



Federal Communications Commission
Washington, D.C. 20554

March 15, 2017

Elisabeth Neasmith
Telesat Canada
1601 Telesat Court
Ottawa, Canada

Re: Telesat Canada, IBFS File No. SAT-LOI-20161115-00108 (Call Sign S2976)

Dear Ms. Neasmith:

On November 15, 2016, Telesat Canada (Telesat) filed the above-captioned petition for a declaratory ruling requesting access to the U.S. market for a non-geostationary orbit (NGSO) low earth orbit (LEO) fixed-satellite service (FSS) system utilizing Ka-band frequencies. To aid in the Commission's evaluation of Telesat's petition, please provide the following additional items or information:¹

1. A statement concerning whether it is Telesat's intent to seek registration of the Telesat NGSO FSS system by Canada consistent with the Convention on the Registration of Objects Launched into Outer Space.
2. Any software used to generate the EPPD results shown in the petition, including inputs and output results.
3. Section 25.114(d)(1) of the Commission's rules requires that applicants provide an explanation of how the uplink frequency bands would be connected to the downlink frequency bands on their proposed satellite system.² In order to better understand the beam and channel connections on the Telesat NGSO FSS system, we request that Telesat supplement its petition with a showing (*e.g.*, a strapping table, chart, or spreadsheet) that clearly presents this information.
4. Commission rules require petitioners requesting U.S. market access for non-U.S. licensed space stations to provide a narrative description of the design and operational strategies that will be used to mitigate orbital debris.³ Alternatively, an applicant seeking market access for a non-U.S. licensed system can satisfy this requirement "by demonstrating that debris mitigation plans for the space station(s) for which U.S. market access is requested are subject to direct and effective regulatory oversight by the national licensing authority."⁴ Telesat states that it satisfies this requirement because the operations of its NGSO FSS system are subject to direct and effective regulatory oversight by the Canadian licensing authority – Innovation, Science and Economic Development Canada (formerly Industry Canada).⁵ Telesat states that Canadian regulations require that space debris mitigation measures be implemented "in accordance with best industry

¹ 47 CFR § 25.111(a).

² 47 CFR § 25.114(d)(1).

³ 47 CFR § 25.114(d)(14); 47 CFR § 25.137 (b), (d).

⁴ 47 CFR § 25.114(d)(14)(v).

⁵ Petition for Declaratory Ruling at 27.

practices so as to minimize adverse effects on the orbital environment,” and that Telesat’s Canadian approval in principle specifies the same condition.⁶ Telesat also disclosed certain information concerning its orbital debris mitigation plans pursuant to Section 25.114(d)(14) of the Commission’s rules.⁷ In order to assist in our assessment of whether Telesat has demonstrated that it is subject to direct and effective regulatory oversight, or alternatively, to permit analysis of the debris mitigation plans for the constellation, we request the following additional information:

- a. Any additional information concerning the scope of oversight to which Telesat is subject, supported if possible by publicly available materials discussing the criteria applied by the Canadian regulatory authority. If an Orbital Debris Assessment Report or other documentation for the Telesat constellation has been prepared for or submitted to ISED, please submit a copy of that report.
- b. The accuracy within which the space station orbital parameters will be maintained for any orbit in which Telesat NGSO FSS satellites will operate, including apogee, perigee, inclination, and the right ascension of the ascending node(s).⁸
- c. The intended orbital parameters of the “Decaying Lower Orbit” to be used for end-of-life disposal, or, if range of possible orbits depending on available fuel is intended, a characterization of the likely distribution of satellites within that range.
- d. Please provide an analysis of collision risk for satellites during the passive disposal phase, *i.e.*, after all propellant is consumed, for a 140 satellite deployment, assuming 100% reliability. As part of that analysis, please provide an assessment of how many conjunctions and/or collision avoidance maneuvers might be required of the International Space Station, assuming it is in operation throughout the period in which disposals occur. To the extent replenishment or deployment rates can be expected to involve more than 140 satellites through 2035, please also provide an analysis assuming such rates.
- e. Please provide an analysis of collision risk, assuming rates of satellite failure resulting in the inability to perform collision avoidance procedures of 10, 5 and 1 percent. This analysis should include a study performed assuming all failures occur at the mission altitude, but may also include additional studies specifying alternative assumptions concerning the orbital locations (such as injection altitude) at which failures might occur.
- f. Any additional information you may wish to provide concerning human casualty risk resulting from satellite disposal, such as outcomes based on higher fidelity analysis, or any risk or loss mitigation strategies under development.

⁶ Telesat Petition at 27. We note that the ISED materials and the condition referenced by Telesat to support its demonstration appear to focus on post mission disposal. *See* Industry Canada Client Procedures Manual “Licensing of Space Stations” CPS-2-6-02, Issue 3 (Provisional), November 2013, at p. 8, § 3.3.3: Constellation Approval in Principal, ¶ 14 (“Telesat, at the end-of-life of the LEOVantage satellites, must implement space debris mitigation measures in accordance with best industry practices so as to minimize adverse effects on the orbital environment”). Other matters, such as operational debris, prevention of accidental explosions, and collision risk, appear to be beyond the scope of the ISED-required material.

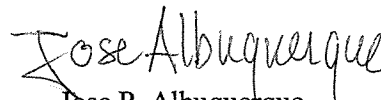
⁷ Telesat Technical Exhibit, Section A11.

⁸ *See* 47 CFR § 25.114(d)(14)(iii). Telesat’s petition states that station-keeping will be maintained “with a level of accuracy sufficient to avoid collision with other non-geostationary satellites,” but provides no specific information regarding the accuracy of the space station orbital parameters. Telesat Technical Appendix at 31. Telesat also describes how satellites will be able to be moved within their “control box,” but provides limited detail on the dimensions of this control box. Telesat Technical Exhibit, Section A11.

- g. Any information or analysis you may wish to provide with respect to treatment of this application under the Commission's environmental processing rules.⁹
5. For optical inter-satellite links, please provide the wavelength, power, duty cycle, beam diameter at emitter, and beam divergence. In addition, please provide the power margin at the receiver at maximum operating distance.
6. Please indicate whether optical inter-satellite links will be coordinated with other systems proposed in FCC applications and with the U.S. Department of Defense's laser clearing house, and, if such coordination has commenced, please address the status of coordination.

Telesat must file a letter providing this information by April 14, 2017. Failure to do so may result in the dismissal of Telesat's request pursuant to Section 25.112(c) of the Commission's rules, 47 CFR § 25.112(c).

Sincerely,


Jose P. Albuquerque
Chief, Satellite Division
International Bureau

cc: Joseph A. Godles Esq.
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⁹ 47 C.F.R. §§ 1.1301-1.1309. Cf. Space Data Corporation, 16 FCC Rcd 16421, ¶¶ 24-27 (WTB 2001).