

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

In the Matter of	)	
	)	
Telesat Canada	)	File No. SAT-PDR-20161115-00108
	)	
Petition for Declaratory Ruling to Grant	)	
Access to the U.S. Market for Telesat's	)	
NGSO Constellation	)	
	)	

**TELESAT CANADA'S RESPONSE TO COMMENTS OF SPIRE GLOBAL, INC.**

In the above-referenced Petition for Declaratory Ruling ("Petition"), Telesat Canada ("Telesat") seeks access to the U.S. market for Telesat's planned low earth orbit ("LEO"), non-geostationary satellite orbit ("NGSO") satellite system (the "Telesat LEO Constellation" or "LEO Constellation"). Telesat's Petition is one of several applications and petitions (collectively, the "Applications") regarding Ku-band and Ka-band NGSO satellite systems that have been accepted for filing by the Commission that are subject to the same comment period.<sup>1</sup>

Telesat's LEO Constellation will be comprised of over 100 advanced satellites that will deliver high capacity, high speed, low latency data services with a distributed space architecture designed to enhance network security and resiliency and the ability to provide coverage anywhere in the world. The innovative design combines polar and inclined orbits, incorporates advanced technologies that will make effective and

---

<sup>1</sup> See *Public Notice, Petitions Accepted For Filing, Cut-Off Established for Additional NGSO-Like Satellite Petitions or Petitions For Operations in the 12.75-13.25 GHz, 13.85-14.0 GHz, 18.6-18.8 GHz, 19.3-20.2 GHz, and 29.1-29.5 GHz Bands*, DA 17-524, File No. SAT-LOI-20161115-00121 (May 26, 2017) ("*May 2017 Public Notice*").

efficient use Ka-band spectrum to bring needed services to the public, including many presently underserved areas. Innovation, Science and Economic Development Canada (formerly Industry Canada) has authorized Telesat to launch and operate this LEO Constellation, and Telesat has filed the Petition for authority to serve the U.S. market.

Spire Global, Inc. (“Spire”) submitted comments to the Commission regarding various NGSO petitions and applications in this processing round, including Telesat’s Petition.<sup>2</sup> Telesat hereby responds to Spire’s Comments. Telesat demonstrates that the Comments provide no basis for delaying a grant of Telesat’s Petition.

## I. DISCUSSION

Spire expresses concern about what it says are risks posed to smallsat operators in the 400-650 km orbital altitude range by the post mission disposal plans of the LEO Operators. Spire asks the Commission to require the LEO Operators to provide more details regarding their post-mission plans.

Spire offers no analysis as to these alleged risks and scant detail about the information that it believes to be necessary from the LEO Operators. Spire makes only a general request for more information regarding “how they will coordinate with users of such orbits, the calculations underlying their re-entry assumptions, and other details necessary to evaluate the risks they pose to smallsat providers.”<sup>3</sup>

---

<sup>2</sup> See *Comments of Spire Global, Inc. in re Telesat Canada Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat’s NGSO Constellation*, IBFS File No. SAT-PDR-20161115-00108 (June 26, 2017) (“*Spire Comments*”). Spire refers to the parties to these Applications as the “LEO Operators.” *Id.* at 3.

<sup>3</sup> *Id.* at 7.

Spire's unsubstantiated assertion of risk, coupled with a general request for more information, provides no basis for delaying favorable action on Telesat's Petition.

Telesat has already provided substantial information regarding its orbital debris mitigation plans, in addition to that set forth in its Petition, in response to a number of questions posed by the Commission.<sup>4</sup>

Nevertheless, to address Spire's stated concerns, Telesat refers Spire to Telesat's detailed response to the questions posed by OneWeb regarding Telesat's orbital debris mitigation plans and analyses, including post-mission disposal risks.<sup>5</sup> Among other aspects of that Response and with particular relevance to Spire's informational request, Telesat shows therein:

- Telesat plans to use highly elliptical orbits of approximately 750 km x 150 km to deorbit its satellites. This will minimize the fuel usage, time in the disposal orbit and debris generation.<sup>6</sup> The use of an elliptical orbit for post mission disposal is also cited by Spire as a strategy that "minimize[s] orbital debris concerns during post mission disposal."<sup>7</sup>
- Calculated using the NASA DAS program for the probability of collision with an object of greater than 10 cm, the collision risk in Telesat's deorbit phase, per satellite, rounded to five decimals, is 0.00000. Given that the probability of collision is less than the resolution of the DAS software resulting in this near zero probability of collision, the probability of collision for the entire constellation would also therefore be near zero.<sup>8</sup>

---

<sup>4</sup> See Letter from Elisabeth Neasmith, Telesat to Jose Albuquerque regarding the FCC's March 15 request for additional information regarding Telesat Canada's Petition for Declaratory Ruling, IBFS File No. SAT-LOI-20161115-00108 (April 14, 2017).

<sup>5</sup> See Telesat Canada's Response To Comments Of WorldVu Satellites Limited in re Telesat Canada Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat's NGSO Constellation, IBFS File No. SAT-PDR-20161115-00108 (July 7, 2017) at 7-15. ("Telesat's Response to OneWeb").  
*Id.* at 9-10.

<sup>7</sup> Spire Comments at 3-4.

<sup>8</sup> Telesat's Response to OneWeb at 9.

- At the time of entry into disposal phase, Telesat will custom design disposal orbit parameters that minimize probability of collision with the International Space Station (ISS) and, Telesat, adds here, other operating satellites. To pre-predict the required parameters about 15 years in advance would be premature, but Telesat is experienced in eccentricity and inclination collocation and probability of collision avoidance strategies and will use that experience further to minimize any chance of collision.<sup>9</sup>
- Telesat shares its satellites' ephemeris data with JSpOC, CANSpOC, the Space Data Association, the Canadian Space Agency, MIT Lincoln Labs, and fellow operators both routinely and upon request (currently including NASA, Star One and EchoStar for near orbit coordination operations).<sup>10</sup>

Telesat acknowledges that the Commission is likely to promulgate additional rules regarding the obligations of all satellite operators, including smallsat operators such as Spire, with respect to the mitigation of the risks of orbital debris, including to protect against collisions with the satellites of other operators. To address this possibility, just as the Commission addressed in its OneWeb grant, Telesat has no objection to accepting a condition to a grant of U.S. market access Petition stating that any earth station licenses granted in the future "would be subject to modification to bring them into conformance with any rules or policies adopted by the Commission in the future."<sup>11</sup>

While Telesat fully accepts its responsibilities to design and operate its satellites, including planning for post-mission disposal, so as to avoid the risk of collision with other spacecraft, Telesat would also note that the responsibility to do so, including at the ongoing operation of satellites, must be a mutual one for all operators, including

---

<sup>9</sup> *Id.*

<sup>10</sup> *Id.* at 4.

<sup>11</sup> *Cf. OneWeb Grant* at ¶ 26.

Spire. The same conditions that apply to Telesat should also apply to Spire, both as to existing and planned future spacecraft. To the extent that Spire's Comments suggest a one-way obligation of Telesat to avoid collisions with Spire, without commensurate obligations of Spire to design and operate its spacecraft in a manner that allows it to do the same vis-à-vis other spacecraft, that suggestion should be rejected.

## II. CONCLUSION

Telesat urges the Commission to grant Telesat's Petition, consistent with the action taken by the Commission with respect to OneWeb's petition for access to the U.S. market. Nothing in Spire's Comments warrants delaying such favorable action.

Respectfully submitted,

TELESAT CANADA

/s/ \_\_\_\_\_  
Elisabeth Neasmith  
Director, Spectrum Management and Development  
1601 Telesat Court  
Ottawa, Ontario  
Canada, K1B 5P4  
(613) 748-0123

*Of Counsel:*  
Henry Goldberg  
Joseph A. Godles  
Jonathan L. Wiener  
Goldberg, Godles, Wiener & Wright LLP  
1025 Connecticut Avenue, Suite 1000  
Washington, DC 20036  
(202) 429-4900

July 7, 2017

## CERTIFICATE OF SERVICE

I hereby certify that on this 7<sup>th</sup> day of July, 2017, a copy of the foregoing Response to Comments of Spire Global, Inc. was sent by first-class, United States mail to the following:

Jonathan Rosenblatt  
General Counsel  
George John  
Legal & Regulatory Counsel  
Spire Global, Inc.  
575 Florida Street, Suite 150  
San Francisco, CA 94110

/s/ \_\_\_\_\_  
Brenda Campbell