

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)	
)	
Public Notice Seeking Comment for Satellite)	IB Docket No. 18-251
Communications Services for the Communications)	
Marketplace Report)	

COMMENTS OF IRIDIUM COMMUNICATIONS INC.

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September 7, 2018

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Iridium Communications Inc. (“Iridium” or “company”) hereby responds to the Federal Communications Commission’s (“Commission’s”) Public Notice in the above-captioned docket, which seeks comment on satellite communications services in advance of the agency’s forthcoming Communications Marketplace Report (“Report”), as required by Title IV of the RAY BAUM’s Act.¹ In addition to assessing the overall state of competition in the communications marketplace, the Commission is also required to include in the Report an assessment of whether laws, regulations, regulatory practices, or demonstrated marketplace practices pose a barrier to competitive entry into the communications marketplace, or to “the competitive expansion of existing providers of communications services.”²

I. Introduction and Summary

Iridium is the only provider of communications services offering truly global coverage, connecting people, organizations, and assets to and from anywhere in real time. Iridium’s one-of-a-kind L-band satellite network provides reliable communications services to regions of the

¹ *International Bureau Seeks Comment on Satellite Communications Services For the Communications Marketplace Report*, Public Notice, DA 18-858 (rel. Aug. 17, 2018) (“Public Notice”); *see also* Consolidated Appropriations Act, P.L. 115-141, Division P, the Repack Airwaves Yielding Better Access for Users of Modern Services (RAY BAUM’S) Act (2018).

² *Id.* at 2; *see also* 47 U.S.C. § 163(b)(3).

world where terrestrial wireless or wireline networks do not exist or are limited – including remote land areas, open ocean, airways, the polar regions, and localities where the terrestrial telecommunications infrastructure has been affected by political conflicts or natural disasters. Iridium provides voice and data communications services to businesses, the U.S. and foreign governments, non-governmental organizations, and consumers via the company’s interlinked mesh architecture that routes traffic across its satellite constellation using radio frequency crosslinks between satellites. The network consists of 66 operational satellites with in-orbit spares and related ground infrastructure.³ The satellite-to-satellite mesh architecture and dedicated gateway provides the highest level of security and minimizes the need for local ground facilities to support the constellation. This facilitates the global reach of Iridium’s services and allows the company to offer services in areas where Iridium has no physical presence.

Iridium has a diverse customer base, with end-users in the following lines of business: land mobile; Internet of Things (“IoT”); maritime; aviation; and government. The company’s fastest growing segment is machine to machine (“M2M”) communications. Iridium provides highly reliable and secure communications that are critical for public safety, whether through daily aviation and maritime communications or in facilitating disaster response and recovery after major disasters. Each of these markets is highly competitive with Iridium competing with different providers for different market segments.

Iridium is pleased to provide information on its industry-leading satellite communications service offerings and also identify important spectrum policy principles necessary to ensure the competitive expansion of new services from Iridium and other satellite communications

³ See, e.g., *Iridium Global Network – Overview: Everywhere Under One Sky*, IRIDIUM, <https://www.iridium.com/network/globalnetwork/> (last visited Sept. 3, 2018); see also *Iridium Satellites*, N2YO.COM, <https://www.n2yo.com/satellites/?c=15> (last visited Sept. 3, 2018).

providers. Namely, the Commission must provide (1) a stable spectrum foundation for the satellite industry; (2) consistent protection from harmful interference; and (3) robust international engagement to preserve space spectrum allocations. Finally, we highlight two specific policy issues that must be addressed for Iridium to continue to expand its services – protection from harmful interference from adjacent band operations, and the potential threat from increasing orbital debris.

II. Iridium’s Industry Leadership

As global uncertainty from a range of issues increases, as modern IoT technologies flourish, the satellite industry – today more than ever – is contributing unique and exciting communications solutions with substantial consumer and economic benefits. The Commission has broadly sought comment on communications marketplace competition in the retail market.⁴ It is also important for the Commission to assess the state of the marketplace for critical retail and enterprise services made possible by satellite services.⁵ To assist the Commission in assessing the state of competition in the communications marketplace, below we provide an overview of our current services and the new services being enabled by Iridium NEXT.⁶ While Iridium has experienced significant growth in many of its lines of businesses, Iridium continues its important mission to help ensure public safety and assist with critical emergency rescue and recovery efforts.

⁴ See Public Notice n.3.

⁵ See *id.* at 1.

⁶ See generally *Iridium NEXT – The Bold Future of Satellite Communications*, IRIDIUM, <https://www.-iridium.com/network/iridium-next/> (last visited Sept. 3, 2018).

A. *Satellite Industry and Iridium Contributions to the U.S. Economy*

Iridium applauds the Commission's interest in streamlining regulations that govern satellite operations. The satellite industry is dramatically improving lives and enhancing our nation's global competitiveness. In 2016 alone, the U.S. satellite industry generated over \$110 billion in revenues and supported over 210,000 American jobs.⁷ On a global scale, in 2017, the satellite industry earned \$269 billion, which translates to 79 percent of the total space economy (\$348 billion).⁸ And these trends are on the rise. Morgan Stanley estimates that by 2040, global space revenue will grow to \$1.1 trillion.⁹ For its part, over the past decade, Iridium has seen increased profits, and doubled the number of employees in the United States. In 2017, backed by more than 300 technology partners, this growth translated to nearly \$450 million in revenues.¹⁰

Iridium's subscribership hit a record number at the end of the second quarter in 2018 when the company reported approximately 1,047,000 subscribers,¹¹ more than double the 427,000 subscribers it had in 2010.¹² Iridium has experienced a 15 percent year-over-year subscribership growth rate (with a jump of nearly 120,000 commercial subscribers alone in Q2

⁷ SATELLITE INDUS. ASSOC., 2017 STATE OF THE SATELLITE INDUSTRY REPORT 6 (June 2017), <https://www.sia.org/wp-content/uploads/2017/07/SIA-SSIR-2017.pdf>.

⁸ SATELLITE INDUSTRY ASSOCIATION, 2018 STATE OF THE SATELLITE INDUSTRY TWO-PAGER 1 (June 2018), <https://www.sia.org/wp-content/uploads/-2018/06/2018-SSIR-2-Pager-.pdf>.

⁹ *Space: Investing in the Final Frontier*, MORGAN STANLEY (Nov. 13, 2017), <https://www.morganstanley.com/ideas/-investing-in-space>.

¹⁰ *See Revenue of Iridium Communications from 2012 to 2017 (in million U.S. dollars)*, STATISTA (2018), <https://www.statista.com/statistics/799958/iridium-communications-revenue/>.

¹¹ Press Release, Iridium, Iridium Announces Second-Quarter 2018 Results; Company Raises 2018 Outlook (July 31, 2018) ("Iridium Q2'18 Press Release"), <http://investor.iridium.com/2018-07-31-Iridium-Announces-Second-Quarter-2018-Results-Company-Raises-2018-Outlook>.

¹² *See* Press Release, Iridium, Iridium Announces Fourth-Quarter and Full-Year 2010 Results; Company Delivers 19% Operational EBITDA Growth in 2010 and Affirms 2011 Outlook (Mar. 7, 2011), <http://investor.iridium.com/03-07-2011-iridium-announces-fourth-quarter-and-full-year-2010-results-company-delivers-19-percent-operational-ebitda-growth-in-2010>.

2017 to Q2 2018).¹³ Iridium is currently serving approximately 107,000 U.S. government subscribers, also a record number (up from 92,000 for the year-ago period).¹⁴ In addition, Iridium works with approximately 230 value-added resellers (“VARs”) and approximately 85 value-added manufacturers (“VAMs”).¹⁵

Iridium continues to modernize its satellite constellation and ground equipment. The company has invested more than \$2.5 of its planned \$3 billion in the development of Iridium NEXT, a complete upgrade replacement of the company’s 66-satellite constellation, with nine on-orbit spares and six ground spares.¹⁶ To date, Iridium has launched 65 of the total 75 satellites and expects to complete its constellation by the end of 2018.¹⁷ While supporting all current Iridium services, Iridium NEXT satellites will also enable significant improvements over its legacy system, including faster speeds for its ultra-reliable enterprise-grade services.¹⁸ To that end, Iridium is developing its Iridium CertusSM (“Certus”) service which will provide best-

¹³ *Id.*

¹⁴ *Id.*

¹⁵ See generally *Partner Ecosystem*, IRIDIUM, <https://www.iridium.com/company-info/partner-ecosystem/> (last visited Sept. 3, 2018).

¹⁶ See generally Press Release, Iridium, Iridium Completes Seventh Successful Iridium® NEXT Launch – One Launch Remains for Iridium to Finish its Historic Constellation Refresh (July 25, 2018), <http://investor.iridium.com/2018-07-25-Iridium-Completes-Seventh-Successful-Iridium-R-NEXT-Launch>.

¹⁷ *Id.*; see also, e.g., Iridium Q2 Press Release (“With three successful launches this year, we now have 65 Iridium NEXT satellites in orbit and expect to complete the launch program in the coming months. We anticipate that the new constellation will be fully deployed this year and begin delivering superior L-band broadband through our new Iridium CertusSM service”); *Iridium Next*, THALES GROUP (July 25, 2018), <https://www.thalesgroup.com/en/worldwide/space/press-release/iridium-next-constellation-66-operational-satellites-will-make> (“everything is on track to meet [the] objective ... to launch all 75 Iridium NEXT [low-earth orbit (“LEO”)] satellites in 2018”).

¹⁸ *New Platform. New Possibilities.*, IRIDIUM CERTUS (Sept. 22, 2016), <https://www.iridiumnext.com-/2016/09/22/new-platform-new-possibilities/>.

in-class broadband satellite connectivity to land, aviation, and maritime customers.¹⁹ The new Iridium NEXT satellites also host the AireonSM aircraft tracking data service, as well as other hosted payload missions.

Iridium's largest growing segment is in the IoT/enterprise space. Iridium's commercial IoT data subscribers grew 25 percent to 576,000 in the last year alone as a result of continued strength in consumer personal communications and tracking devices, with IoT data subscribers representing 61 percent of Iridium's billable commercial subscribers at the end of Q2 2018 quarter (an increase from 56 percent at the end of the prior-year period).²⁰ IoT data subscribers represent a 50 percent of Iridium's *government* customers, as well.²¹

B. Iridium's Commitment to Public Safety

Disaster Response. A number of satellite operators provide critical and reliable communications services after natural disasters when terrestrial services are often not available or non-existent.²² During and after natural disasters, Iridium's unique satellite network provides reliable communications services to regions of the world where terrestrial wireless or wireline networks do not exist or are limited, including regions where the telecommunications infrastructure has been affected by political conflicts or natural disasters. Relief agencies such as the Federal Emergency Management Agency ("FEMA"), as well as others including the Department of Homeland Security ("DHS"), use Iridium's products and services in their

¹⁹ See *Iridium CertusSM – Satellite Communications Reinvented*, IRIDIUM, <https://www.iridium.com/services/iridium-certus/> (last visited Sept. 3, 2018).

²⁰ See Iridium Q2'18 Press Release.

²¹ *Id.*

²² Press Release, Satellite Industry Association, *Satellites to the Rescue – Space-Based Communications and Imagery Invaluable for Hurricane and Disaster Relief* (Oct. 18, 2016), <https://www.sia.org/wp-content/uploads/2016/10/SIA-Press-Release16-Hurricane-Preparedness-FINAL-1.0.pdf>.

emergency response plans.²³ This is particularly true in the aftermath of natural disasters such as Hurricanes Harvey, Irma, and Maria – especially in island U.S. territories like Puerto Rico, where U.S. citizens were especially hard-hit by the 2017 storm season.²⁴ These agencies and their critical missions generate significant demand for both the company’s voice and data products. After Hurricanes Irma and Maria, the Commission reported that more than 95% of cell sites were unavailable in Puerto Rico and 77 % of cell sites were out in the Virgin Islands.²⁵ Iridium provides critical communications services when cell towers are unavailable. In addition to Iridium’s satellite phones, tracking devices and multi-user push-to-talk services provide essential services during natural disaster recovery.²⁶

Iridium voice, data, and tracking devices also provide critical connectivity that can be deployed quickly and reliably to first responders around the world.²⁷ Iridium provides “always connected” group communications to enable first responders to stay in reliable contact in any location without the need to rely on local ground infrastructure.²⁸ Iridium will enhance its

²³ See, e.g., *Case Study: Homeland Security – Fleet Management*, IRIDIUM (Jan. 2011), <https://www.iridium.com/file/24401/?d1m-dp-dl-force=1&d1m-dp-dl-nonce=25fd252c8f> (link triggers download).

²⁴ Cf. Chris Gebhardt, *Iridium Satellite Communication Aids Caribbean/Puerto Rico Recovery Efforts*, NASASPACEFLIGHT.COM (Oct. 28, 2017) (“Iridium Hurricane Recovery Article”), <https://www.nasa-spaceflight.com/2017/10/iridium-satellite-aids-caribbeanpuerto-rico-recovery/>.

²⁵ Chairman Ajit Pai, Federal Communications Commission, *In the Aftermath of Hurricanes Irma and Maria, Resilience and Challenges in Puerto Rico and the U.S. Virgin Islands* (Mar. 19, 2018), <https://www.fcc.gov/news-events/blog/2018/03/19/aftermath-hurricanes-irma-and-maria-resilience-and-challenges-puerto>.

²⁶ See Iridium Hurricane Recovery Article.

²⁷ Press Release, Iridium, Iridium® PTT Wins MSUA Award for Emergency Response (Mar. 16, 2016), <https://www.iridium.com/blog/2016/03/16/iridium-ptt-wins-msua-award-for-emergency-response/>.

²⁸ See generally *Humanitarian and Emergency Response, Reliable Global Communications Can Make All the Difference*, IRIDIUM, <https://www.iridium.com/solutions/enterprise/humanitarian/> (last visited Sept. 5, 2018).

services to first responders with Iridium Certus, which will provide “real-time, reliable coordination and information access when managing local government activities.”²⁹

Aviation Safety. Satellites play an important role in providing communications services for aircraft operations. Iridium provides mission-critical communications for aircraft operations of all sizes (~30,000 aircraft worldwide); the company is the leading supplier of mobile satellite services to global aviation and the only satellite network to provide polar coverage which aids in air navigation for cross-polar flights. Iridium systems are deployed on major carriers like United Airlines and JetBlue, in thousands of rotorcraft, and in as many as 10,000 business jets.³⁰

The International Civil Aviation Organization (“ICAO”) has approved standards and recommended practices allowing Iridium to provide Aeronautical Mobile Satellite (Route) Services (“AMS(R)S”) to commercial aircraft on long-haul routes. Iridium has been providing AMS(R)S pursuant to Commission approval.³¹ And the Federal Aviation Administration (“FAA”) has approved Iridium for use in both the Future Air Navigation Services (“FANS”), and in Automatic Dependent Surveillance – Contract (“ADS-C”) datalink communications with air traffic control.³²

Finally, the Iridium NEXT satellites host the Aireon system to provide a global air traffic surveillance service through a series of automatic dependent surveillance-broadcast, or ADS-B,

²⁹ See *Iridium CertusSM – Land, Deploy Mobilized Satellite Communications Anywhere*, IRIDIUM, <https://www.iridium.com/services/iridium-certus/land/> (last visited Sept. 3, 2018).

³⁰ See generally *Commercial Aviation: Keeping Passenger Aircrafts Safe and Connected – Anywhere Airlines Fly*, IRIDIUM, <https://www.iridium.com/solutions/aviation/commercial-aviation/> (last visited Sept. 3, 2018); *Business Aviation: Coverage and Connectivity in the Air – Anywhere Business Takes You*, IRIDIUM, <https://www.iridium.com/solutions/aviation/business-aviation/> (last visited Sept. 3, 2018).

³¹ See *Iridium Constellation LLC, for Authority to Modify License for a Low Earth Orbit Mobile Satellite System*, Memorandum Opinion and Order, 28 FCC Rcd 964 (IB 2013).

³² See, e.g., Press Release, Iridium, U.S. FAA Authorizes Airlines' Use of Iridium for Oceanic Air Traffic Control Communications (July 11, 2011), <http://investor.iridium.com/2011-07-11-U-S-FAA-Authorizes-Airlines-Use-of-Iridium-for-Oceanic-Air-Traffic-Control-Communications>.

receivers on the Iridium NEXT satellites.³³ Iridium initially formed Aireon LLC in 2011. It has subsequently become a joint venture from subsequent investments from the air navigation service providers (“ANSPs”) of Canada, Italy, Denmark, Ireland and the United Kingdom. Aireon has already contracted to provide the service to at least ten ANSPs even before the service is fully operational. Aireon plans to offer the service to other customers worldwide, including the FAA.³⁴ Aireon will also offer its free, global Aircraft Locating and Emergency Response Tracking (ALERT) service starting in 2019.³⁵ The Aireon ALERT service will provide ANSPs, aircraft operators, Regulators, and Search and Rescue organizations with the last known position of aircrafts equipped with Automatic Dependent Surveillance-Broadcast (“ADS-B”) that is in apparent distress or experiencing a loss of communication.

Maritime Safety. Ships in distress, including as a result of potential piracy, hijack or terrorist activity, rely on mobile satellite voice and data services. Per the requirements of the International Maritime Organization (“IMO”) to enhance maritime security in response to the threat from terrorism and piracy, most deep-sea passenger and cargo ships must be fitted with a device that can send an alert message containing the ship’s ID and position whenever the ship is under threat or has been compromised. In addition, the IMO and a NATO advisory group have recommended the installation of a safe room equipped with a standalone secure communication

³³ See generally *Iridium Next*, AIREON, <https://aireon.com/resources/iridium-next/> (last visited Sept. 3, 2018) (“The backbone of Aireon’s technology resides on the **Iridium NEXT** constellation of satellites, scheduled for eight launches. Iridium’s next generation satellite constellation will deliver exciting new innovations and opportunities, while ensuring continued high performance and reliability far into the future. To enable the Aireon system, Iridium will host specially designed receivers on each Iridium NEXT satellite, covering 100 percent of the globe.”).

³⁴ See generally *id.*

³⁵ Press Release, Runway Girl Network, Pre-registration open for Aireon’s free tracking service (Aug. 23, 2018), <https://runwaygirlnetwork.com/2018/08/23/press-release-pre-registration-open-for-aireons-free-tracking-service/>.

link the crew can use from inside the room to communicate with rescuing forces.³⁶ Iridium's distribution partners have developed several product solutions using the company's network to meet these requirements for merchant and fishing vessels.³⁷

The Global Maritime Distress and Safety System ("GMDSS") is a maritime service built to alert a maritime rescue coordination center of each vessel's situation and position, information that can then be used to coordinate search and rescue efforts among ships in the area. The IMO requires all vessels flagged by signatories to the International Convention for the Safety of Life at Sea ("SOLAS") over 300 gross tons and certain passenger vessels, irrespective of size, that travel in international waters to carry distress and safety terminals that use GMDSS applications. Iridium was recognized by the IMO as a GMDSS provider in May 2018.³⁸ By 2020, Iridium plans to provide truly global voice and data GMDSS communications to ship operators worldwide, including in the polar regions.³⁹ Iridium will be the only satellite company that can provide GMDSS in the polar regions, and will introduce important competition for GMDSS into what is currently a monopoly market.

III. The FCC Must Maintain a Regulatory Environment That Allows for Continued U.S. Satellite Leadership

Iridium and other satellite providers offer unique services within the communications marketplace. America's continued satellite leadership depends predominantly on three factors:

³⁶ Iridium Communications, Inc., SEC Form 10-K for the Year Ended December 31, 2017, at 11 (Feb. 22, 2018).

³⁷ *See generally Maritime Solution: Keeping Ships Connected, Efficient and Safe at Sea – Anywhere*, IRIDIUM, <https://www.iridium.com/solutions/maritime/> (last visited Sept. 3, 2018).

³⁸ *Iridium® for GMDSS: New Choice is Coming For Global Maritime Safety*, IRIDIUM, <https://www.-iridium.com/services/gmdss/> (last visited Sept. 3, 2018).

³⁹ *Id.* ("Expected to launch in early 2020, Iridium will deliver a new GMDSS solution offering simple, reliable, and truly global voice and data GMDSS communications in a single, small-form-factor maritime mobile terminal – at a fraction of the price of competing solutions.").

(1) a stable spectrum foundation for the satellite industry both domestically and internationally; and (2) consistent protection from harmful interference.

Predictability in spectrum allocations in the United States and internationally. Satellite networks take years and significant sums of money to develop and launch. When the Iridium NEXT constellation is complete, Iridium will have invested years and nearly \$3 billion in its development. Satellite operators spend years and significant amounts of money to design new networks, both NGSO and GSO. To invest such large sums of time and money in satellite operations, operators must be presented with a stable and predictable spectrum operating environment. As satellite operators construct and launch their satellites, they need to be certain that once satellites are operational the rules of the road will not materially change.

Spectrum allocations must be stable internationally as well as in the United States. International consistency on allocations and interference protection provides Iridium with necessary regulatory certainty that allows the satellite industry to thrive. It is essential that the U.S. government work with satellite operators before the ITU and other multilateral organizations to defend domestic allocations and interference protections so satellite operators may continue to provide innovative services to the United States and around the world.

Protection from harmful interference from adjacent-band operations. The nature of satellite services requires robust protection from harmful interference in order to thrive. This must be true at the inception of the business (or else it will never launch) and throughout the satellite's useful life (or the investment, customers and spectrum resources will be stranded). The L-band is no different. Along with Iridium, the L-band⁴⁰ is also home to other significant

⁴⁰ Iridium operates in the 1618.725-1626.5 MHz on an exclusive basis and in the 1617.775-1618.725 MHz band on a shared basis with Globalstar.

operators in satellite industry, including the GPS industry and users of NOAA GOES satellites, among others.⁴¹ In order for Iridium and its L-Band satellite neighbors to continue to flourish, the Commission must ensure that harmful interference from adjacent band operations is consistently and perpetually prevented, regardless of its source.

IV. In Addition to Facilitating Market Entry for New Providers, the Commission Must Provide Necessary Protections to Enable Expanded Service Offerings for Existing Satellite Company Investments

As Congress has dictated, while the Commission prepares to “assess the state of competition in the communications marketplace, including competition to deliver voice, video, audio, and data services,”⁴² the agency must also assess in part how and if specific laws, regulations, and regulatory practices pose a barrier to “the competitive expansion of existing providers of communications services.”⁴³ Highlighted below are two specific ongoing regulatory issues that pose potential barriers to the competitive expansion of satellite services: Ligado’s pending license modification request and the threat of orbital debris.

Protection from Ligado’s proposed adjacent band operations. Iridium satellite service has been provided in the L-band since 1999 alongside other satellite operators that operate in nearby spectrum. Iridium and other satellite operators in the L-Band⁴⁴ have depended on the knowledge that their neighbors would operate satellite systems at permitted power levels and with operational characteristics that will ensure their coexistence. The Commission should reject proposals that are inconsistent with these requirements. One such example is Ligado’s proposal

⁴¹ Letter from Satellite, Aviation, and Weather Data Industry Leaders to the Honorable Wilbur Ross, Secretary, U.S. Dep’t of Commerce *et al.*, at 4-6 (Sept. 4, 2018) (“Ross Letter”), <https://gama.aero/wp-content/uploads/Space-Policy-Directive-Letter-September-2018.pdf>.

⁴² *Id.* at 1 (quoting 47 U.S.C. § 163(b)(1)).

⁴³ *See* 47 U.S.C. § 163(b)(3).

⁴⁴ L-band operators include GPS, NOAA satellite services and other satellite communications operations.

to convert 40 MHz of prime satellite spectrum to a mobile broadband terrestrial service in the middle of the L-Band satellite spectrum neighborhood.⁴⁵ In 2003, the Commission adopted technical rules to allow Mobile Satellite Service (“MSS”) providers to offer an integrated MSS and ancillary terrestrial component (“ATC”) to prevent the ATC from causing harmful interference to adjacent and in-band operations. In the event that harmful interference still resulted from ATC operations, the Commission requires the ATC operator to “resolve such interference”⁴⁶ and explained that the rule “imposes an absolute obligation on the MSS/ATC operator to resolve any harmful interference to other services.”⁴⁷ Granting Ligado’s request would upend forty years of a predictable spectrum environment for satellite providers in the L-band. Allowing a nationwide mobile broadband service to operate directly adjacent to satellite services will cause harmful interference to Iridium and the government and commercial entities that rely on Iridium and other L-band satellite operations.⁴⁸ This is precisely the type of activity that must be avoided to allow existing satellite operators to continue to operate and innovate without the threat of harmful interference.

Orbital Debris. The launch of new satellite constellations offers great promise for consumers and American space leadership – but they also create potential space traffic management challenges. Government and industry must work together and address issues

⁴⁵ See Ligado Networks LLC, Amendment to License Modification Applications, IBFS File Nos. SES-AMD-20180531-00856, SAT-AMD-20180531-00044, SAT-AMD-20180531-00045, SES-MOD-20151231-00981, SAT-MOD-20151231-00090, and SAT-MOD-20151231-00091, IB Docket No. 11-109 (filed May 31, 2018).

⁴⁶ 47 C.F.R. § 25.255.

⁴⁷ *Spectrum & Service Rules for Ancillary Terrestrial Components in the 1.6/2.4 GHz Big LEO Bands; Globalstar Licensee LLC, Auth. to Implement an Ancillary Terrestrial Component*, Report & Order and Order Proposing Modification, 23 FCC Rcd 7210, 7223 ¶ 35 (2008).

⁴⁸ See, e.g., Ross Letter (in part explaining the economic harms spectrum uncertainty flowing from Ligado’s proposal would impose).

related to orbital debris mitigation and space traffic management issues. The U.S. government has taken the important step of releasing Space Policy Directive-3 which seeks to “develop a new approach to space traffic management that addresses current and future operational risks.”⁴⁹ Iridium agrees that regulations and best practices must be developed in order to keep space open to existing and new satellite operations while avoiding the creation of debris. These requirements should not be seen as barriers to entry. Rather, they should be seen as necessary to ensure continued growth. Specific issues in need of resolution include:

- *Pre-launch risk assessment.* As new satellite operators design satellites that may not be as rigorously tested as those launched by Iridium or other incumbent satellite operators, precautions need to be taken in order to avoid failures in orbit that will threaten other operating satellites. These operators should be required to provide sufficient technical and design information with their applications for the Commission and satellite operators to determine that these designs will not fail and become a source of debris after they are launched.
- *Collision avoidance maneuvers.* Operators should be required to have the ability to perform collision avoidance maneuvers in order to respond to conjunction notifications and avoid collision. In addition, operators should be required to retain control of the satellite to perform avoidance maneuvers even after the satellite has reached the end of its useful life and as it goes through the process of deorbiting.
- *On-orbit collision avoidance support services.* The FCC’s rules should be revised to include a reporting requirement for satellite operators to immediately notify the FCC of a satellite anomaly or failure that poses a sufficient threat to the useful life of the satellite so that it may fail and become a source of debris. These operators could also be subject to an enforcement mechanism which would require a NGSO operator to address any unforeseen orbital debris issues prior to launching any remaining satellites to complete or replenish a constellation.
- *Access to reliable information on space debris from government sources.* Access to no-cost government-supported basic space situational awareness data and basic space traffic management services is important.
- *End-of-life.* Satellite operators should be required to follow best practices to prevent the creation of orbital debris when a satellite has reached the end of its useful

⁴⁹ Space Policy Directive-3, National Space Traffic Management Policy, at Section 1 (June 18, 2018) (“SPD-3”), <https://www.whitehouse.gov/presidential-actions/space-policy-directive-3-national-space-traffic-management-policy>.

operational life. Satellites should be decommissioned and stored in a far-away graveyard orbit or be capable of having their orbits lowered so they re-enter the earth's atmosphere. Satellites that are re-entering the earth's atmosphere upon the end of their life should be designed to not survive re-entry to limit risk to reduce casualty risk when re-entering the earth's atmosphere. All satellites should be designed so no fuel will remain when the satellite is deorbited.

V. Conclusion

Iridium appreciates this opportunity to inform the Commission of the wide range of competitive consumer- and government-oriented products the company provides, as the agency prepares its Communications Marketplace Report, including its assessment of potential barriers to competitive expansion in the satellite communications marketplace.

Respectfully submitted,

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