

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

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In the Matter of)	
)	
RURAL DIGITAL OPPORTUNITY FUND AUCTION)	AU Docket No. 20-34
(AUCTION 904))	
)	
RURAL DIGITAL OPPORTUNITY FUND)	WC Docket No. 19-126
)	
CONNECT AMERICAN FUND)	WC Docket No. 10-90
_____)	

COMMENTS OF SPACE EXPLORATION TECHNOLOGIES CORP.

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I. INTRODUCTION AND SUMMARY

Space Exploration Technologies Corp. (“SpaceX”) welcomes the opportunity to comment in response to the Public Notice on bidding procedures and program requirements for the Rural Digital Opportunity Fund auction.¹ As with prior filings, SpaceX offers these comments to help develop fair and robust rules and processes; as with filings from any other commenter, this filing should not be interpreted as an announcement of whether SpaceX will participate in this or other auctions. In the spirit of contributing to the development of an efficient program, SpaceX continues to encourage the Commission to modernize its subsidy programs by incorporating metrics and milestones focused on the provision of service to actual customers.

SpaceX applauds the Commission’s recognition in its January Auction Order and subsequent proposed procedures that a technologically neutral approach is the most efficient way to award finite universal service resources to support “the best possible networks in the most cost-effective manner.”² To that end, the Commission’s Auction Order struck a careful balance—encouraging auction participation and intermodal competition, while ensuring that all bidders, regardless of technology, are qualified to bid for and provide service at levels consistent with their network capabilities. The Commission should preserve that balance now. In particular, the Commission should adopt proposed auction procedures that allow potential participants, including providers using proven innovative technologies, the opportunity to bid using latency and speed tier combinations that are consistent with the actual capabilities of their networks. The Commission

¹ *Comment Sought on Competitive Bidding Procedures and Certain Program Requirements for the Rural Digital Opportunity Fund Auction (Auction 904)*, Public Notice, FCC No. 20-21, AU Docket No. 20-34, WC Docket No. 19-126, WC Docket No. 10-90 (rel. Mar. 2, 2020) (“Procedures PN”).

² *Rural Digital Opportunity Fund*, Report & Order, FCC No. 20-5, WC Docket Nos. 19-126, 10-90, ¶ 19 (rel. Feb. 7, 2020) (“Auction Order”).

has already adopted multiple safeguards to ensure that participants will deliver broadband service that meets their bid-for performance levels. Artificial and unsupported limits on provider eligibility are unnecessary, anti-competitive, and undermine the fundamental purpose of the reverse auction.

To be clear, SpaceX is not asking (and has not asked) for any special treatment. To the contrary, SpaceX asks only to be treated the same as other providers whose networks can offer the same level of service. For instance, Starlink's capabilities are not reliant on an untested or experimental technology. Rather, because satellite latency is a function of altitude, the Starlink system's low latency is dictated by the laws of physics. Similarly, just as terrestrial networks adjust traffic dynamically to meet demand and can be densified to increase capacity, Starlink's system uses steerable beams to manage traffic and is highly scalable.

SpaceX therefore encourages the Commission to adopt rules that subject SpaceX to the same auction procedures as other participants and provide SpaceX the same ability to demonstrate its technical qualifications to place bids consistent with its network capabilities. To do otherwise, by arbitrarily barring *non-geostationary* orbit ("NGSO") satellite providers from certain bidding tiers based on the constraints applicable to *geostationary* orbit ("GSO") satellite service, would unreasonably depart from the Commission's long-held principal of technological neutrality, artificially reduce competition, and prevent the auction from achieving the Commission's goals. A technologically neutral, freely competitive auction remains the best way to connect rural consumers, particularly those in remote areas of the country, who have for too long fallen into the digital divide.

II. BACKGROUND

Founded in 2002, SpaceX designs, manufactures, and launches advanced rockets and

spacecraft that have revolutionized space technology. Today, SpaceX has more than 6,000 employees across the United States, including its headquarters in Hawthorne, CA; launch facilities at Cape Canaveral Air Force Station, FL, Kennedy Space Center, FL, and Vandenberg Air Force Base, CA; a rocket development facility in McGregor, TX; a satellite manufacturing facility in Redmond, WA; and other offices across the country. SpaceX has suppliers in all 50 states. Committed to improving the reliability, safety, and affordability of space transportation, SpaceX's Falcon family of launch vehicles regularly provides launch services to NASA, the Department of Defense, and satellite manufacturers and operators.

SpaceX is leveraging its experience in building rockets and spacecraft to create, deploy, and operate the Starlink network: an innovative, cost-effective, and spectrum-efficient NGSO satellite system capable of delivering high-quality broadband service—at competitive speeds and latencies—anywhere on the planet. Because the network will operate at lower orbits, far closer to Earth than traditional satellite systems operating at GSO altitudes, Starlink will deliver low-latency broadband service—below many terrestrial services and well below the Commission's 100-millisecond threshold for low-latency services. SpaceX also specifically designed Starlink to provide high-speed broadband service, using advanced phased-array antennas that allow the system to automatically optimize service to certain locations and dynamically adjust its throughput per user. Unlike traditional GSO systems, Starlink's smaller, more efficient spot beams mean that fewer users share the same throughput, which translates to more throughput per user. In short, with performance on par with terrestrial service offered in urban areas, Starlink is uniquely positioned to deliver high-quality broadband service to the hardest-to-reach rural Americans, for whom access has for too long been unreliable, prohibitively expensive, or completely unavailable.

Recognizing Starlink's ability to provide robust low-latency broadband to unserved and

underserved rural Americans, the Commission has licensed SpaceX to operate 4,409 satellites in the Ku- and Ka- spectrum bands.³ As Chairman Pai stated, systems like Starlink “will deliver fast, low-latency broadband services to millions in the United States and around the world. This meshes well with the FCC’s twin goals of closing the digital divide and promoting innovation.”⁴ These goals are no longer aspirational. SpaceX is now operating more than 360 satellites and is rapidly deploying gateways across the United States. Moreover, the Commission recently authorized SpaceX to connect one million user terminals to the Starlink system.⁵ With these pieces in place, SpaceX has already demonstrated unprecedented throughput and latency on par with terrestrial networks. SpaceX will now begin to offer its Starlink broadband service for consumers—first in the United States and Canada—by the end of 2020.

III. COMMISSION POLICIES SHOULD PROVIDE INCENTIVES FOR SERVING CONSUMERS, NOT JUST DEPLOYING INFRASTRUCTURE.

The most effective way to reach rural Americans that remain unconnected is to update the Commission’s high-cost universal service subsidy programs to reflect the capabilities of new technological advances and to encourage the accelerated deployment of innovative new technology in rural areas. As technology evolves, the Commission’s metrics and milestones should evolve as well, creating stronger incentives for industry to optimize investment and align with the Commission’s goals of closing the digital divide. Specifically, SpaceX again urges the

³ *Space Exploration Holdings, LLC*, Memorandum Opinion, Order & Authorization, 33 FCC Rcd. 3391, ¶ 1 (2018) (“Grant of this application will enable SpaceX to bring high-speed, reliable, and affordable broadband service to consumers in the United States and around the world, including areas underserved or currently unserved by existing networks.”).

⁴ Remarks of FCC Chairman Ajit Pai at the U.S. Chamber of Commerce Policy Roundtable on Small Satellite Integration, Washington, DC (July 9, 2019).

⁵ *Satellite Communications Services Information re: Actions Taken*, Public Notice, Report No. SES-02250, at 6 (rel. Mar. 18, 2020).

Commission to design subsidy programs that reward actual service to consumers, based on aggressive broadband performance and competitive consumer service goals.

Right now, we are witnessing a painful reminder of the importance of developing technologies that can be deployed quickly to remote areas. Rather than focusing only on census block coverage that can take years to meet, the Commission should establish real incentives for rapid service to actual consumers. This structure would drive providers to develop more efficient technologies and to build broadband systems that quickly deliver high-speed, low-latency broadband all the way to the hardest-to-reach homes and small businesses in rural America. In other words, providers would be rewarded for results in providing service, rather than simply for effort.

IV. TO PRESERVE A TECHNOLOGICALLY-NEUTRAL, COMPETITIVE, AND EFFECTIVE AUCTION, THE COMMISSION SHOULD PERMIT PROVIDERS TO PARTICIPATE BASED ON THE CAPABILITIES OF THEIR NETWORKS.

The Commission’s Rural Digital Opportunity Fund auction represents the Commission’s most well-funded step under its traditional infrastructure-based model towards closing the digital divide, awarding up to \$20.4 billion in universal service support to connect millions of American homes and small businesses that remain unserved and underserved today. To achieve its goal, the Commission correctly and deliberately designed the auction to “favor[] faster services with lower latency and encourage[] intermodal competition in order to ensure that the greatest possible number of Americans will be connected to the best possible networks, all at a competitive cost.”⁶ In so doing, the Commission struck a careful balance, designing rules that foster auction participation and competition while adopting extensive safeguards to ensure auction participants

⁶ Auction Order ¶ 5.

are fully qualified and able to deliver on promised levels of broadband service.

SpaceX's objectives are tightly aligned with the Commission's: to provide high-quality, reliable, and affordable broadband service, particularly to those unserved and underserved Americans located in remote areas of the country. The Commission got the balance right in the Auction Order and should not reverse course in the auction procedures. In the Auction Order, the Commission determined that a competitive reverse auction for awarding support that encourages intermodal competition is consistent with the agency's objective of supporting "the best possible networks in the most cost-effective manner possible."⁷ The Commission doubled down on this approach in the Procedures PN, explaining that the goal of the auction is "to maximize the value the American people receive for the universal service dollars we spend, balancing the need for future-proofed networks and higher-quality services against cost efficiencies."⁸

But these important goals can be achieved only if the auction allows all eligible providers the opportunity to participate and freely compete on the basis of their true network capabilities. The Commission would undermine these objectives by choosing winners and losers of support at the outset or barring providers or technologies from the opportunity to participate in the auction at performance levels consistent with their networks and capabilities. Instead, the Commission should continue to embrace its long-held principle of technological neutrality—allowing all eligible providers to bid based on neutral, performance-based standards for latency and speed.⁹ The Commission was correct to propose to hold tight to these successful principles, rather than abandon this approach midstream.

⁷ *Id.* ¶ 19. *See also id.* ¶ 18 (describing the potential of auctions "to maximize the impact of finite universal service resources while awarding support to those providers that will make the most efficient use of the budgeted funds").

⁸ Procedures PN ¶ 2.

⁹ Auction Order ¶ 31.

The Procedures PN seeks comment on limiting eligibility for certain providers to bid for certain performance tier and latency combinations.¹⁰ In particular, the Commission has proposed prohibiting GSO operators and NGSO operators using satellites in medium-Earth orbit (“MEO”) from bidding as a low-latency service or from bidding in the two higher-speed tiers.¹¹ SpaceX understands the Commission’s desire for administrative efficiency and the hope to streamline the application review process. But any bidding limitations must be based on well-known technical constraints and data. The Commission should not artificially apply such bidding prohibitions to systems that can meet the Commission’s rigorous performance requirements, such as low-orbit NGSO satellite service—a fundamentally different technology with different network capabilities.

SpaceX’s Starlink system will deliver low-latency broadband service. Far from aspirational, the network’s low latency is dictated by the laws of physics. Satellite service latency is a function of altitude. Unlike GSO and MEO satellite broadband service, SpaceX’s low-Earth orbit (“LEO”) system operates at an altitude of 550 kilometers. That means the roundtrip time for a signal to be sent from Earth to Starlink satellites and back is a fraction of the 100-millisecond threshold for a low-latency bid. Starlink can deliver extremely low-latency long-haul communication, essentially eliminating the historically poor latency characteristics of most rural and remote internet communications. Requiring SpaceX to bid as a high-latency service runs counter to the laws of physics and would mandate that SpaceX affirmatively mischaracterize the capabilities of its network in any bid. Worse yet, such an artificial constraint would create a technological bias, unsupported by the evidence, that prevents fair competition based on network capabilities, undermining the very purpose of the reverse auction—to connect the most Americans,

¹⁰ Procedures PN ¶¶ 48-52.

¹¹ *Id.* ¶¶ 49-50.

using the best possible networks in the most cost-effective manner possible.

SpaceX has also specifically designed the Starlink system to provide high-speed broadband. Just as terrestrial networks manage their networks to adjust to actual demand and regulatory requirements, SpaceX's sophisticated phased-array antennas enable it to dynamically adjust its throughput per user to meet the requirements of higher-speed performance tiers. Unlike GSO and MEO satellite services, Starlink's smaller spot sizes permit more efficient spectrum re-use and allow more throughput per user because fewer users share the same throughput. Far from untested or hypothetical, SpaceX has already launched over 360 satellites and demonstrated that its network is capable of offering high-speed, low-latency service.¹² Simply put, the Commission should not limit *LEO* satellite operators' bidding opportunities based on constraints applicable to *GSO and MEO* satellite operators.¹³ More broadly, restrictions that require operators like SpaceX to mischaracterize their performance using artificially low speed tiers that are unrelated to, and inconsistent with, their actual network capabilities would ultimately distort the market and harm consumers.

To restate, SpaceX is not asking (and has not asked) for any special treatment in the auction. Rather, SpaceX—like all other providers—should be permitted the opportunity to participate in the auction and to demonstrate its technical qualifications to bid at latency and speed levels consistent with its network capabilities. No bidder—regardless of technology—should be permitted to misrepresent the capabilities of its network or the levels of service it can provide to

¹² Letter from David Goldman, Dir. of Satellite Policy, SpaceX, to Marlene Dortch, Secretary, FCC, WC Docket Nos. 19-126, 10-90, Attach. B (filed Feb. 21, 2020). *See* Joey Roulette, *SpaceX satellites are being used by the Air Force to test encrypted internet for military planes*, VENTUREBEAT (Oct. 23, 2019), <https://venturebeat.com/2019/10/23/spacex-satellites-are-being-used-by-the-air-force-to-test-encrypted-internet-for-military-planes/>.

¹³ Procedures PN ¶ 50.

customers. But artificial eligibility restrictions would undercut the competitive nature of the auction. To balance these two objectives, the Commission has already adopted and now proposes multiple safeguards to ensure providers' technical and financial qualifications before allowing them to participate in the auction and before allowing them to receive support:

First, in the short-form application, applicants must provide documentation sufficient to allow Commission staff to determine that they are reasonably capable of meeting bid-for performance requirements.¹⁴ Each applicant must affirmatively certify that it is technically qualified to meet its obligations in each tier and in each area for which it seeks support.¹⁵ Further, the applicant must be able to demonstrate that its network technology and design support the proposed performance tier for the requisite locations during peak periods.¹⁶ Indeed, satellite providers must provide additional information about which satellites would be used and describe the total satellite capacity available for the supported service.¹⁷ Finally, consistent with the Commission's prior decision allowing new providers to participate, an applicant deploying new broadband systems must submit additional financial information, including a letter of interest,¹⁸ and technical information to demonstrate its ability to meet performance and build out obligations.¹⁹

Second, Commission staff will review submitted long-form applications to determine whether long-form applicants are qualified to receive support.²⁰ While the Commission is still

¹⁴ Procedures PN ¶¶ 53-54.

¹⁵ *Id.* ¶ 33.

¹⁶ *Id.*, App. A, no. 4a.

¹⁷ *Id.*, App. A, no. 8.

¹⁸ *Id.* ¶ 56.

¹⁹ *Id.*, App. A, no. 7e.

²⁰ *Id.* ¶ 33; Auction Order, App. B ¶ 34.

developing what specific information will be required,²¹ the applicant must be able to certify that it can deliver service meeting the performance tier requirements in each winning service territory.²² In particular, the applicant must describe the technology and system design used to meet the performance requirements and provide professional engineer certification that the network is capable of delivering services that meet the performance tier requirements to at least 95% of model locations.²³

Moreover, applicants know at the time that they place their bids that failure to meet their public interest obligations may subject them to stringent non-compliance measures.²⁴ Indeed, under the Commission's uniform performance testing framework, those measures could be triggered to the extent recipients are ultimately unable to demonstrate their ability to deliver broadband at the supported levels of speed and latency.²⁵

All of these safeguards combine to protect against applicants selecting performance speed tier and latency combinations that they cannot reasonably expect to meet. And they do so without penalizing specific technologies, artificially constraining competition, or thwarting the auction's ability to efficiently allocate finite support funds to the best, most cost-effective networks for unserved and underserved rural Americans.

That SpaceX has developed a commercial offering that will deliver high-quality broadband service using innovative LEO NGSO technology is no reason to subject it to performance tier prohibitions or otherwise exclude it from the auction. To encourage participation and competition,

²¹ Procedures PN ¶ 65.

²² 47 C.F.R. § 54.804(b)(2)(ii).

²³ *Id.* § 54.804(b)(2)(iv).

²⁴ Procedures PN ¶ 33.

²⁵ Auction Order, App. B ¶ 31; *Connect America Fund*, Order, 33 FCC Rcd. 6509 (WCB/WTB/OET 2018); *Connect America Fund*, Order on Reconsideration, 34 FCC Rcd. 10109 (2019).

the Commission already made the wise decision to open the auction to new providers that were not yet offering consumer broadband service when the auction procedures were proposed, subject to the above safeguards.²⁶ The Commission also previously distinguished LEO networks that have low latency as distinct from GSO and MEO satellites as well as hybrid networks.²⁷ Even if it were not too late to revisit these decisions, there is no basis to do so now.

Instead of eligibility restrictions for new entrants, the Procedures PN appropriately proposes that “Commission staff review applications from providers using nascent technologies on a case-by-case basis,” to determine—as with all applicants—whether “they can reasonably be expected to meet the specific requirements” of the auction and “the specific performance tier(s) and latency for which [they] would be qualified” to bid.²⁸ This tracks the Commission’s successful approach to nascent technologies in the successful CAF II auction.²⁹

To date, the Commission’s auction rules and procedures have been carefully designed to maximize the benefits of the auction mechanism. The Commission should not reverse course based on overwrought, misleading, parochial or anti-competitive calls (clothed in the rhetoric of preserving auction integrity) to exclude SpaceX from the auction. The Commission’s extensive and tested safeguards already address any valid concerns by ensuring that eligible auction participants—and support recipients—have realistic plans to construct and operate a network capable of performing at bid-for speed and latency levels.

²⁶ Auction Order ¶ 75.

²⁷ *Id.* ¶ 37.

²⁸ Procedures PN ¶ 52 n.94.

²⁹ *Id.* (citing *Auction 903 Procedures*, Public Notice, 33 FCC Rcd. 1428, 1468-69 (2018)).

V. CONCLUSION

The Commission has struck the right balance in the auction—allowing providers the opportunity to participate based on the capabilities of their network, while adopting extensive safeguards to ensure that eligible bidders and support recipients will deliver their bid-for levels of service. The Commission’s procedures should preserve that balance, which ensures a pro-competition, pro-innovation auction that will achieve the Commission’s goal of efficiently allocating support to connect unserved and underserved Americans with the best networks.

Respectfully submitted,

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