ENERGY & COMMERCE
CHAIR RODGERS

MEMORANDUM 1/31/2023

To: Members, Subcommittee on Communications and Technology
From: Majority Staff
Re: Communications and Technology Subcommittee Hearing

I. INTRODUCTION

On Thursday, February 2, 2023, at 9:30a.m. (ET), the Subcommittee on Communications and Technology will hold a hearing in 2123 Rayburn House Office Building titled "Launching Into the State of the Satellite Marketplace." The following witnesses are expected to testify:

II. WITNESSES

- Tom Stroup, President, Satellite Industry Association
- Julie Zoller, Head of Global Regulatory Affairs, Project Kuiper at Amazon
- Jennifer Manner, Senior Vice President of Regulatory Affairs, EchoStar Corporation
- Margo Deckard, Co-Founder and Chief Operating Officer, Lynk Global, Inc.
- Kari Bingen, Director, Aerospace Security Project and Senior Fellow, International Security Program, Center for Strategic and International Studies

III. BACKGROUND

Closing the digital divide and encouraging innovation in communications technologies in the United States has long been a priority for the Committee on Energy and Commerce. Communications services provided by satellite operators are an important component of the marketplace. Satellite operators provide broadband service to homes and businesses as well as mission critical services like highly reliable voice, video, data, and observation capabilities to critical infrastructure companies and the Federal government.[1] The Federal Communications Commission (FCC) is responsible for authorizing the use of electromagnetic spectrum ("spectrum") in the United States, and therefore plays an important role in advancing the availability of satellite-provided communications services.[2]

In general, satellite providers operate at different levels, or altitudes, above Earth, which impacts the way in which they use spectrum to provide communications services. Consequently, the FCC—in coordination with the International Telecommunication Union (ITU)—authorizes

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[1] *See*, 2022 Communications Marketplace Report, Federal Communications Commission, at para. 174. Rel. December 30, 2022. Available at: https://www fcc.gov/reports-research/reports/consolidated-communications-marketplace-reports/CMR-2022.
[2] Communications Act of 1934 §§ 2; 303 at 47 U.S.C. 152; 47 U.S.C. 303(r).

the orbital slots and spectrum use of commercial satellite communications systems.[3] Satellites operate in either a geostationary satellite orbit (GSO) or in a non-geostationary satellite orbit (NGSO). GSO satellite systems rotate around the Earth at the same speed that the Earth rotates. This means they appear as stationary from Earth, and operate at approximately 22,300 miles above earth, which can result in a delay in transmitting a signal from Earth to the satellite, and back. NGSO systems, on the other hand, can operate at varying altitudes, and many current and proposed systems operate closer to Earth in Low Earth Orbit (LEO). NGSO systems can also operate in Medium Earth Orbit (MEO) or High Earth Orbit (HEO). Due to their proximity to Earth, satellites in non-geostationary orbit can offer lower latency services than their GSO counterparts. However, as any one satellite moves closer to Earth, the geographic area it serves becomes smaller. Thus, NGSO systems in low earth orbit require many satellites to cover the same area that may be served by only a few GSO satellites. In the same way cellular networks hand off your signal from one tower to the next, NGSO systems also hand off a signal to other satellites in the constellation as they pass over the consumer on Earth.

Satellite operators must make tradeoffs when determining whether to design and operate a system in geostationary orbit or non-geostationary orbit. GSO systems require fewer satellites to provide ubiquitous coverage around the world, but may be more expensive to build and launch, have higher latency that could affect the service quality, and require larger, higher powered ground stations.[4] On the other hand, NGSO satellites may provide better latency, but require many more satellites to be launched and operated as a constellation to reach a desired service level or ubiquitous coverage.[5] Much like the terrestrial communications marketplace where broadband providers utilize fixed and wireless technologies, many satellite communications providers operate or partner with others to utilize satellites in both geostationary and non-geostationary orbit for best service.

Selected Issues:

1. Satellite Communications Licensing

In recent years, the satellite communications marketplace has seen rapid development and innovation in a short period of time.[6] The economics of launching new satellites has become more affordable, and private capital investments in commercial satellite communications providers has increased.[7] Subsequently, the number and complexity of applications filed to the FCC to provide new or enhanced satellite services has risen considerably.[8] Some applications

[3] 47 C.F.R. 25 et seq.
[4] *Supra*, Note 1 at para.177.
[5] *Supra*, Note 1 at para. 178.
[6] *See*, "In the Matter of Expediting Initial Processing of Satellite and Earth Station Applications," Notice of Proposed Rulemaking, Federal Communications Commission at para. 11. (IB Docket Nos. 22-411; 22-271). Rel. Dec 22, 2022. Available at: https://www fcc.gov/document/fcc-takes-latest-step-improve-satellite-application-process
[7] *See*, https://www.morganstanley.com/ideas/future-space-economy
[8] *See*, "In the Matter of Revising License Determination Rules for Non-Geostationary License Applications," Petition for Rulemaking, Olin Satellite + Spectrum Technology & Policy Group. Nov. 9, 2022. Available at: https://www.fcc.gov/ecfs/document/1110237682587/1.

have raised novel issues regarding orbital debris and the impacts on radio astronomy, as well as the spectrum sharing rules for certain operations.

Despite the work of FCC staff to review applications, many applications still face delay. The complex nature of the applications and novel issues raised by technological advancements were not envisioned when the FCC's existing rules and regulations were adopted. To promote U.S. leadership in satellite communications technologies, the U.S. regulatory process must be updated and streamlined to provide predictability and transparency.

2. Spectrum Used for Fixed Satellite Services and Mobile Satellite Services

The FCC authorizes satellite operators to provide a variety of voice, video, data, or observation services. The two main services that the FCC authorizes are "Fixed Satellite Services" (FSS) which provide service to fixed points on Earth, and "Mobile Satellite Services" (MSS) which provide service to mobile earth stations on land, on sea, or in the air.[9] Commonly, FSS services include consumer broadband services, wholesale transponder services, or enterprise services.[10] FSS services use technologies that allow multiple operators to reuse and share spectrum. The FCC also authorizes MSS services, which include voice, low-speed data, tracking services for aircraft and ships, and voice/data for handsets operating in remote locations on land. Because MSS services are provided to moving earth stations like aircraft or maritime vessels, certain technologies are used that make it more difficult to share spectrum.

The FCC also authorizes more specialized services like Satellite Digital Audio Radio Service (SDARS), commonly known as satellite radio; Direct Broadcast Satellite Service (DBS), commonly known as satellite television; and Earth Exploration Satellite Service (EESS), which are services that use active or passive sensors to collect information relating to the characteristics of Earth (like imaging, weather data, etc.). These services all provide Americans, businesses, and the government with important capabilities, and each requires a different use of spectrum to ensure they can be provided reliably.

3. Satellite to Cellular Communications

Recently, there has been increased interest in using satellite technologies to provide cellular services, or support cellular services, from space in addition to terrestrial infrastructure.[11] Some satellite operators have applied for authorization from the FCC to provide these services in the United States, and others have requested experimental authorization to test the potential for these technologies. Additionally, satellite operators and wireless carriers have announced partnerships to integrate non-terrestrial networks and terrestrial networks to eliminate coverage gaps.[12] Private-sector standards bodies are also paving the way for continued integration of satellite services and terrestrial 5G and 6G networks.[13]

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[9] 47 C.F.R. 25 et seq.
[10] *Supra*, Note 1 at para. 181-183.
[11] *See*, e.g., https://www.cnbc.com/2022/10/23/space-race-to-connect-satellites-to-phones-with-apple-spacex-att html.
[12] See, https://www.lightreading.com/satellite/how-and-when-you-might-connect-your-smartphone-to-satellite/d/d-id/780114.
[13] *See*, https://www.5gamericas.org/wp-content/uploads/2022/01/5G-Non-Terrestrial-Networks-2022-WP-Id.pdf.

These advances in technology raise new regulatory questions, such as the ability to use spectrum traditionally used for cellular technology from outer space, whether wireless emergency alerts ("WEA alerts") could be provided via satellite, or whether satellite systems could provide 9-1-1 service in areas where terrestrial networks are incapable of providing 9-1-1. The Communications Act charges the FCC to regulate interstate and foreign communication by wire or radio, "for the purpose of promoting safety of life and property…".[14] In remote or unserved areas, Americans may not have service from a terrestrial network to call 9-1-1 or receive WEA alerts, and having such capability may be lifesaving.

4. International Considerations

Inherently, satellite communications services are a global enterprise. Satellite operators provide service in markets around the world, and it is critical that satellite use of spectrum is harmonized internationally. The International Telecommunications Union (ITU)—a division of the United Nations—manages a global table of spectrum allocations. This table represents treaty-level agreements where countries agree to define uses for certain spectrum frequencies in different regions across the world. Domestic regulators, like the FCC in the United States, must therefore update their regulations in accordance with the radio regulations of the ITU.

Additionally, the ITU plays an important role in managing orbital slots for GSO and NGSO systems. The location of satellites in orbit are an important component of determining the spectrum usage of each satellite, and therefore are considered in deliberations at the ITU and the FCC when licensing satellite communications systems.

5. Recent Developments at the FCC

The FCC has recently announced it will begin to take steps to update its licensing process. On November 3, 2022, the FCC proposed reorganizing the International Bureau of the FCC into a Space Bureau and a standalone Office of International Affairs to better support the FCC's processing of satellite license applications.[15] On January 9, 2023, the FCC voted unanimously to reorganize the International Bureau into a Space Bureau and Office of International Affairs.[16] Additionally, the FCC adopted a proposed rule seeking comment on changes to its rules regarding when a satellite and earth station application is considered complete, among other issues, on December 22, 2022.[17]

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[14] 47 U.S.C. 151.
[15] *See*, "Chairwoman Rosenworcel Proposes Space Bureau," Federal Communication Commission Press Release, Nov. 3, 2022. Available at: https://www.fcc.gov/document/chairwoman-rosenworcel-proposes-space-bureau.
[16] *See*, "In the Matter of Establishment of the Space Bureau and the Office of International Affairs and Reorganization of the Consumer and Governmental Affairs Bureau and the Office of the Managing Director," *Order*, Federal Communications Commission. (MD Docket No. 23-12) Rel. Jan. 9, 2023. Available at: https://www.fcc.gov/document/fcc-votes-establish-space-bureau-office-international-affairs.
[17] *See*, "In the Matter of Expediting Initial Processing of Satellite and Earth Station Applications", *Notice of Proposed Rulemaking*, Federal Communications Commission. (IB Docket Nos. 22-411; 22-271). Rel. Dec. 22, 2022. Available at: https://www.fcc.gov/document/fcc-takes-latest-step-improve-satellite-application-process.

IV. KEY QUESTIONS

- How has the satellite communications marketplace changed in recent years?
- What is the FCC's role in licensing satellite communications systems?
- What challenges do satellite operators face getting their systems licensed at the FCC?
- How can the United States encourage innovation and maintain leadership in the satellite communications marketplace?

V. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Kate O'Connor or Evan Viau of the Committee Staff at (202) 225-3641.