SPACEX

March 6, 2023

Robert Latta
Chairman, Subcommittee on
Communications and Technology,
Committee on Energy and Commerce
U.S. House of Representatives

Doris Matsui
Ranking Member, Subcommittee on
Communications and Technology,
Committee on Energy and Commerce
U.S. House of Representatives

Dear Chairman Latta and Ranking Member Matsui,

Thank you again for the opportunity to testify at the hearing entitled "Liftoff: Unleashing Innovation in Satellite Communications Technologies." Attached to this letter please find responses to the questions for the record submitted by Members of the Committee.

Sincerely,

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**Rep. Carter**

1. **As both a launch and satellite company, what are the differences in the federal approval processes you have to undergo? What are the different challenges you face with each process?**

Because SpaceX launches its missions from United States soil, it works closely with federal regulators and agency partners to safely conduct its missions. For example, the Federal Aviation Administration ("FAA") licenses commercial space launches and re-entries to protect the uninvolved public, and the Federal Communications Commission ("FCC") licenses the spectrum used to communicate with rockets and spacecraft during launches, orbital operations, and re-entries. Launch services providers also work closely with Federal Ranges within NASA and the U.S. Space Force, as well as other Government agencies that serve specific functions related to commercial space operations (e.g., the U.S. Coast Guard for offshore hardware recovery activities). Each process covers a discrete element of launch and space services operations.

For its satellite broadband service, SpaceX designs, builds, and launches from the United States, and is licensed by the FCC to use spectrum to communicate with its ground equipment. The application material includes the frequencies the system will use, technical details regarding space station design such as type of antennas, and detailed information on how the satellites will operate in space and limit the potential for orbital debris. Unfortunately, outdated regulations, exacerbated by the proliferation of delay tactics employed for foreign competitors and late comers, has contributed to the lengthening time it takes for the FCC to process applications. For companies seeking licenses in the United States, the average processing time now takes over two and a half years, with the trend line pointing in the wrong direction. To cite one recent example, SpaceX filed the original application for our Gen 2 system in May 2020, and the Commission had not even sought public comment on the application 15 months later when SpaceX filed an amendment with details it had updated since first filing. The Commission did ask for public comment three months later, and finally granted SpaceX its license in December 2022, nearly 30 months after SpaceX filed the Gen 2 application.

One major delaying factor in satellite license applications is the ability of foreign-licensed competitors to game the system by filing frivolous comments at the FCC that fill the docket with spurious and repetitive filings in a deliberate effort to overwhelm Commission resources. FCC staff has taken the view that it is bound by the Administrative Procedure Act to respond to every filing, no matter how late in the process those filings are received. Typically, foreign-licensed operators leverage a loophole in the FCC's rules that applies its rules unevenly to U.S. and foreign operators. Foreign operators then exploit this loophole by calling for the FCC to impose conditions and requirements on U.S. operators that would not apply to them and that they could not meet themselves. As just one example, a company that chose to license in a foreign jurisdiction to avoid U.S. oversight filed hundreds of pages in a SpaceX docket 8 months after the comment cycle closed, yet the FCC felt obligated to respond to each new argument dumped on it. Every argument in that filing was eventually rejected by the FCC and later by the courts,

but only after years of litigation and after Commission staff spent months sifting through pages of the frivolous claims.

2. **You mention in your testimony that there is currently a preferential regulatory treatment for those who get licensed outside the U.S. How can we attract satellite companies to get licensed in the U.S.?**

The main way that the United States government can encourage satellite operators to license in the United States is to improve the regulatory process by which operators receive licenses to provide service, and by applying its rules equally, regardless of whether a system received its license in the United States or abroad. SpaceX recently filed at the Federal Communications Commission seeking equitable application of the conditions that it placed on SpaceX's Gen 2 system for all other systems serving the U.S. market. These conditions include robust space safety requirements and reports, as well as a requirement to coordinate with the National Science Foundation with respect to radio and optical astronomy protections. To be very clear, SpaceX supports these conditions. Indeed, what is good for the SpaceX system should also be good for other satellite constellations. Commission license conditions should be equitably applied to all systems hoping to serve the U.S. market.

**Rep. Allen**

1. **We've learned there's a lot of satellites up there, and we know that technology is changing and updating by the hour. Do some of those satellites need to come down, and we need to put new ones up there? What is the program in place for recycling everything up there [in space]?**

SpaceX is constantly innovating and improving the design and functioning of its network. To date, SpaceX has launched more than 4,000 satellites, and has launched the first of its newest satellite -- V2 "mini" satellites – into orbit. SpaceX satellites are designed for a lifetime of 5-7 years, and when they reach their operational end, SpaceX actively deorbits the satellites safely, creating no persistent debris in space and no risk to humans on the ground. SpaceX takes space safety and sustainability very seriously, and has been an industry leader in promoting responsible space operations. SpaceX's space safety approach includes, but is not limited to:

- **Design and build reliability.** SpaceX satellites are designed and built with high reliability, with reliability now approximately 99% after the deployment of more than 4,000 satellites.
- **Operations below 600 km.** SpaceX has chosen to operate at an altitude below 600 km, since this altitude is self-healing, meaning that objects will decay out of orbit due to atmospheric drag within a short period of time in rare off-nominal scenarios, eliminating the risk of persistent orbital debris. By contrast, several other commercial satellite

constellations are designed to operate above 1,000 km, where it will take hundreds to thousands of years for spacecraft to naturally deorbit if they fail on orbit.

- **Deployment into a low insertion orbit, typically below 300 km.** At this low altitude, any SpaceX satellites that do not pass initial system checkouts are quickly deorbited actively, or by atmospheric drag.
- **Radical transparency and data sharing with the U.S. Government and other satellite owners/operators to ensure full space situational awareness.** SpaceX openly shares high-fidelity future position and velocity prediction data for all SpaceX spacecraft. SpaceX was the first operator to share both ephemeris and covariance data and calls on all other operators to do so. In addition, SpaceX volunteered to provide routine system health reports to the Federal Communications Commission, something no other operator has ever offered or does.
- **Advanced collision avoidance systems protect SpaceX and other satellites.** Every SpaceX satellite is equipped with an autonomous collision avoidance system that ensures it can maneuver away from any other tracked object that could approach it. SpaceX's autonomous collision avoidance system has been evaluated by NASA's Conjunction Assessment and Risk Analysis (CARA) program, which deemed it sufficiently trustworthy to rely on it to avoid collisions with NASA spacecraft.
- **Post-mission disposal.** In nominal scenarios, SpaceX satellites are propulsively deorbited within weeks of spacecraft end of mission. This vastly exceeds the international standard of 25 years.
- **SpaceX spacecraft are 100% demisable**. At end of life, SpaceX satellites are designed to vaporize upon atmospheric reentry, eliminating the risk of falling debris.

Unfortunately, not everyone operates in this responsible manner. The creation of large debris objects has its origins in a relatively few significant events that took place over the last two decades. Many of these events can be directly traced to irresponsible actions by foreign governments, which have intentionally destroyed satellites in space to demonstrate anti-satellite missile capability, or by poor design and operational choices by non-state actors. In addition to debris from the destruction of satellites, derelict rocket bodies have also contributed significant quantities of orbital debris. The Department of Defense currently tracks more than 27,000 pieces of orbital debris through the Space Surveillance Network. There are an estimated 500,000 objects approximately one centimeter in size or larger, and more than 100 million objects at least one millimeter in size. Low Earth orbit ("LEO") constellations, if properly conceived, manufactured and operated, present a highly manageable, low-risk to the space environment, especially when operated at altitudes below 600 km.

**Rep. Pfluger**

1. **Given recent concerns over spying on American territory, can you talk about the dual-use, or commercial and defense nature of satellite technology, and the importance of America leading in this area?**

SpaceX plays an important role in national defense for the U.S. government. SpaceX is developing a specific product called Starshield for use by the U.S. Department of Defense. Starshield leverages SpaceX's existing satellite technology and launch capability to support national security efforts. While Starlink is designed for consumer and commercial use, Starshield is designed for government use, with an initial focus on three areas: Earth observation, communications, and hosted payloads.

The importance of U.S. leadership in satellite technology cannot be overstated. Other countries are moving forward with significant investment in LEO space systems, and are clearing regulatory obstacles to allow for their state-backed networks to rapidly launch and deploy. China is aggressively pursuing a satellite constellation that is similar to the one operated by SpaceX, with plans to launch approximately 13,000 satellites in the coming years. The European Union is also pursuing its own LEO system, as are Russia and India. Beyond the clear benefits to the U.S. government in having U.S. companies lead in LEO broadband, ceding U.S. leadership in the race to provide satellite internet globally creates significant geopolitical risks. China's "Starnet" system will be folded into the larger Belt and Road Initiative, with aggressive plans to expand into foreign markets in Asia, Africa, and South America. While the U.S. has blocked the installation or use of Chinese hardware for telecommunications networks domestically due to security concerns, many nations have few options when it comes to telecommunications infrastructure and must rely on whoever can provide connectivity. If the United States cedes leadership in this sector, other countries will not hesitate to use their increased leverage to their geopolitical advantage.

**Rep. Eshoo**

1. **In your written testimony you mention the regulatory asymmetry that allows foreign licensed systems to evade U.S. regulations. You mention how the current approach drives company operators out of the U.S., but allows them to continue to take advantage of the U.S. market. For the record, please explain how the current U.S. system allows foreign licensed systems to evade U.S. regulations, what the FCC has done and could do to address this issue, and what actions, if any, congress should take to address the issue.**

With the pace of space innovation speeding up, the U.S. needs a regulatory process that can keep up. Unfortunately, outdated regulations, exacerbated by the proliferation of delay tactics employed for foreign competitors and late comers, has contributed to the lengthening time it takes for the FCC to process applications. For companies seeking licenses in the United States, the average processing time now takes over two and a half years, with the trend line pointing in the wrong direction.

These timelines create an impossible situation for American operators. The extreme demand to connect unserved Americans quickly, coupled with a lengthy timeline for regulatory reviews,

drive U.S. licensees to begin work on these complex satellite constellations years before the license is granted. If they did not, no U.S. system would be able to compete with foreign—and often state-backed—competitors. As a result, U.S. operators are forced to build at risk, exposing themselves and investors to significant capital risk. Worse, the FCC issues each satellite license with its own unique operating conditions, meaning the operator generally is not aware of what restrictions will be placed on its system—or whether those conditions will be debilitating to their operations—until the license is issued. Not only does this place U.S. companies at a competitive disadvantage, it undermines the U.S. as a regulatory venue of choice, and it needlessly delays critical services to consumers.

This case-by-case nature of satellite licensing in the U.S. has made it an unfortunate target for gaming by foreign competitors and late comers to the market with legions of lawyers and lobbyists. Foreign-licensed operators will call for conditions and requirements on U.S. operators that would not apply to them and that they could not meet themselves.

These same operators that game the U.S. process to slow down decisions for U.S. licensees rely on a glaring loophole that exempts foreign-licensed systems from the U.S. regulations. Specifically, while the FCC generally exempts foreign licensees from U.S. rules for orbital debris and space sustainability, no other country has comparable regulatory requirements, combined with the transparency associated with American public notice and comment. As a result, while many foreign jurisdictions employ protectionist regimes to support their domestic licensees, the U.S. uses an asymmetric set of rules that benefit foreign-licensed systems over U.S.-authorized systems. This legacy loophole has been a leading cause for most satellite operators to license overseas—outside the reach of U.S. oversight—while still taking advantage of the U.S. market.

To help correct this imbalance, SpaceX recently filed at the FCC seeking equitable application of the conditions that it placed on SpaceX's Gen 2 system for all other systems serving the U.S. market. These conditions include robust space sustainability requirements and reports, as well as a requirement to coordinate with the National Science Foundation with respect to radio and optical astronomy protections. To be very clear, SpaceX supports these conditions. Indeed, what is good for SpaceX's system should also be good for other satellite constellations. Commission license conditions should be equitably applied to all systems hoping to serve the U.S. market. Asymmetric regulatory treatment of U.S. systems, unbounded anti-competitive regulatory triage against U.S. licenses, and long delays have a cost. As noted, they introduce enormous amounts of risk for investment and innovation, especially in a sector as capital intensive as satellite communications. Many innovative companies may simply not have the wherewithal to accept these risks and delays.