available.

Currently, approximately 39 percent of Alaskans have little or no Internet access—the largest unserved or underserved population of any U.S. state. Launch of the Arcturus satellite will bring more reliable broadband Internet access to the entire state and surrounding regions, resulting in increased connectivity and lower prices.[33] It is expected that aggregate Internet access throughput in Alaska will triple and costs will be reduced by a factor of three.

Introduction of new Ka-band satellite services will help bridge the digital divide, bringing modern, high-speed Internet to Alaska's predominantly rural and remote populations, while improving the local economies and enhancing all aspects of community life. The proposed operation of the Arcturus satellite will provide an essential piece of the solution to ensure that underserved communities in Alaska have adequate broadband connectivity.

[33] The Commission has previously taken note of the unusual case of the Alaska Bush, where terrestrial connectivity is more expensive than equivalent satellite bandwidth. *See* Promoting Telehealth in Rural America, WC Docket No. 17-310, *Report & Order*, FCC 19-78 (rel. Aug 20, 2019), at ¶ 96 ("[I]n Alaska for funding year 2017, health care providers reported, on the FCC Form 466, rural rates ranging from $30,000 to $40,500 for a 10 Mbps satellite service per month. In comparison, rural rates for a terrestrial-based 10 Mbps MPLS service in Alaska, in many instances, were between $60,000 and $75,000 per month." (available at: https://ecfsapi.fcc.gov/file/0820192610299/FCC-19-78A1.pdf).

Spectrum availability. In the attached Technical Description and as discussed above, Astranis Bermuda has demonstrated the ability to share spectrum with other space and terrestrial systems while mitigating harmful interference. This Petition proposes market access using frequencies in which the Commission's rules explicitly contemplate GSO use on either a primary or secondary base.[34] Finally, the are no other potentially affected applications or petitions pending in the FCC's GSO satellite queue.[35]

National security, law enforcement, foreign policy, and trade considerations. The Commission has stated that the issues of national security, law enforcement, foreign policy, and trade will be considered in evaluating requests for market access but are likely to arise only in "rare circumstances."[36] Astranis Bermuda's request for access the U.S. market with the Arcturus satellite raises no such issues.

In particular, the gateway and most user terminals that will communicate with the Arcturus satellite will operate in the United States and therefore be authorized by the Commission. Furthermore, the Arcturus satellite's operations will be conducted through a subcontract between Astranis Bermuda and Astranis. In addition, TT&C communications will occur through the satellite's U.S. gateway.

Finally, Astranis Bermuda is based in Bermuda (a United Kingdom Overseas Territory, thus benefiting from the close ties between the United Kingdom and the United States) and is a wholly owned subsidiary of U.S.-based Astranis (headquartered in San Francisco, California).

[34] *See generally*, 47 C.F.R. § 2.106.

[35] *See* International Bureau Queue Report (available at http://licensing.fcc.gov/myibfs/qReportExternal.do).

[36] *See DISCO II*, ¶ 180.

Thus, there are no national security, law enforcement, foreign policy, or trade concerns that would undermine grant of this Petition.

Eligibility and operational requirements. Astranis Bermuda has also demonstrated that it is legally eligible and qualified to operate the Arcturus satellite. As noted previously, the proposed operations comply with the Commission's operational requirements. Given all of the foregoing, grant of this Petition would be consistent with the Commission's rules and policies, and would further the public interest.

D. Waiver Request

Commission rule 47 C.F.R. § 25.283(c) requires that after the completion of a satellite mission "all stored energy sources on board the satellite are discharged, by venting excess propellant, discharging batteries, relieving pressure vessels, and other appropriate measures." Astranis Bermuda requests waiver of 47 C.F.R. § 25.283(c) to the extent necessary to grant this Petition. Out of an abundance of caution, Astranis Bermuda seeks a waiver of the "relieving pressure vessels" provision because residual monopropellant and pressurant will not be fully evacuated at end-of-life.

The Commission has authority to grant waivers of its rules for "good cause shown."[37] In general, good cause exists if grant of a waiver would not undermine the purposes of the rule and would otherwise serve the public interest.[38] As discussed below, compelling reasons exist to grant the requested waiver in connection with this Petition.

The Arcturus satellite includes a hydrazine monopropellant propulsion system. The monopropellant system tank is a 22" flight-heritage titanium tank from Northrop Grumman

[37] *See* 47 C.F.R. § 1.3; *WAIT Radio v. FCC*, 418 F.2d 1153 (D.C. Cir. 1969).

[38] *WAIT Radio*, 418 F.2d at 1157; *Intelsat North America LLC*, 22 FCC Rcd 11989 ¶ 6 (2007).

(formerly ATK), which uses a rubber diaphragm in blowdown configuration with helium pressurant. The tank has a 79.5 kg (91 liter) capacity, has a burst pressure of 49.3 bar, and its latch valve-based isolation is designed to eliminate the need for pyrotechnic-based devices.

During end-of-life deorbiting, the hydrazine monopropellant is effectively entirely consumed with small amount residuals of less than 1 kg contained by dual-seat solenoid valves, which close upon passivation. Although virtually all monopropellant is consumed or vented to the extent possible, some residuals remain and the helium pressurant used in the monopropellant propulsion system will remain contained by the rubber diaphragm and is thus not ventable.

Multiple factors ensure that Arcturus's design, including retention of residual Helium, is consistent with a safe flight profile and end-of-life passivation, and thus will not pose a risk of creating orbital debris. As noted in the Arcturus Space Debris Mitigation Plan, the tank has been validated against MIL-STD-1522A and is "leak before burst." Furthermore, the amount of helium in the tank will be *de minimis* (approximately 0.1 kg) and at a pressure (approximately 5 bar) well below the burst rating of the tank. Therefore, the risk of break-up from such residuals is negligible.[39]

Astranis Bermuda notes that the Commission has granted a waiver in analogous circumstances, such as for Anik F3, AMAZONAS-3, and Eutelsat 36B.[40] Astranis Bermuda respectfully submits that a similar waiver is justified in this circumstance. Based on the above, a

[39] *See* ODMP, p. 4.

[40] *See, e.g.*, Telesat Canada Petition for Partial Waiver of Section 25.283(c), File No. SAT-APL-20111117-00222, Call Sign S2703 (granted April 11, 2012); Hispamar Satélites, S.A. Petition for Declaratory Ruling to Add Amazonas-3 Satellite to the Permitted Space Station List, File No. SAT-PPL-20121018-00183, Call Sign S2886 (Granted March 14, 2013) (granting Permitted List status to Amazonas-3, which will retain a de minimis quantity of helium pressurant at end of life); Boeing Application Supplement and Request for Waiver, Eutelsat 36B Space Debris Mitigation Plan at 6, File No. SES-LIC-20140922-00748, Call Sign E140097 (granted March 13, 2015).

grant of this waiver would be consistent with Commission policy and precedent, will serve the public interest by enabling new commercial operations at the 163° W.L. orbital location, and will not undermine the purposes of the Commission's rule.

III. CONCLUSION

Astranis Bermuda seeks authority for the Arcturus satellite to access the U.S. market in the 18.2-19.3 GHz and 19.7-20.2 GHz bands (space-to-Earth) and 28.0-29.1 and 29.3-30.0 GHz bands (Earth-to-space), as well as for the addition of Arcturus to the Permitted List in eligible Ka-band frequencies at the 163°W.L. orbital location. The Arcturus satellite will bring broadband Internet connectivity to Alaska to meet the needs of underserved U.S. consumers, as well as corporate and government customers. Grant of the Petition will help bridge the digital divide and allow users the rural and most remote areas of Alaska to enjoy the same benefits of broadband access already available in most of the country.

For these and other reasons set forth herein, grant of the Petition would strongly serve the public interest and Astranis Bermuda respectfully requests that the Arcturus satellite be permitted to access the U.S. market, and be added to the Permitted List in relevant Ka-band frequencies, at the earliest practicable time.