SPACEX

October 20, 2022

BY ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street, N.E.
Washington, DC 20554

Re: *IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105*

Dear Ms. Dortch:

SpaceX designed its second-generation ("Gen2") constellation to maximize the efficient, responsible, and sustainable use of orbital resources. To that end, SpaceX has worked extensively and collaboratively with federal agencies and the scientific community to establish and implement best practices that will preserve space and our environment for future generations.

Ignoring these efforts, Viasat has repeatedly raised vague, unsubstantiated environmental arguments to cajole the Commission to undertake an environmental review of SpaceX's application under the guise of the National Environmental Policy Act ("NEPA"). As an initial matter, it bears repeating that Viasat—which chose to license outside the United States to exploit the foreign-operator loophole that allows it to avoid scrutiny of its own high-risk satellite system—does not actually care about the impacts of satellites on the environment. Its efforts are simply and transparently part of its scorched earth strategy to misuse the regulatory process to slow down a competitor.[1]

Even leaving aside its improper motives, Viasat's attempt to weaponize NEPA fails. In fact, the Commission already correctly rejected Viasat's arguments when they were raised with respect to SpaceX's first-generation ("Gen1") constellation,[2] and the D.C. Circuit upheld the Commission's decision on the ground that Viasat's claims of harm are "speculative" and "beyond the purview of NEPA."[3] The Commission should reject Viasat's recycled arguments here as well.

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1 *See, e.g.*, Petition to Deny or Hold in Abeyance of Viasat, Inc., IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, at 54-67 (Feb. 8, 2022) ("Viasat Petition"); Letter from Jarrett S. Taubman to Marlene H. Dortch, IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, at 4 (June 7, 2022) ("Viasat June Letter"); Letter from Jarrett S. Taubman to Marlene H. Dortch, IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, at 4-5 (Oct. 13, 2022) ("Viasat October Letter").

2 *See Space Exploration Holdings, LLC*, 36 FCC Rcd. 7995, ¶¶ 80-92 (2021) ("*2021 SpaceX Modification Order*").

3 *See Viasat, Inc. v. FCC*, 47 F.4th 769, 778-80 (D.C. Cir. 2022).

I. EFFECTS OF DEORBITING SATELLITES ON THE ATMOSPHERE

Viasat has rehashed the same speculative argument about SpaceX's Gen2 constellation that the Commission rejected in relation to SpaceX's Gen1 constellation: that deorbiting satellites will introduce alumina into the upper atmosphere as they demise on reentry, and that this will have a significant environmental impact that warrants environmental review. This argument fails again.

It fails legally both because NEPA does not apply to activities in space and because Viasat's asserted injury does not affect interests of the sort protected by NEPA. Either reason is enough to reject Viasat's claims.[4]

Beyond those threshold obstacles, Viasat's arguments would fail substantively. As SpaceX has previously pointed out, the NEPA claims raised in this proceeding are carbon copies of the ones Viasat raised against SpaceX's last application[5]—the very claims that the D.C. Circuit dismissed for lack of cognizable harm. Even so, SpaceX thoroughly rebutted Viasat's claims with respect to the Gen2 system.[6] Most notably, Viasat has failed to overcome the Commission's categorical exclusion of satellite-licensing activities from case-specific environmental review. Under generally applicable NEPA regulations promulgated by the Council on Environmental Quality ("CEQ")—the body tasked with interpretation and oversight under NEPA—agencies are obliged to "identify in their agency NEPA procedures . . . categories of actions that normally do not have a significant effect on the human environment, and therefore do not require preparation of an environmental assessment or environmental impact statement."[7] The Commission—with the CEQ's approval—has categorically excluded satellite-licensing activities from case-specific environmental review, concluding through a notice-and-comment rulemaking proceeding that these activities "individually and cumulatively [will] have no significant effect on the quality of the human environment."[8] For most Commission activities, including satellite licensing, the categorical exclusion is the beginning and end of the agency's NEPA obligations. In exceptional cases where an agency determines that there are "extraordinary circumstances in which a normally excluded action may have a significant effect," however, the agency must conduct further environmental review.[9]

Contrary to its earlier recognition that "extraordinary circumstances" are required to overcome the categorical exclusion,[10] Viasat now argues that the Commission must initiate an environmental review merely upon a finding that an action *may* have a significant environmental impact.[11] Relying on that standard, it cites studies that present only generalized evidence and do not establish a

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4 *See id*.

5 *See* Consolidated Opposition to Petitions and Response to Comments of Space Exploration Holdings, LLC, IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105, at 43-45, 50-58 (Feb. 24, 2022) ("SpaceX Consolidated Response") (NEPA arguments "merely put a new coat of paint on arguments Viasat has previously raised against a SpaceX application and the Commission has decisively rejected").

6 *See id*.

7 40 C.F.R. § 1501.4(a).

8 47 C.F.R. § 1.1306(a); *Amendment of Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality*, 60 Rad. Reg. 2d (P&F) 13, ¶ 3 (1986) ("*NEPA Rules Order*").

9 40 C.F.R. § 1501.4(b).

10 Petition Pursuant to Section 1.1307(c) of Viasat, Inc., IBFS File No. SAT-MOD-20200417-00037, at 6 (Dec. 22, 2020) (citing 40 C.F.R. §§ 1501.3(a)(1), 1501.4(b)).

11 *See* Viasat Petition at 54.

connection between reentry of Gen2 satellites and the environmental harms Viasat claims will occur.[12] For example, the only new study Viasat cites in support of its NEPA petition merely speculates about the relative amount of aluminum in meteoroids compared to SpaceX's Gen1 satellites, without finding, let alone demonstrating, either that the reentering Gen1 satellites would produce more alumina than meteorite reentry or that such reentry may have a significant environmental impact.[13]

It cannot be the case that such unsubstantiated allegations of any chance of environmental impact are enough to compel an environmental assessment—least of all where, as here, the agency has already promulgated a categorical exclusion covering the activity. After all, "[s]ome 'quotient of uncertainty . . . is always present when making predictions about the natural world,'" an undeniable fact that has led courts to uphold decisions not to undertake further environmental processing under NEPA "despite some uncertainty."[14] Instead, the Commission must be provided a record basis for concluding that the alleged environmental impact of the Gen2 satellites is both significant and sufficiently plausible. This was precisely the reason why the Commission rejected Viasat's alumina arguments against the Gen1 system, finding that "the allegations Viasat makes in its petition are insufficient for us to determine that additional environmental consideration is necessary under our rules or that granting the SpaceX modification application may have a significant environmental impact on the atmosphere or ozone layer."[15] Viasat has failed to provide additional material evidence in this proceeding beyond that previously cited and rejected.

In an apparent effort to get around its own lack of NEPA-protected interests, Viasat has recruited stalking horses such as the Natural Resources Defense Council ("NRDC"), International Dark-Sky Association ("IDA"), and a handful of astronomers in its anti-competitive crusade. But these entities merely parrot Viasat's arguments and likewise fail to provide any specific, concrete evidence to support them.[16] That leaves the record devoid of evidence sufficient to establish even that the Gen2 license might have a significant environmental impact. Their copycat efforts thus fail just like Viasat's.

While Viasat and its recruited confederates struggle to muster any concrete evidence to support their environmental parade of horribles, they also mischaracterize or ignore evidence that undermines their claims. For example, while Viasat asserts that a report recently issued by the U.S. Government Accountability Office ("GAO") somehow confirms Viasat's concocted claim that alumina created through satellite reentry will cause a significant environmental impact, the

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12 *See* Aaron C. Boley & Michael Byers, *Satellite mega-constellations create risks in Low Earth Orbit, the atmosphere and on Earth*, SCIENTIFIC REPORTS, May 20, 2021) ("Boley and Byers Study"); *City of New York v. ICC*, 4 F.3d 181, 185 (2d Cir. 1993) (in deciding whether to conduct environmental assessment of excluded activity, agency properly evaluated the effects of only the "four licenses it was considering").

13 *See* Boley and Byers Study.

14 *Am. Wild Horses Campaign v. Bernhardt*, 963 F.3d 1001, 1008-09 (9th Cir. 2020) (second alteration in original) (quoting *Ctr. for Biological Diversity v. Kempthorne*, 588 F.3d 701, 712 (9th Cir. 2009)).

15 *2021 SpaceX Modification Order* ¶ 82.

16 *See* Letter from Sharon Buccino & Ruskin Hartley to Marlene H. Dortch, IBFS File Nos. SAT-LOA-20200526-00055 and SAT-AMD-20210818-00105 (Sept. 7, 2022) ("NRDC/IDA Letter"); Viasat October Letter at 2 (citing NRDC/IDA letter and others).

GAO report actually concludes that there is a "lack of observational data" to support such a finding or to warrant mitigation at this time.[17]

Similarly, two independent studies that the European Space Agency ("ESA") commissioned in 2019—the ATISPADE and ARA studies—show that satellite reentry has a "negligible" effect on the environment.[18]

The ATISPADE study looked at the effect of reentering satellites on the ozone layer. It found that, in the worst case analyzed, the additional yearly ozone reduction was "negligible when compared to the impact of anthropogenic activities," only between 0.0006% and 0.0008% of global annual ozone loss.[19] While the worst case used in the study assumed an average of 450 tons worth of satellites reentering every year and a peak of 650 tons per year,[20] the fundamental conclusion—that the impact to the ozone is "negligible" compared to other sources—remains valid even when extrapolating to one order of magnitude more mass per year, as Viasat aggressively assumes would occur.[21]

But Viasat presents no justification for its allegations that these extremely aggressive scenarios will come to pass. Indeed, one leading study raises questions about Viasat's fundamental premise, finding that the chemical reactions that take place during meteorite reentry do not create alumina at all, even though meteorites contain aluminum.[22] In fact, no alumina has ever been detected using rocket-borne spectrometry specifically looking for all aluminum species precipitated by reentering meteorites.

The ESA-commissioned ARA study undercuts Viasat's overblown claims—parroted by NRDC/IDA and others—about the climate effects of the Gen2 satellites. The study found the climate effects of satellite reentry to be minute compared to other man-made sources. For instance, in the worst-case scenario, the annual impact of satellite reentry was 290,000 times less than the annual impact of the aviation sector and 650,000 times less than the annual impact of the road transportation sector.[23] Again, even when extrapolated to an order of magnitude greater than the worst case evaluated in the ARA study, the effect would remain negligible relative to other man-made sources. Similarly, assuming the extremely aggressive reentry figures that Viasat touts, the

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17 *Large Constellations of Satellites: Mitigating Environmental and Other Effects*, U.S. Gov't Accountability Off. i, 10, 55 (Sep. 29, 2022) ("GAO Report"), https://www.gao.gov/products/gao-22-105166.

18 *See* Jessica, *On the Atmospheric Impact of Spacecraft Demise upon Reentry* Eur. Space Agency (Aug. 11, 2022) ("ESA Report") (summarizing the results of the ATmospheric Impact of SPAcecraft DEmise ("ATISPADE") and Atmospheric Reentry Assessment ("ARA") studies), https://blogs.esa.int/cleanspace/2022/08/11/on-the-atmospheric-impact-of-spacecraft-demise-upon-reentry/.

19 *Id; see also* Slimane Bekki et al., *Environmental impacts of atmospheric emissions from spacecraft re-entry demise*, Eur. Space Agency, at 10, 13 (Sept. 21, 2021), https://indico.esa.int/event/321/contributions/6403/attachments/4335/6538/esa-csid-21-bekki.pdf.

20 *See id.* at 9.

21 *See* Viasat June Letter at 4.

22 *See* John M. C. Plane et al., *Meteor-Ablated Aluminum in the Mesosphere-Lower Thermosphere*, 126 J. of Geophysical Research: Space Physics 1 (2021), https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2020JA028792.

23 *See* ESA Report.

annual impact of reentering Gen2 satellites on Earth's albedo—the fraction of solar radiation that is reflected away from Earth—will be negligible compared to natural sources (i.e., just 0.005% of the amount of mineral dust created annually through naturally occurring dust storms from the Sahara Desert alone).[24]

It would be arbitrary to assume that alumina potentially produced by reentering satellites presents a significant environmental issue when it remains a minute fraction of the metals and other chemical compounds introduced each year from natural sources (to say nothing of man-made sources)—a fact that remains true of both SpaceX's Gen1 and Gen2 systems.[25] Indeed, courts have recognized that the mere "presence of some negative effects does not necessarily rise to the level of demonstrating a significant effect on the environment,"[26] and "nonzero" harms "could still be insignificant"[27] under NEPA.[28]

Together, these studies demonstrate what SpaceX has long argued and the Commission determined in the *2021 SpaceX Modification Order*: like Viasat's failed attacks on SpaceX's Gen1 system, Viasat has entirely failed to establish that the reentry of Gen2 satellites warrants further environmental review. Certainly, Viasat has failed to establish the "extraordinary circumstances" necessary to overcome the categorical exclusion of satellite activities from NEPA review or the "significant environmental impact" sufficient to mandate preparation of an environmental review.

II. ATMOSPHERIC EFFECTS FROM LAUNCH ACTIVITIES

Viasat also baselessly asserts that the Commission must conduct an environmental review of SpaceX's launch activities for the Gen2 constellation.[29] As SpaceX explained in its Consolidated Response, launch activities subject to NEPA are already reviewed by the Federal Aviation Administration ("FAA"), and as such there is no need for the Commission to engage in a costly and duplicative review of its own.[30] Indeed, the Commission unambiguously—and reasonably—concluded in the *2021 SpaceX Modification Order* that pursuant to its rules, when the FAA has conducted its own environmental assessment, "no additional consideration of potential impacts associated with those launches is required."[31] To require otherwise would undermine decades of federal rules and best practices, miring agencies in environmental reviews outside the scope of their expertise and potentially undermining expert agency action where two agencies reach different conclusions.

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24 *See* J. M. Prospero, *Saharan Dust Transport Over the North Atlantic Ocean and Mediterranean: An Overview,* in 11 THE IMPACT OF DESERT DUST ACROSS THE MEDITERRANEAN. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 133-151 (S. Guerzo and R. Chester eds., 1996), https://doi.org/10.1007/978-94-017-3354-0_13.

25 *See* SpaceX Consolidated Response at 57.

26 *Am. Wild Horse Campaign*, 963 F.3d at 1009 (cleaned up).

27 *New York v. Nuclear Regul. Comm'n*, 681 F.3d 471, 482 (D.C. Cir. 2012).

28 The ESA also noted that "both [the ATISPADE and ARA] studies agree that the impact of toxic materials reaching the surface even in the long term is negligible." ESA Report. *See* J.M. Prospero, *supra*.

29 *See* Viasat Petition at 57; Viasat October Letter at 1.

30 *See* SpaceX Consolidated Response at 50-51, 55-57.

31 *2021 SpaceX Modification Order* ¶ 82; *cf. Sierra Club v. FERC*, 827 F.3d 59, 68 (D.C. Cir. 2016) (agency was not required to analyze the environmental effects of the gas exports that a different agency had the "legal authority to authorize").

Even if the Commission were required to duplicate the FAA's expert environmental reviews of launch activities, Viasat has again failed to substantiate its vague assertions of environmental harm. The recent GAO report on large satellite constellations helps explain why. Citing a 2018 World Meteorological Organization report, the GAO found that "rocket launches presently have a small effect on total stratospheric ozone (much less than 0.1%)."[32] Further, launch vehicles that rely on kerosene- and methane-based propellants—as SpaceX's launch vehicles do—*do not* create the alumina or chlorine compounds that Viasat cites to support its claim for an environmental review.[33] Thus, Viasat's unsupported assertions fall far short of demonstrating the need for an environmental review, and just as it did in the *2021 SpaceX Modification Order*, the Commission should summarily reject them.

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In the two-and-a-half years since SpaceX filed its Gen2 application, Viasat and its recruits have completely failed to substantiate any of the vague environmental assertions they have made against the Gen2 system or to differentiate their latest attacks from those that the Commission and the D.C. Circuit already rejected. Like the nearly identical attacks it levied on SpaceX's Gen1 system, Viasat's claims against Gen2 are insufficient to meet Viasat's burden of "setting forth in detail" why the Gen2 system presents a plausible risk of substantial environmental harm, or to overcome the Commission's correct categorical exclusion of satellite licensing from environmental review. The Commission has previously rejected these baseless arguments from Viasat and should do so again here.

Sincerely,

/s/ Jameson Dempsey

Jameson Dempsey
Principal, Satellite Policy

SPACE EXPLORATION TECHNOLOGIES CORP.
1 Rocket Road
Hawthorne, CA 90250
Email: Jameson.Dempsey@spacex.com
Phone: +1 (310) 682-9836

[32] GAO Report at 13 (quoting World Meteorological Organization, Scientific Assessment of Ozone Depletion: 2018, Global Ozone Research and Monitoring Project Report No. 58 (Geneva, Switzerland: 2018)).

[33] *See id.* at 12, Table 1.