

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554**

In the Matter of

SWARM TECHNOLOGIES INC.

Petition for Declaratory Ruling to Access
the U.S. Market using NVNG UHF MSS
Spectrum

File No. SAT-PDR-20200228-00021

**CONSOLIDATED OPPOSITION AND RESPONSE OF
SWARM TECHNOLOGIES INC.**

No credible policy or technical basis exists for excluding Swarm Technologies, Inc. (“Swarm”) from the Federal Communications Commission’s (“FCC” or “Commission”) Ultra High Frequency (“UHF”) Non-Voice, Non-Geostationary (“NGSO”) Mobile-Satellite Service (“NVNG MSS”) processing round.¹ The arguments of Hiber Inc. (“Hiber”), Kineis, and Myriota Pty. Ltd. (“Myriota”) (collectively, “the Petitioners”) to defer or dismiss Swarm’s petition for declaratory ruling seeking market access are frivolous and reflect only a transparent effort to obstruct a dynamic, technologically innovative, and well-funded competitor from competing on a level playing field in the mobile satellite market.² These arguments merit no further consideration or Commission resources.

¹ See *Myriota Pty. Ltd. Petition Accepted for Filing*, IBFS File No. SAT-PDR-20190328-00020 *CutOff Established for Additional NVNG MSS Applications or Petitions for Operations in the 399.9-400.05 MHz and 400.15-401 MHz Bands*, Public Notice, 34 FCC Rcd 7185 (2019) (“*UHF Processing Round PN*”); see also Petition for Declaratory Ruling, Swarm Technologies, IBFS File No. SAT-PDR-20200228-00021 (filed Feb. 28, 2020) (“*Swarm Access Petition*”)

² See Petition to Defer or Dismiss of Hiber Inc., IBFS File No. SAT-PDR-20200228-00021 (filed May 18, 2020) (“*Hiber Petition*”); Petition to Defer and Comments of Myriota Pty.Ltd., IBFS File No. SAT-PDR-20200228-00021 (filed May 18, 2020) (“*Myriota Petition*”); Letter from David S. Keir, Lerman Senter PLLC (Counsel to Kineis), to Marlene H. Dortch, IBFS File No. SAT-PDR-20200228-00021 (filed May 18, 2020) (“*Kineis Comments*”).

The Petitioners wrongly assert that FCC policy and precedent supports dismissing or deferring action on Swarm's application. The historical precedent they rely upon, however, involves applicants that arrived several years after the initial processing round cut-off date. Conversely, in the instant situation, Swarm narrowly missed the deadline, and had its petition for market access on file prior to any final FCC action involving other applications, thus enabling all participants in the processing round to include an additional system in their operational plans and coordination efforts. In fact, participants who have been granted a license are required to undertake coordination with federal entities such as National Oceanic and Atmospheric Administration and the Department of Defense, and with the longstanding commercial incumbent UHF MSS operator, ORBCOMM. To the best of Swarm's knowledge, the Petitioners have not concluded coordination with any of these interests at this time, which can easily take more than a year to complete.

The Petitioners offer no basis for arguments that they will be in some way be prejudiced by Swarm's inclusion in the UHF processing round because they have already begun coordination "discussions." At best, these arguments are disingenuous, and at worst, suggest that the Petitioners misrepresented their technical prowess and dynamic spectrum sharing and deconflicting capabilities in their own respective NVNG UHF applications.

Finally, despite the Petitioners' assertions to the contrary, Swarm's waiver request serves the public interest and meets the high bar for waiver of the Commission's rules. Favorable treatment of Swarm's waiver would not undermine the Commission's rules given that Swarm narrowly missed the cut-off date and no other applicant had been authorized. Swarm's inclusion in the UHF Processing Round aligns with FCC's longstanding policy goal of promoting innovation and competition in the commercial space sector. Moreover, strict adherence to the Commission's cut-off deadline for processing round applicants in the instant situation would be more than

burdensome—it would be punitive given the likely years long delay that would result from the FCC rebooting and treating Swarm as a lead applicant in a second processing round.

I. SWARM’S INCLUSION IN THE CURRENT NVNG MSS UHF PROCESSING ROUND ALIGNS WITH FCC POLICY AND PRECEDENT

The Petitioners assert that Swarm’s inclusion in the current UHF NVNG processing round is inconsistent with FCC policy goals and the objectives. Hiber argues that including Swarm would undermine the “orderliness and finality” of its processing round rules.³ Myriota alleges that including Swarm “would simply invite additional late-filed system proposals after the cut-off date, undermining if not eliminating regulatory certainty for processing-round participants.”⁴ Both Hiber and Myriota thereafter contend that prior decisions by the Commission concerning late-filed processing round applicants support excluding Swarm from the instant processing round.⁵

Contrary to the Petitioners arguments and assertions, Swarm’s inclusion in the current UHF processing round aligns with the FCC’s NGSO policy goals and objectives, as well as with prior Commission precedent. In developing the current NGSO processing round framework, the Commission’s principal policy objectives were: (1) improving its ability “to act on applications dramatically faster...”; and (2) adopting rules that “recognize technical growth in satellite design.”⁶ Swarm’s participation in the instant processing round checks both of these policy boxes, permitting speedy action on applications already before the Commission while also promoting technical growth.

³ *Hiber Petition* at 4.

⁴ *Myriota Petition* at 3.

⁵ *See Hiber Petition* at 4; *Myriota Petition* at 6; *see also EchoStar Satellite Corp.*, Memorandum Opinion and Order, 16 FCC Rcd 14300 (2001), *recon. denied*, 17 FCC Rcd 8305 (2002) (“*EchoStar Order*”); *Final Analysis Communications Services, Inc.*, Memorandum Opinion and Order, 16 FCC Rcd 21463 (2001).

⁶ *Amendment of the Commission’s Space Station Licensing Rules and Policies*, First Report and Order and Further Notice of Proposed Rulemaking in IB Docket No. 02-34, and First Report and Order in IB Docket No. 02-54, 18 FCC Rcd 10760, ¶ 1 (2003) (“*2003 Space Station Licensing Reform Order*”).

More specifically, given that the Commission immediately began processing the other UHF NVNG applications concurrently after the cut-off date, Swarm's participation in the processing round in no way impacts expeditious action on earlier filed applications. In fact, the Commission recently acted on two applications, and will almost certainly meet its longstanding policy goal of acting on all processing round applicants within a calendar year of the cut-off date.⁷

Swarm is also a technological leader driving small satellite innovation by: pioneering cubesats with a 1/4 form factor; introducing technology to enhance the radar cross-section of small satellites; developing innovative satellite-based networking and communications protocols; and, most recently, developing in-house active propulsion that can be deployed on 0.25U spacecraft.⁸ All of this innovation is due to the fact that Swarm's manufacturing and design is vertically integrated, with design and manufacture of the satellites in house. Of course, such technological developments are not merely vaporware, Swarm has nine (9) satellites already in orbit, and has secured adequate future launches and raised over \$30 Million to loft its full constellation of already approved VHF NVNG satellites into orbit.⁹ Additionally, Swarm has deployed its own

⁷ In 2003 the Commission expressly set a goal for reducing processing time on applications from "two-to-three years to less than one year." *Id.* at ¶ 1.; *see also In the Matter of Myriota Pty. Ltd. Petition for Declaratory Ruling Granting Access to the U.S. Market for Non-Voice, Non-Geostationary Satellite System*, Order and Declaratory Ruling, IBFS File No. SAT-PDR-20190328-00020 (released May 29, 2020); *In the Matter of Hiber Inc. Petition for Declaratory Ruling to Access U.S. Market Using the Hiberband Low-Earth Orbit System*, Order and Declaratory Ruling, IBFS File No. SAT-PDR-20180910-00069 (released May 6, 2020).

⁸ *See* Swarm Technologies, Inc. Application for Modification, IBFS File No. SAT-MOD-20200501-00040 (filed May 1, 2020) (seeking authority to implement dual mode, cold gas/electric propulsion system on already authorized 0.25U VHF spacecraft); *see also* Swarm Technologies, Inc., *Application for Authority to Deploy and Operate a Non-Voice, Non-Geostationary Lower Earth Orbit Satellite System in the Mobile-Satellite Services*, Memorandum Opinion, Order and Authorization, File No. SAT-LOA-20181221-00094, Call Sign S3041 (released Oct. 17, 2019) (authorizing Swarm's 0.25U VHF satellite constellation).

⁹ *See* Fast Company, *The Most Innovative Space Companies of 2020*, <https://www.fastcompany.com/90457907/space-most-innovative-companies-2020> (last visited May 30, 2020); *see also* Devin Coldeway, *Swarm Gets Green Light from FCC for its 150-Satellite Constellation*, <https://techcrunch.com/2019/10/17/swarm-gets-green-light-from-fcc-for-its-150-satellite-constellation/> (last visited May 31, 2020).

international ground-station network to provide reliable communications to its space stations. Swarm is committed to bringing similar innovations to the UHF NVNG band.¹⁰

Similarly, Commission treatment of earlier satellite systems that missed processing round cut-off dates does not support the proposition of excluding Swarm from the instant UHF NVNG processing round. While Hiber and Myriota both reference the FCC’s decision to exclude EchoStar Satellite Corp. (“EchoStar”) from participating in the FCC’s first geostationary Ka-band processing round in 1995, they conveniently fail to mention that EchoStar actually missed the relevant cut-off date by an astounding *four years*.¹¹ Seeking to participate in a processing round four years after the cut-off date would obviously present challenges from a policy and practical perspective.¹² The instant circumstances, however, are quite different. Swarm sought leave to participate only four months after the cut-off date and filed its application before final Commission action occurred on any other application. In addition, in excluding EchoStar, the FCC noted that EchoStar’s promise of public benefits through increased competition was negligible because it was merely seeking to compete with the same service offerings as the substantial number of processing round applicants—in fact, five times as many as in the instant processing round.¹³ As discussed in greater detail in Section III, below, Swarm’s innovative constellation provides a necessary alternative to traditional satellite service and, with it, a host of unique public interest benefits.

¹⁰ In the United States Swarm gateway and end user ground stations already enjoy individual or blanket earth station authority. *See, e.g.*, FCC Call Signs E190490 and E190859.

¹¹ *See EchoStar Order* at ¶ 2 (the relevant processing round closed in July 1995; EchoStar filed a modification application making proposing sweeping changes to its authorization (effectively a request for fresh authority) on February 22, 2000).

¹² The design of a large geostationary spacecraft is frozen several years prior to launch, which would have put applicants from the first Ka-band processing round in 1995 that were already constructing spacecraft by 1999 at a meaningful disadvantage vis-à-vis EchoStar in terms of design characteristics that would constitute a major modification (*e.g.*, frequency selection), as well as characteristics that might not involve FCC consent (*e.g.*, on-board processing).

¹³ *See EchoStar Order* at ¶ 7; *Satellite Policy Branch Information: Ka-Band Satellite Applications Accepted for Filing*, Public Notice, Report No. SAT-00012 (rel. Mar. 16, 1999).

Hiber also wrongly asserts that the Commission’s treatment of a modification application from Final Analysis Communications Services, Inc.’s (“Final Analysis”) supports excluding Swarm.¹⁴ Final Analysis was actually not precluded from participating in an earlier NVNG MSS processing round. Instead, the Commission simply declined to allow the company to make sweeping changes that would have created a constellation with a completely new architecture that bore little resemblance to the original system proposed years earlier by the company.¹⁵

II. ALLOWING SWARM TO PARTICIPATE IN THE UHF NVNG PROCESSING ROUND DOES NOT DISADVANTAGE OR PREJUDICE ANY OTHER APPLICANT

Without offering any substantive explanation or technical specifics, the Petitioners allege that Swarm’s participation in the processing round will hinder coordination and prejudice them. Hiber references ongoing “active coordination discussions” to share the 400 MHz band, and asserts that these discussions require a “feat of complex engineering” that leaves no room for a newcomer.¹⁶ Myriota similarly states that coordination has begun, and that Swarm’s arrival would force them “to start over again from scratch in a far more challenging operational environment.”¹⁷ None of the Petitioners provides further evidence that meaningful coordination discussions have occurred, nor do they elaborate on the supposed technical challenges or complexities of adding another satellite system to coordination discussions. Swarm believes that it can indeed reach a satisfactory coordination with other applicants once included in the coordination discussion as part of the processing round.

¹⁴ See *Final Analysis Communications Services, Inc.*, Order and Authorization, 13 FCC Rcd 6618, ¶¶ 3-8, fn 17 (1998) (the relevant processing round closed in November 1994; Final Analysis proposed dramatic changes to its authorization on October 30, 1997).

¹⁵ See *Id.* at ¶ 13 (the Commission permitted Final Analysis to certify and move forward with its original 1994 design).

¹⁶ *Hiber Petition* at 6-7.

¹⁷ Myriota Petition at 5. Swarm notes that it is currently engaged in coordination discussions with Myriota.

Swarm urges the Commission to disregard or dismiss the unsupported arguments of the Petitioners that they lack the technical wherewithal to incorporate an additional satellite operator (*i.e.*, Swarm) into good faith coordination discussions. If the Petitioners had real concerns about coordinating with Swarm, they would have provided a substantive explanation or technical details.

Moreover, both operators previously made extensive representations to the FCC about their respective dynamic spectrum sharing and coordination capabilities. Myriota definitively stated that, even in the absence of the historical band sharing plan adopted in the 1990s for the NVNG UHF by the FCC, its system enjoyed the “flexibility and spectral efficiency to be able to operate harmoniously,” and touted that its “satellites can vary the bandwidth of their emission through on-board processing and dynamically control their emissions to accommodate sharing arrangements with other users of the band.”¹⁸ Myriota further elaborated that its “downlink emissions can range in bandwidth between 10-140 kHz and operate with the entire 850 MHz MSS allocation or any portion thereof designated for their use...[and] can employ frequency hopping to move throughout the assigned band or operate with a defined channel plan, using either multiple contiguous channels or a fragmented channel arrangement. By combining [a] 10% duty cycle with the flexibility of the software defined radio on board its satellites, Myriota will be able to share spectrum by coordinating usage and/or time of operations.”¹⁹ Hiber is no less enthusiastic about its flexible architecture and ability to share NVNG UHF band. Hiber states that its “satellites only transmit to the earth stations in short bursts when the satellite is directly overhead,” and that it “believes it will be able to coordinate successfully with Orbcomm and any other users in the band.”²⁰

¹⁸ Myriota Pty Ltd, Petition for Declaratory Ruling, IBFS File No. SAT-PDR-20190328-00020, Attachment A/Technical Information, 8 (filed March 28, 2019).

¹⁹ *Id.* at 8-9.

²⁰ Hiber Inc., Petition for Declaratory Ruling, IBFS File No. SAT-PDR-20180910-00069, Attachment A/Technical Annex, 8 (filed September 10, 2018).

Swarm takes no position on whether these operators overstated or misrepresented their capabilities to the Commission, but neither party has explained why their supposed advanced systems now lack the ability to coordinate with another system, and neither system has credibly demonstrated any prejudice or harm.

III. SWARM'S WAIVER REQUEST SERVES THE PUBLIC INTEREST AND SATISFIES THE COMMISSION'S STANDARD FOR INTERVENTION

Petitioners incorrectly assert that Swarm's waiver request lacks public interest benefits and does not meet the prerequisites for Commission intervention. Swarm's waiver request in fact satisfies all threshold questions for favorable FCC action, because grant of the waiver will facilitate several U.S. Government and Commission policy goals.

First, grant of the waiver will achieve the White House objective of "fostering continued growth and innovation in the U.S. commercial space sector;"²¹ and also further the Commission's hard work of "promot[ing] American innovation in space."²² Swarm is a U.S. company with domestic manufacturing, and is heavily involved in developing cutting-edge IoT technology with other U.S. flag bearers. For example, in collaboration with Ford Motor Company, Swarm is testing a connected vehicle solution that will enable emergency and other services in remote areas.

Swarm's partners include automakers, transportation companies, and operators in the maritime industry that capitalize on Swarm's global coverage to connect small, low-power ground devices ideally suited to track mobile vehicles, equipment, and others while also reducing supply

²¹ *Space Policy Directive-3, National Space Traffic Management Policy*, Presidential Memorandum, (issued June 18, 2018), available at <https://www.whitehouse.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy/>; *Remarks by Vice President Pence at the Sixth Meeting of the National Space Council*, Remarks, (issued August 20, 2019), available at <https://www.whitehouse.gov/briefings-statements/remarks-vice-president-pence-sixth-meeting-national-space-council/>.

²² *In the Matter of Streamlining Licensing Procedures for Small Satellites*, Report & Order, Statement of Chairman Ajit Pai, 34 FCC Rcd 13077, 13140 (rel. Aug. 2, 2019).

chain costs. Indeed, Swarm’s technology offers a critical solution for companies engaged in locations where connectivity is often problematic. Currently, satellite operators that provide data services that are technically comparable to Swarm’s offerings rely on older network architectures that are cost-prohibitive for IoT and M2M applications. Conversely, Swarm’s constellation is a robust, capable, and low-cost solution that will drive both innovation and competition.

In this vein, grant of the waiver will further the Commission’s goals of ensuring connectivity for underserved regions of the U.S. As Chairman Pai recently explained at the Second Annual Space Summit, Swarm’s satellite connectivity “will enable farmers to have sensors where there is no cell coverage, supporting new precision agriculture applications.”²³ In fact, Swarm’s satellite connectivity allows for applications of many kind—including weather monitoring, disaster detection, asset tracking, emergency response, and even telehealth—in areas that may otherwise not have adequate coverage.

Grant of the waiver will also promote public-private partnerships in furtherance of national security. As the U.S. Government increasingly prioritizes the need for secure communications,²⁴ Swarm has received substantial interest by U.S. government organizations who aim to leverage its network to strengthen its communications networks domestically and globally. Recently, Swarm was tentatively selected to receiving a Strategic Financing (“STRATFI”) to provide a persistent

²³ See Ajit Pai, Chairman, FCC, Remarks at the “LAUNCH: The Space Economy” Summit (Dec. 3, 2019), <https://docs.fcc.gov/public/attachments/DOC-361140A1.pdf>.

²⁴ See generally *Critical Information Protection: Commercial Satellite Security Should be More Fully Addressed*, Report to the Ranking Member, Permanent Subcommittee on Investigations, Committee on Government Affairs, U.S. Senate, GAO-02-781 (August 2002), available at <https://www.gao.gov/new.items/d02781.pdf>; *Challenges to Security in Space*, Defense Intelligence Agency at 6 (January, 2019), available at https://www.dia.mil/Portals/27/Documents/News/Military%20Power%20Publications/Space_Threat_V14_020119_sm.pdf.

communications capability via a satellite network to the U.S. Air Force.²⁵ Swarm has also received Small Business Innovation Research grants from the U.S. Air Force as well as the National Science Foundation.²⁶

The Commission has repeatedly granted waiver of a rule when strict adherence to the rule would be burdensome. In the instant case, excluding Swarm from the processing waiver would not only be burdensome, but also punitive. Absent waiver and leave to participate in the instant processing round, Swarm would likely need to wait years for the initiation of a new processing round. Given the rapid speed of innovation in the small satellite market, this would disadvantage Swarm such that even attempting to serve the U.S. market using NVNG UHF frequencies would be impractical, if not impossible.

IV. CONCLUSION

The record continues to demonstrate that granting Swarm's application would serve the public convenience, interest, and necessity.

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Dated: June 1, 2020

²⁵ See Jennifer-Leigh Oprihory, *Roper Unveils AFVentures, Announces Nearly \$1B in Small Business Contracts*, AIR FORCE MAGAZINE (Mar. 18, 2020), <https://www.airforcemag.com/roper-unveils-afventures-announces-nearly-1b-in-small-business-contracts/>; *See also*, Press Release, U.S. Air Force, Air Force Pivots to Virtually Connect Defense Innovators, Announces 'Big Bets' (Mar. 13, 2020), <https://www.af.mil/News/ArticleDisplay/Article/2111607/air-force-pivots-to-virtually-connect-defense-innovators-announces-big-bets/>.

²⁶ *See* SBIR Award contract numbers Phase I: FA875119PA053 and Phase II: FA864919CA010; NSF Award Nos. 1647553 and 1758752.

CERTIFICATE OF SERVICE

I, M. Renee Britt, certify that a copy of the foregoing Consolidated Opposition and Response of Swarm Technologies Inc. has been served upon the Parties listed below via Electronic Mail and/or U.S. First Class Mail, postage pre-paid as follows:

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