



January 10, 2022

BY ELECTRONIC FILING

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

Re: *IBFS File No. SAT-MOD-20211207-00186*

Dear Ms. Dortch:

In this proceeding, Kuiper Systems LLC (“Amazon”) seeks to satisfy a condition in its authorization for a non-geostationary orbit (“NGSO”) satellite system by modifying or altering its system for a third time over the past several months, this time including an updated orbital debris mitigation plan.¹ Unfortunately, this application extends a pattern in which Amazon seeks to apply a very favorable standard to its own application after insisting upon very different and far more exacting standards for others. Moreover, Amazon repeatedly asserts its ability to coordinate with other systems, when to date it has instead preferred time and again to demand Commission mandates on other systems to the advantage of its own. The Commission should request additional information to explore these issues and it should seek clarification as to why Amazon believes that its system should be judged by a different set of rules than it has demanded be applied to others.

Below are critical aspects of the application that require further information, along with related background from prior Amazon filings:

Ignoring vs. embracing inclination. The Commission’s orbital debris mitigation rules require an NGSO applicant to identify other NGSO systems that could require physical coordination to ensure safe operations. Specifically, any applicant that proposes to launch a space station “into a low-Earth orbit that is identical, or very similar, to an orbit used by other space stations” must file a statement that includes “an analysis of the potential risk of collision and a description of what measures the space station operator plans to take to avoid in-orbit collisions.”² To comply with this rule, Amazon first determined that there were no active spacecraft operating in an “identical” orbit (i.e., at the exact same altitude and inclination) to one it proposes.³ Next, “[f]or the purpose of considering ‘very similar’ orbits, Amazon analyzed space stations within 2 degrees inclination and 10 km in altitude, which is an orbital area larger than the Kuiper Satellites’

¹ See Application for Modification, IBFS File No. SAT-MOD-20211207-00186 (Dec. 7, 2021) (“Amazon Application”). It modified its system the first time by applying for relief from a different condition in its authorization. See Application for Modification, IBFS File No. SAT-MOD-20210806-00095 (Aug. 6, 2021). Amazon has also applied for thousands of new satellites and several new spectrum bands as part of the V-band processing round. See Application for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in V-Band and Ku-Band Frequencies, IBFS File No. SAT-LOA-20211104-00145 (Nov. 4, 2021).

² 47 C.F.R. § 25.114(d)(14)(iii).

³ See Amazon Application, Technical Appendix at 9.

expected deviation.”⁴ Amazon identified 30 satellites that meet this definition, but without explanation or substantive analysis concluded that “none create additional risk and require coordination.”⁵

This vague approach and unsupported conclusion is a very different standard than Amazon applied when it was asking the Commission to impose restrictions on SpaceX’s NGSO constellation. In that proceeding, SpaceX had proposed a modification under which some of its satellites would operate at nominal 560 km and 570 km altitudes with a ± 30 km tolerance, allowing them to reach the altitude of Amazon’s lowest orbital shell (590 km) when both systems were operating toward their maximum allowances. However, whereas the SpaceX satellites would operate at inclinations of 70 and 97.6 degrees, Amazon’s satellites in the 590 km shell would operate at an inclination of 33 degrees—i.e., well more than 2 degrees difference. Under the definition of “very similar” orbits Amazon uses in its application, SpaceX’s satellites would not even register as a potential cause for concern.

Yet that is not the position Amazon took in SpaceX’s modification proceeding. To the contrary, Amazon inundated the Commission with claims about the dangers of allowing SpaceX’s NGSO system to “overlap” with Amazon’s system.⁶ It repeatedly described this “overlap” as creating a “significant risk to space safety.”⁷ Indeed, Amazon went so far as to prepare an analysis purporting to show hundreds of “daily conjunction events of close approach distance less than 1 km” between Amazon and SpaceX satellites that could result from the modification.⁸ In fact, Amazon continued near-daily meetings with the Commission about this topic, even after SpaceX offered to move its satellites to lower altitudes once Amazon was ready to begin using those altitudes. Although SpaceX argued the two systems—both of which have propulsive satellites—should simply coordinate their operations, Amazon demanded that SpaceX be prohibited from ever operating within 10 km of the closest orbital shell Amazon hopes to use if it ever launches its system—a demand that SpaceX eventually agreed to accept despite no concession or coordination from Amazon.⁹

⁴ *Id.*

⁵ *Id.*

⁶ See *Space Exploration Holdings, LLC*, 36 FCC Rcd. 7995, ¶ 66 & nn.272, 276 (2021) (“*SpaceX Modification*”) (citing Amazon filings re concerns about “overlapping” orbital shells).

⁷ See, e.g., Letter from Mariah Dodson Shuman to Marlene H. Dortch, IBFS File No. SAT-MOD-20200417-00037, at 1-2 (Aug. 18, 2020); Letter from Mariah Dodson Shuman to Marlene H. Dortch, IBFS File Nos. SAT-MOD-20200417-00037, et al., at 2 (Sept. 2, 2020); Letter from Mariah Dodson Shuman to Marlene H. Dortch, IBFS File No. SAT-MOD-20200417-00037, at 2 (Nov. 24, 2020).

⁸ Kuiper Systems LLC Petition to Deny and Comments, IBFS File No. SAT-MOD-20200417-00037, at 10 (July 13, 2020) (“Amazon Petition to Deny”). However, to reach that worst-case result, Amazon conceded that it assumed “a particular orbital configuration” for the SpaceX satellites. See *id.* n.28. Amazon’s chosen configuration unrealistically assumed that SpaceX satellites would consistently operate very near the top of their orbital range—20-22 km above the nominal altitude of the shell. That is not a valid assumption, if only because satellites could be operating above or below the nominal altitude.

⁹ See *SpaceX Modification* ¶ 66 & nn.272, 276 (discussing Amazon’s concerns about “overlapping” orbital shells and request to restrict SpaceX’s operational altitude).

In this application, however, Amazon conveniently forgets the serious concerns it had only months ago and now asserts that any satellite operating more than 2 degrees of inclination away need not even be considered because they would fall outside “an orbital area larger than the Kuiper Satellites’ expected deviation.”¹⁰ The Commission should request information from Amazon to explain why it claimed that SpaceX satellites operating at 37 to 64 degrees greater inclination constituted a “significant risk” to Amazon’s system, and more specifically could present “daily conjunction events of close approach distance less than 1 km” that required Commission action, while in this application it claims that satellites operating at any inclination more than 2 degrees away pose no risk whatsoever.

This is no idle question. In addition to SpaceX, several other NGSO systems have been authorized to operate hundreds of satellites at altitudes that fall within those used by Amazon’s system. For example, Kepler has been authorized to operate 140 NGSO satellites at a nominal altitude of 600 km.¹¹ Spire has been authorized to deploy 900 satellites at altitudes up to 650 km and another 100 at altitudes up to 600 km.¹² Spire has actually launched at least four satellites to 650 km, two satellites to 613 km, and another eight satellites to 600 km.¹³ Myriota is also authorized to deploy 26 satellites at altitudes up to 600 km.¹⁴ Moreover, two operators have pending applications that propose operations at the altitudes used by Amazon’s system,¹⁵ and many more systems have ITU filings covering these altitudes as well. Yet Amazon did not include any of these authorized or proposed systems in its orbital debris mitigation analysis, having simply defined the problem away.¹⁶ The Commission should ask Amazon why different standards should apply to the two cases and whether Amazon now believes its satellites are more capable than it believed they were months ago when it demanded SpaceX unilaterally change its operations without further coordination.

Coordination. Amazon’s approach to the altitudinal “overlap” with SpaceX should also inform the Commission’s view of Amazon as a potential partner in physical coordination among NGSO systems. As discussed above, while SpaceX argued that the two systems should have little difficulty coordinating operations (especially given that both have propulsive satellites), Amazon

¹⁰ Amazon Application, Technical Appendix at 9.

¹¹ See *Kepler Communications, Inc.*, 33 FCC Rcd. 11453 (2018); Schedule S Tech Report, IBFS File No. SAT-PDR-20161115-00114 (Nov. 15, 2016) (defining operational altitude for Kepler satellites).

¹² See Grant Stamp, IBFS File No. SAT-MOD-20200603-00065 (Oct. 30, 2020). Moreover, 872 of those satellites have “inclinations ranging from equatorial to polar sun-synchronous (98 degrees).” *Id.* at 2.

¹³ See Letter from Michelle A. McClure to Marlene H. Dortch, IBFS File No. SAT-MOD-20200603-00065 (June 25, 2020) (2020 Annual Report); Letter from Francisca Adeuyi to Marlene H. Dortch, IBFS File Nos. SAT-LOA-20151123-00078, et al. (May 12, 2021) (notice of deployment).

¹⁴ See *Myriota Pty. Ltd.*, 35 FCC Rcd. 5475, ¶ 1 (2020).

¹⁵ See, e.g., Amendment to Pending Application for the SpaceX Gen2 NGSO Satellite System, IBFS File No. SAT-AMD-20210818-00105 (Aug. 18, 2021) (SpaceX Gen2 system with orbital shells at 604 km and 614 km); Application for Market Access Authority for a Non-Geostationary Satellite Orbit System in Ka- and Ku-Band Frequencies, IBFS File No. SAT-PDR-20200526-00059 (May 26, 2020) (Kepler system of 360 satellites at 600 km).

¹⁶ Amazon Application, Technical Appendix at 9 & n.20 (Amazon “took into consideration both licensed systems that have yet to become operational and systems with pending license applications with the Commission,” it identified no such systems that fell within the altitude and inclination range considered for its analysis and specifically excluded those systems that had not sought Commission authorization).

instead insisted that coordination would be too burdensome for its system and asked the Commission instead to impose a solution that would not require its satellites to alter their operations in any way. Amazon complained incessantly during the SpaceX modification proceeding, evidencing a truly concerning lack of confidence in its own system's ability to coordinate physical operations with another system. At the end of the day, SpaceX agreed to limit its own operation—relieving any burden from Amazon for having to coordinate, which Amazon seemed unable or unwilling to do. Given Amazon's past conduct, Amazon's repeated claims about the capability of its system and its willingness to coordinate with other NGSO systems affected by its operations ring entirely hollow.

Out of caution, at minimum, the Commission should request further information from Amazon in the following areas:

1. Please explain why you chose to consider only space stations within 2 degrees inclination and 10 km in altitude for purposes of your “similar orbits” analysis. Could space stations operating outside those limitations create conjunction events of close approach distance less than 1 km?
 - a. If they would create such conjunctions, would that require a maneuver by Amazon or the other operator to reduce collision risk? Should the number of such maneuvers be a factor in our review of your orbital debris mitigation proposal?
 - b. If they would not create such conjunctions, please explain how your analysis of the SpaceX modification reached the opposite conclusion.
2. You have claimed that having to consider approximately 500 conjunction events per day would be burdensome and “have the potential to challenge safety practices.”¹⁷ How many conjunction events would Amazon have to consider with respect to the systems licensed to Kepler, Spire, and Myriota? What about the systems currently under consideration for Kepler and SpaceX, or other systems with ITU filings that “overlap” Amazon's orbital altitudes? Does Amazon have the technical capability to coordinate at the level required for an NGSO system of over 3,200 satellites in the presence of other large NGSO systems at similar operational altitudes?
3. As a condition of your current authorization, Amazon is required to complete a coordination agreement with or make a showing that it will not cause harmful interference to any operational system licensed or granted U.S. market access in the 2016 and 2017 NGSO FSS processing rounds prior to commencing operations in the 17.8-18.6 GHz, 18.8-20.2 GHz, and 27.5-30 GHz bands.¹⁸ Please provide a detailed update on your monthly progress in satisfying this condition and your anticipated timeline for submitting evidence to the Commission required to satisfy this condition.

¹⁷ Amazon Petition to Deny at 10.

¹⁸ See *Kuiper Systems, LLC*, 35 FCC Rcd. 8324, ¶ 59a (2020).

4. What is the expected reliability of Amazon's post-mission disposal systems?
5. Please provide additional detail regarding Amazon's launch plans. Specifically, what is the anticipated order for launching into the various altitudes and orbital planes and what are the contracted timeframes? Provide updates regarding the expected timing of launches for your system versus contracted.
6. Please indicate whether the application, as modified, includes all satellites for which Amazon is pursuing regulatory approval for operations in the frequency bands included in the referenced IBFS files, whether from the Commission, other ITU Administrations, or other national licensing authorities. To the extent there are any such satellites not described in the application, please provide information concerning the deployment plans for those satellites, including the number of such satellites and whether they are intended as substitutes or replacements for the satellites request in this application, or additional deployments.

Sincerely,

/s/ David Goldman

David Goldman
Director of Satellite Policy

SPACE EXPLORATION TECHNOLOGIES CORP.
1155 F Street, NW
Suite 475
Washington, DC 20004
Email: David.Goldman@spacex.com

cc: Karl Kensinger
John L. Flynn