

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

In the Matter of	)	
	)	
Viasat, Inc.	)	Callsign S2985
	)	File No. SAT-MPL-20200526-00056
Application to Modify	)	
NGSO System Authorization	)	
	)	

**REPLY OF TELESAT CANADA**

Viasat, Inc. (“Viasat”) has submitted the above-captioned application (the “Application”) seeking modification of its authorization for an NGSO FSS system and requesting that the Application be considered part of the first processing round.<sup>1</sup>

Telesat Canada (“Telesat”) was one of several parties that petitioned to deny or defer consideration of Viasat’s Application or otherwise commented on the Application.<sup>2</sup>

On September 15, 2020, Viasat submitted a “Consolidated Opposition to Petitions and Response to Comments” (“Opposition”). Telesat hereby replies to Viasat’s Opposition.

**I. SUMMARY**

Telesat agrees with elements of Viasat’s Opposition, but has a fundamental disagreement with a key element.

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<sup>1</sup> See Viasat Application, Exhibit A, at 2.

<sup>2</sup> See Petition to Deny or Defer Consideration of Telesat Canada, IBFS File No. SAT-MPL-20200526-00056 (filed Aug. 31, 2020) (“*Telesat Petition*”); Petition to Deny or Defer of Space Exploration Holdings, LLC, IBFS File No. SAT-MPL-20200526-00056 (filed Aug. 31, 2020) Petition to Deny or Condition of O3b Limited, IBFS File No. SAT-MPL-20200526-00056 (filed Aug. 31, 2020) Comments of The Boeing Company, IBFS File No. SAT-MPL-20200526-00056 (filed Aug. 31, 2020) Kuiper Systems LLC, IBFS File No. SAT-MPL-20200526-00056 (filed Aug. 31, 2020).

In its Petition, Telesat identified gaps in the technical information and analysis that Viasat provided. Telesat showed that using available data and making reasonable assumptions as to missing information leads to the conclusion that Viasat's system, as modified, would become more susceptible to interference from Telesat's system and would be more likely to cause interference to Telesat's system. Telesat suggested that Viasat be given an opportunity to supplement its analysis by providing the missing information.

Rather than taking up this invitation, Viasat now proposes that the Commission simply trust it to employ a variety of "tools" to avoid additional interference. Telesat opposes this proposal, which is contrary to the *Teledesic* precedent Viasat professes to endorse; would deprive the Commission and interested parties of any meaningful opportunity to assess interference potential; and is dependent on Viasat having real-time information about the operation of other systems, which Viasat acknowledges it would be improper for it to possess.

Telesat also takes this opportunity to correct two errors Viasat committed in commenting on Telesat's technical analysis. Viasat misstates the relevant distance for evaluating interference from Viasat's uplinks into Telesat's satellites. Viasat also incorrectly asserts that Telesat had assumed Viasat would have eight or more satellites active on a given frequency, at any given moment, and at any given location.

## II. POINTS OF AGREEMENT

Telesat agrees with Viasat that Viasat's Application should be judged under the *Teledesic* standard.<sup>3</sup> Telesat also agrees with the following points Viasat made in its

Opposition:

- In applying the *Teledesic* standard, with which most parties agree, "an I/N CDF assessment provides the relevant analysis."<sup>4</sup>
- "[A]pplying the *Teledesic* standard is not as simple as 'counting the satellites' and determining whether the number has increased."<sup>5</sup>
- SpaceX's arguments to the contrary are inconsistent with the very arguments put forth by SpaceX to justify modifications to its own system and have no technical justification. "It is particularly ironic for SpaceX to be making such an argument"<sup>6</sup> given
  - previous SpaceX assertions that "deploying *more satellites* in its constellation would help *reduce the potential for band-splitting events, and thus reduce interference potential*";
  - SpaceX saying that having more satellites meant "more satellite diversity options"; and
  - SpaceX further saying such satellite diversity would allow SpaceX to "*greatly reduce the number of in-line events*."<sup>7</sup>
- The assessment carried out by the Commission in granting SpaceX's first modification to its system<sup>8</sup> "does not consider mere geometric in-line alignments alone – with respect to either number or duration. Rather, it considers the

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<sup>3</sup> See Viasat Opposition at 4.

<sup>4</sup> *Id.* at 20.

<sup>5</sup> *Id.* at 10.

<sup>6</sup> *Id.* at 11.

<sup>7</sup> *Id.* at 11 (citations omitted).

<sup>8</sup> *Space Exploration Holdings, LLC, Request for Modification of the Authorization for the SpaceX NGSO Satellite System*, Order and Authorization, 34 FCC Rcd 2526 (IB 2019) ("*First SpaceX Modification Order*");

aggregate change in predicted interference over a certain threshold and also above the baseline established by the initial grant.”<sup>9</sup>

- “[T]he Commission *has* allowed applicants to increase the number of satellites in a constellation not yet deployed without affecting processing-round status.”<sup>10</sup> Viasat cites for authority the Commission’s action with respect to Orbcomm’s “Little LEO” first round application.<sup>11</sup> To this, Telesat adds similar action of the Commission with respect to a previous modification of O3b’s system that added satellites to its constellation.<sup>12</sup>
- “[B]ecause Kuiper’s system was granted as part of a later processing round, Kuiper must protect Viasat’s system from interference, not vice versa.”<sup>13</sup>
- “O3b presents a very simplistic assessment of the total duration of projected ‘in line’ events with the O3b system before and after the proposed modification [...] O3b does not even differentiate between (i) a mere geometric alignment and (ii) a circumstance that potentially could cause Viasat to exceed [an I/N threshold].”<sup>14</sup>
- Sharing “detailed and proprietary real-time beam-pointing information” as urged by SpaceX and Kuiper would be a “new, impractical, and burdensome rule that would require sharing competitively-sensitive business information.”<sup>15</sup>

### **III. PLEDGING TO USE A VARIETY OF “TOOLS” IS NO SUBSTITUTE FOR A TECHNICAL ANALYSIS**

Although, as stated above, Telesat agrees with Viasat on many points, it disagrees with Viasat on a most basic point. In Telesat’s view, determining whether

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<sup>9</sup> *Id.* at 6-7.

<sup>10</sup> *Id.* at 18 (citation omitted).

<sup>11</sup> *Id.*

<sup>12</sup> See *Grant Stamp*, O3b Limited, File Nos. SAT-LOI-20141029-00118 and SAT-AMD-20150115-00004 (Jan. 22, 2015).

<sup>13</sup> Viasat Opposition at 21.

<sup>14</sup> *Id.* at 28-29 (citation omitted).

<sup>15</sup> *Id.* at 37.

Viasat's Application would worsen the interference environment requires a technical analysis and showing, not a vague commitment to use a variety of "tools."

In its Petition, Telesat identified several deficiencies in the technical portion of Viasat's Application. Telesat showed that Viasat had not even addressed two of four interference scenarios, *i.e.*, the scenarios in which Viasat's modified system might become more susceptible to interference on the uplink or the downlink. Telesat further showed that Viasat's modified system would, in fact, be more susceptible to interference from Telesat's uplinks. Telesat also demonstrated that in the two scenarios Viasat did examine (*i.e.*, when its modified system might cause additional interference on the uplink or the downlink), not only could the analysis not be replicated because Viasat had not provided sufficient details, but when reasonable assumptions were made, Viasat's proposed modification was shown to increase interference to Telesat's system.

Viasat's Opposition addresses none of the deficiencies noted by Telesat. Rather, Viasat proposes that the Commission rely solely on "Viasat's commitment to ensure that its operations will stay within the NGSO FSS operating environment established in the 2016/2017 processing rounds" by using "appropriate combinations of [...] operational tools to ensure that the I/N of the modified system does not exceed the interference profile of its premodified system with respect to other same-round NGSO FSS systems."<sup>16</sup> This "trust me" proposal conflicts with Commission precedent Viasat

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<sup>16</sup> Id. at 33.

claims it supports; would preclude meaningful review of the impact of Viasat's proposed modifications on the interference environment; and is dependent on information sharing that Viasat itself opposes.

Viasat professes to support the *Teledesic* precedent<sup>17</sup> and acknowledges that under *Teledesic* "an I/N CDF assessment provides the relevant analysis."<sup>18</sup> The "tools" approach Viasat proposes, however, directly conflicts with these principles. If the Commission were to adopt Viasat's approach, an I/N "assessment" would serve no purpose and, potentially, any proposed modification to an NGSO system authorization would have to be granted as long as the applicant filed a commitment similar to the one Viasat makes.

Viasat's "tools" approach would render its Application impervious to review. As this proceeding makes evident, even when facts are known there is room for valid technical disagreements. Under Viasat's approach, however, there would be no opportunity to surface these disagreements; neither the Commission nor interested parties would know how Viasat's modified system would function in practice. In short, Viasat's proposal would eliminate the benefit of public comment that is supposed to inform the Commission's judgments.

Moreover, Viasat's positions are internally inconsistent. In order to employ its "tools," Viasat would need real-time information about the operation of other NGSO systems. Viasat, however, has taken the position, with which Telesat agrees, that

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<sup>17</sup> See Viasat Opposition at 4.

<sup>18</sup> *Id.* at 20.

sharing “detailed and proprietary real-time beam-pointing information” would be a “new, impractical, and burdensome rule that would require sharing competitively-sensitive business information.”<sup>19</sup> One cannot employ tools based on information one does not possess.

Viasat attempts to analogize its “tools” proposal to the Commission’s approach on EPFD limits, but that analogy does not withstand scrutiny. In the case of EPFD limits, there is an established methodology; a requirement to make a showing employing this methodology; and an international body, the ITU, that passes upon the showing, supported by an ITU-approved software freely available to anyone. The Commission evaluates compliance with EPFD limits based on whether there has been a “favorable” or “qualified favorable” finding by the ITU’s Radiocommunication Bureau, in accordance with Resolution 85 of the ITU’s Radio Regulations (incorporated by reference, see Section 25.108 of the Commission’s rules).<sup>20</sup> In the case of Viasat’s proposal, on the other hand, there would be no review employing an established methodology by the ITU, the Commission, or anyone. There would be only one party’s unsupported hope that all will be well.

For all these reasons, the Commission should reject Viasat’s “tools” proposal.

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<sup>19</sup> *Id.* at 37.

<sup>20</sup> See 47 C.F.R. §25.146(c).

#### **IV. TELESAT NEEDS TO CORRECT TWO ERRONEOUS STATEMENTS BY VIASAT**

Telesat hereby corrects two erroneous statements Viasat made in commenting on Telesat's technical analysis.

As discussed in the attached Technical Appendix, Viasat errs in suggesting that when evaluating the potential for interference from Viasat's uplinks to Telesat's satellites, the relevant distance is from the ground to Viasat's satellites. Plainly, when considering the interference from a Viasat transmit earth station to Telesat's satellites, what matters is the distance from the ground to Telesat's satellites.

As also discussed in the attached Technical Appendix, Viasat errs when it states Telesat assumed Viasat would have eight or more satellites active on a given frequency at any given moment, and at any given location. To the contrary, Telesat clearly indicated that it was assuming only two active satellites, and that this assumption was based on Viasat's own filings.<sup>21</sup>

#### **V. CONCLUSION**

Telesat demonstrated in its Petition that Viasat's Application as filed cannot be granted. While Telesat suggested Viasat might rectify the Application's defects, Viasat declined to do so and has suggested instead the Commission trust Viasat to implement "tools" it claims can be used to avoid additional interference.

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<sup>21</sup> See Petition at 14, n.20.



For the reasons stated herein, the Commission should reject Viasat's tools proposal, and, given that Viasat has not redressed the defects Telesat identified, the Commission should deny Viasat's Application.

Respectfully submitted,

**TELESAT CANADA**

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September 25, 2020

## TECHNICAL APPENDIX

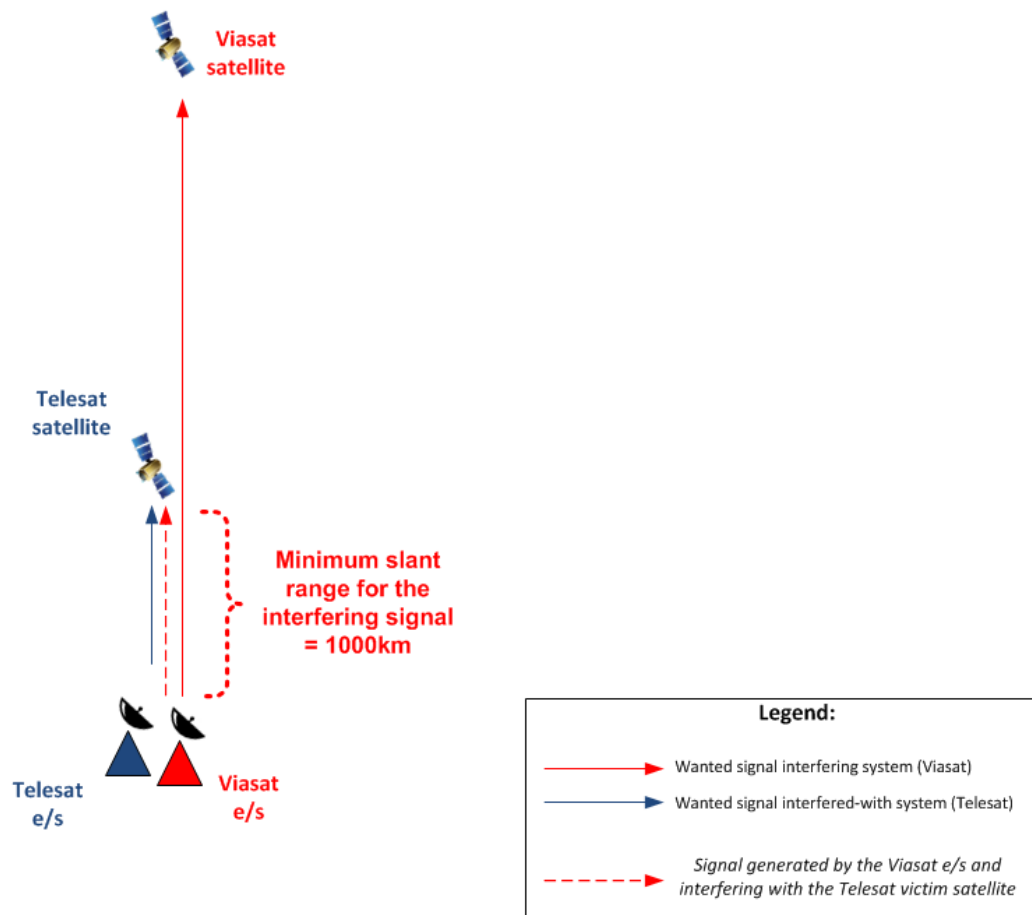
### **I. VIASAT IS CONFUSED ABOUT WHICH MINIMUM SLANT RANGE SHOULD BE USED IN A WORST-CASE STATIC ANALYSIS OF SCENARIO 2 (UPLINK, VIASAT AS THE INTERFERER)**

Viasat claims that Telesat has failed to identify “discrepancies” between Viasat’s EIRP data and its I/N plots. To support such claim, Viasat states that Telesat is not modelling the Viasat system correctly, as it uses, in Tables A2-1a and A2-1b of the Telesat petition, a minimum slant range of 1,000 km. Viasat asserts that, instead, Telesat should use a minimum slant range of 8,200 km or 1,300 km, which are the orbit altitudes of the Viasat system *before* and *after* the proposed modification, respectively. Viasat seems confused with respect to the basic assumptions that should be made when assessing the interference environment in a worst-case static analysis of “Scenario 2” (i.e., when Viasat is the interferer in the uplink direction). This scenario evaluates the interference from a Viasat uplink into a Telesat satellite in a geometry where one satellite for each of the Telesat and Viasat systems are exactly above the collocated earth stations of those systems and point the boresight of one of their beams in that same direction. In such scenario, 1,000km is the correct slant range to use in the calculation because it is the distance from the Viasat uplink to the satellite of the Telesat constellation, which is where the interference is being measured in this Scenario. Correspondingly, in this scenario, the distance to the Viasat satellite is irrelevant. This geometry can be easily illustrated in Figure 1 below. Furthermore, in order to avoid any further confusion, Telesat is pleased to clarify some of the terms used in Tables A2-

1a and A2-1b of its Petition. The tables from Telesat's Petition are reproduced below, however a new column "Parameter (clarified wording)" has been added. Telesat trusts that with these clarifications, Viasat confusion on this basic analysis is removed.

**Figure 1**

**Illustration of a worst-case static analysis of Scenario 2 (Uplink, Viasat as Interferer)**



Tables A2-1a and A2-1b from Telesat's Petition (with new column "Parameter (clarified wording)")

Static analysis of Scenario 2 (Uplink, Viasat as Interferer)

Case 1: 27500-28600 MHz

Parameter (as originally worded)	Parameter (clarified wording)	Value	Unit	Value	Unit	Value	Unit
Centre frequency	Centre frequency	28050 MHz					
Min. slant range	Minimum slant range between the interfering Viasat e/s and the victim Telesat satellite	1000 km					
Min. FSL <sup>1</sup>	Minimum FSL <sup>1</sup> between the interfering Viasat e/s and the victim Telesat satellite	181.4 dB					
Telesat beam G/T	Beam G/T of the Telesat victim satellite	13.2	dB/K	2.5	dB/K	-17.0	dB/K

<sup>1</sup> Free-Space Loss.

Viasat 30cm e/s				
Max. EIRP sd <sup>2</sup>	Maximum EIRP sd <sup>2</sup> radiated by the interfering Viasat e/s	-20.8 dB(W/Hz)		
Max. I/N	Maximum I/N ratio measured at the input of the Telesat satellite victim receiver	39.6 dB	28.9 dB	9.4 dB

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<sup>2</sup> The EIRP spectral density values for the earth stations of the Viasat system before modification have been extracted by the masks provided by selecting a latitude of 40 deg N.

Viasat 60cm e/s				
Max. EIRP sd	Maximum EIRP sd radiated by the interfering Viasat e/s	-19.8 dB(W/Hz)		
Max. I/N	Maximum I/N ratio measured at the input of the Telesat satellite victim receiver	40.6 dB	29.9 dB	10.4 dB

Viasat 7m e/s				
Max. EIRP sd	Maximum EIRP sd radiated by the interfering Viasat e/s	1.2 dB(W/Hz)		
Max. I/N	Maximum I/N ratio measured at the input of the Telesat satellite victim receiver	61.6 dB	50.9 dB	31.4 dB
Maximum "Pre-Mod" I/N in Figure A2-1	Maximum "Pre-Mod" I/N ratio measured at the input of the Telesat satellite victim receiver in Figure A2-1	22.0 dB		

Case 2: 29500-30000 MHz

Parameter (as originally worded)	Parameter (clarified wording)	Value	Unit	Value	Unit	Value	Unit
Centre frequency	Centre frequency	29750 MHz					
Min. slant range	Minimum slant range between the interfering Viasat e/s and the victim Telesat satellite	1000 km					
Min. FSL <sup>3</sup>	Minimum FSL <sup>3</sup> between the interfering Viasat e/s and the victim Telesat satellite	181.9 dB					
Telesat beam G/T	Beam G/T of the Telesat victim satellite	13.2	dB/K	2.5	dB/K	-17.0	dB/K

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<sup>3</sup> Free-Space Loss.



Viasat 30cm e/s				
Max. EIRP sd	Maximum EIRP sd radiated by the interfering Viasat e/s	-20.3 dB(W/Hz)		
Max. I/N	Maximum I/N ratio  measured at the input of the Telesat satellite victim  receiver	39.6 dB	28.9 dB	9.4 dB
Viasat 60cm e/s				
Max. EIRP sd	Maximum EIRP sd radiated by the interfering Viasat e/s	-19.4 dB(W/Hz)		
Max. I/N	Maximum I/N ratio  measured at the input of the Telesat satellite victim  receiver	40.5 dB	29.8 dB	10.3 dB

Viasat 7m e/s				
Max. EIRP sd	Maximum EIRP sd radiated by the interfering Viasat e/s	1.6 dB(W/Hz)		
Max. I/N	Maximum I/N ratio measured at the input of the Telesat satellite victim receiver	61.5 dB	50.8 dB	31.3 dB
Maximum "Pre-Mod" I/N in Figure A2-1	Maximum "Pre-Mod" I/N ratio measured at the input of the Telesat satellite victim receiver in Figure A2-1	22.0 dB		

## II. CONTRARY TO WHAT VIASAT CLAIMS, IN ITS ANALYSES, TELESAT USED AN “N\_CO PARAMETER” EQUAL TO TWO RATHER THAN EQUAL TO EIGHT

In its consolidated opposition, Viasat states that “each of the “analyses” provided by the commenters and petitioners suffers from fundamental flaws, including [...] wrongly assuming that eight, or more, Viasat NGSO satellites would be active at a given frequency, at any given moment, and at any given location”. Such an operational parameter for a NGSO system is commonly referred to as “N\_co” and is defined in the Radio Regulations<sup>4</sup> as the “the maximum number of non-geostationary satellites transmitting with overlapping frequencies to a given location”. As clearly stated in its Petition<sup>5</sup>, Telesat assumed for the analyses it carried out an “N\_co parameter” equal to two for the Viasat system both *before* and *after* modification; Telesat made this assumption because Viasat stated that “except as addressed in [its] modification application, the information required under Section 25.114 and previously provided remains unchanged<sup>6</sup>”. In its modification application, Viasat did not indicate its intention to change the N\_co parameter. Taking the above into account, it should also be noted that an “N\_co parameter” assumed to be equal to two makes Telesat analyses conservative; still, those analyses show that the Viasat system would worsen the interference environment for the Telesat system *after* the proposed modification.

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<sup>4</sup> See item A.4.b.6.a.1 of the Appendix 4 to the ITU Radio Regulations, Edition of 2020

<sup>5</sup> See fn 20 at p. 14 and fn 22 at p. 15

<sup>6</sup> See Viasat Application, Exhibit A at 2

## CERTIFICATE OF SERVICE

I hereby certify that on this 25th day of September, 2020, a copy of the foregoing Reply of Telesat Canada was sent by electronic mail to all parties identified below except Viasat, Inc. which was sent by US mail.

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