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

In the Matter of	)	
	)	
Iridium Constellation LLC	)	File No. SAT-MOD-_____
	)	
Application for Modification of Non-Geostationary Mobile Satellite Service System Authorization (S2110) To Launch and Operate Replacement Satellites	)	Call Sign S2110

APPLICATION FOR MODIFICATION OF NGSO AUTHORIZATION TO LAUNCH AND OPERATE REPLACEMENT SATELLITES

Iridium Constellation LLC ("Iridium"), pursuant to Sections 25.117 and 25.143 of the rules of the Federal Communications Commission ("Commission" or "FCC"),[1] files this application to modify its space station authorization for its Non-Geostationary Satellite Orbit ("NGSO") Mobile Satellite Service ("MSS") constellation (call sign S2110) to include the Iridium NEXT second generation satellites. As demonstrated herein and in the attached exhibits, Iridium is legally and technically qualified to hold the requested modified authorization. Moreover, grant of this modification application for the launch and operation of the second generation Iridium NEXT satellite system will serve the public interest. Commission grant will protect continuity of service and promote expanded service offerings and improved broadband capacity for critical public safety and national security communications infrastructure. It will also promote investment in global MSS. The Commission has long recognized the unique capacity for MSS systems to offer services that cannot be matched by other terrestrial and

[1] 47 C.F.R. §§ 25.117 and 25.143; *see also* 47 U.S.C. §§ 308 and 309.

satellite systems.[2] The Iridium NEXT constellation will enhance these vital services for a continuously growing MSS customer base in a range of sectors spanning maritime, aviation, machine-to-machine and land/mobile communications.

I. REQUEST FOR MODIFICATION OF AUTHORIZATION FOR THE IRIDIUM NEXT SATELLITE SYSTEM

On January 1, 1995, the FCC authorized Iridium's predecessor in interest to launch and operate a NGSO satellite constellation in the Big LEO band.[3] The Iridium constellation commenced operations on November 1, 1998.[4] Iridium timely filed an application for renewal of its license for an additional fifteen-year term through November 1, 2028.[5] In that renewal application, Iridium announced its plan to replenish and to enhance its existing satellite constellation with a next-generation system.[6] It also indicated that when Iridium and Thales Alenia Space (the manufacturer of the Iridium NEXT satellites) finalized the technical details of

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2 *Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L band*, Notice of Proposed Rulemaking, 11 FCC Rcd 11675, ¶ 12 (1996).

3 *See Application of Motorola Satellite Communications, Inc. for Authority to Construct, Launch and Operate a Low Earth Orbit Satellite System in the 1616-1626.5 MHz Band*, File No. SAT-L/A-19941115-00068 (granted Jan. 31, 1995); *Application of Iridium Constellation LLC For Minor Modification of Mobile Satellite Service Authorization to Update Orbital Debris Mitigation Requirements*, File No. SAT-MOD- 20080701-00140 (filed Jul. 1, 2008).

4 Press Release, Iridium Constellation LLC, *The World's First Global Satellite Telephone and Paging Company Starts Service Today* (Nov. 1, 1998).

5 *See Application of Iridium Constellation LLC for Renewal of NGSO Space Station License*, File No. SAT-MOD-20101001-00207 (filed Oct. 1, 2010) ("2010 License Renewal Application"). The Commission requires that NGSO licensees apply for authority to launch replacement satellites no earlier than 90 days and no later than 30 days prior to the end of the twelfth year of the existing license term. 47 C.F.R. § 25.121(e).

6 2010 License Renewal Application.

the design of the next-generation satellite system, Iridium would request modification of its space station authorization to accommodate the next-generation design.[7]

This modification application requests authority to replace the current ("Block 1") Iridium satellite system with the Iridium NEXT satellite system using the same frequencies. The Iridium NEXT satellite system has the capability to operate in 1616-1626.5 MHz frequency bands. Iridium seeks authority to operate these Iridium NEXT satellites in the 1617.775–1626.5 MHz frequencies currently assigned to Iridium's NGSO satellite operations.[8] The Iridium NEXT satellites have feeder links in the 29.1-29.3 GHz and 19.4-19.6 GHz bands and inter-satellite cross links on 22.18-22.38 GHz. Additionally, the Iridium NEXT satellite system has a hosted payload for its Aireon LLC joint venture that receives information on 1090 MHz. This application is not seeking FCC authority to receive these ADS-B signals.[9]

Iridium will continue to operate its existing in-orbit Block 1 satellites until they are decommissioned at end of life. As the satellites in the current 66 satellite constellation are decommissioned, Iridium will replace them with the second generation Iridium NEXT

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7 *Id.*

8 *See In re Globalstar LLC, GUSA Licensee LLC (Call Signs S2115 and E970381) and Iridium Constellation LLC Iridium Satellite LLC Iridium Carrier Services LLC (Call Signs S2110, E960132, E960622) Modification of Authority to Operate a Mobile Satellite System in the 1.6 GHz Band*, Modification Order, 23 FCC Rcd 15207, 15222 (2008). Iridium has a pending Petition for Declaratory Rulemaking requesting expansion of the operating frequency range of its Mobile Satellite Service (MSS) service links to 1616-1626.5 MHz. *See Iridium Constellation LLC Petition for Rulemaking to Promote Expanded Mobile Satellite Service in the Big LEO MSS Bands, RM 11697* (filed Feb. 11, 2013). Until such time as the Commission reaches a decision on this Petition for Rulemaking, Iridium requests the authority for the Iridium NEXT satellite system service links to operate in the 1617.775–1626.5 MHz frequency band, as currently authorized.

9 The Aireon space based ADS-B receiver currently is planned to be authorized by another administration.

satellites.[10] During the entire transition period for the replacement of the Iridium Block 1 satellites with Iridium NEXT satellites, the Iridium satellite system will remain fully operational.

II. IRIDIUM IS LEGALLY QUALIFIED.

Iridium is legally qualified to hold the requested modified Big LEO space station authorization. The information provided in the attached FCC Form 312 and exhibits demonstrates Iridium's compliance with the Commission's basic legal qualifications. In addition, Iridium already holds Commission licenses, and its qualification to hold satellite authorizations is a matter of record confirmed by the Commission in 2009.[11]

III. IRIDIUM IS TECHNICALLY QUALIFIED.

Iridium is technically qualified to hold the requested modified Big LEO space station authorization. The technical information requested in Sections 25.114 and 25.143 of the Commission's rules is provided in the attached FCC Form 312, Schedule S and in narrative form in the attached Engineering Statement.[12] The orbital debris mitigation information for the Iridium NEXT satellites requested by Section 25.114(d)(14) is provided in Exhibit C.

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[10] Iridium has a pending modification application seeking approval for a modified end of life disposal plan for the existing Block1 satellites. *Application of Iridium Constellation LLC for Minor Modification of Mobile Satellite Service Authorization to Update Orbital Debris Mitigation Requirements*, File No. SAT-MOD-20080701-00140 (filed Jul. 1, 2008).

[11] *See Iridium Holdings LLC and Iridium Carrier Holdings LLC, Transferors and GHL Acquisition Corp., Transferee, Applications for Consent to Transfer Control of Iridium Carrier Services LLC, Iridium Satellite LLC, and Iridium Constellation LLC*, Memorandum Opinion and Order and Declaratory Ruling, 24 FCC Rcd 10725, 10733, ¶18 (2009) ("In the 2002 Iridium Order, we concluded that Iridium Constellation, Iridium Satellite and Iridium Carrier Services, the assignees in that transaction, are qualified to hold their respective licenses and authorizations and nothing in the current record would lead us to conclude otherwise.").

[12] 47 C.F.R. § 25.114. Iridium completed Schedule S to the fullest extent possible recognizing that its Iridium NEXT satellite system will use on board processing and will not have transponders *per se*.

As demonstrated in the attached Engineering Statement and FCC Form 312, Schedule S, Iridium NEXT is technically consistent with the existing Iridium constellation. The Commission has recognized that replacement satellites need not be technically identical to those originally authorized. Recognizing that replacement satellites often incorporate technical advancements, the Commission examines whether the operations of the replacement satellite are consistent with international coordination obligations and International Telecommunication Union ("ITU") regulations.[13] The Commission has stated that granting replacement applications ensures that service will be provided to consumers as efficiently as possible because the current licensee will be familiar with the service requirements and, given its experience, should be able to deploy a replacement satellite in the shortest possible time.[14] The Iridium NEXT satellites satisfy the Commission's policy authorizing the launch and operation of replacement satellites.[15]

The Iridium NEXT satellite system complies with the replacement satellite requirements in Section 25.165(e). Iridium NEXT uses the same orbital parameters to provide the same orbital coverage using the same frequency bands as the Iridium Block 1 satellite constellation. The Iridium NEXT constellation schedule is to place the Iridium NEXT satellites into the current

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[13] *See In re Amendment of the Commission's Space Station Licensing Rules and Policies; Mitigation of Orbital Debris*, First Report and Order and Further Notice of Proposed Rulemaking, 18 FCC Rcd 10760, ¶ 257 (2003) ("We do not require replacement satellites to be technically *identical* to the existing satellite.") (emphasis in original).

[14] *See Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands*, 18 FCC Rcd 1962, ¶ 83 (2003) ("Repairing or even replacing a malfunctioning satellite, for all its complexity, requires less time than designing and constructing a new system. Even in the worst case where a satellite is destroyed, a licensee can ordinarily replace a lost satellite with a ground spare at the next available launch window, or procure a technically identical satellite in an expedient manner since it would have already completed the complex design process.").

[15] *See Application of Iridium Constellation LLC for Renewal of License*, File No. SAT-MOD-20101001-00207 (filed Oct. 1, 2010).

Iridium constellation in order to provide a seamless transition to the Iridium NEXT satellite network from the Iridium Block 1 satellite network. Therefore Iridium is not required to post a bond pursuant to Section 25.165 for the Iridium NEXT second generation satellite system.

IV. GRANT OF THIS MODIFICATION APPLICATION FOR THE SECOND GENERATION IRIDIUM NEXT SATELLITE SYSTEM WILL SERVE THE PUBLIC INTEREST.

Grant of this modification application for the launch and operation of the second generation Iridium NEXT satellite system will serve the public interest by allowing Iridium to continue to provide vital MSS to its extensive, and rapidly growing, global customer base, and to introduce advanced new services. Iridium, a U.S.-based and U.S.-licensed company, is the only MSS provider with full global satellite coverage—achieved through its constellation of 66 low-Earth orbiting ("LEO"), cross-linked satellites operating as a fully meshed network and supported by multiple in-orbit spares. Iridium's highly efficient MSS operations provide important public interest benefits that are not achievable with any other form of communications, particularly for first responders and the U.S. government during times of emergency. With Iridium NEXT, Iridium will sustain and build upon its core services, adding new, advanced functionality that will bring the benefits of its highly reliable, ubiquitous satellite services to new industries and markets.

Iridium satellites provide a range of services throughout the United States and the world, particularly in regions that are not reached by other terrestrial or satellite services. The Commission previously has recognized the unique ability for Big LEO MSS operators to "serve areas of the country that are too remote or sparsely populated to be served by terrestrial mobile systems" and "generate a host of new services by providing communication between virtually

any point in the country, irrespective of distance."[16] The Commission also has acknowledged that Big LEO Services "meet rural, public safety needs and provide emergency communications to any area in times of emergencies and natural disasters" and "would be uniquely suited for meeting the needs of transportation, petroleum and other vital services"[17] Iridium's services are integral to the realization of the Commission's vision that the Big LEO MSS sector would enhance the availability of commercial and public safety services worldwide.[18]

The Iridium satellite network supports a variety of affordable, reliable MSS communications solutions, including one-way and two-way portable, mobile and fixed voice and data communications services, satellite data modem, asset tracking, simplex messaging, and remote monitoring services. A key characteristic of Iridium's system, which is unique among Big LEO MSS providers, is that it can provide all of its core functionality without local or regional ground infrastructure. It is this feature, combined with Iridium's extensive constellation, which allows Iridium's MSS to be always available, on demand, anywhere on Earth. In many geographic areas, Iridium's service is the only connectivity available for mission-critical applications; as such, Iridium's communications solutions have become an integral part of the communications and business infrastructure of many of its end users.

In addition to its core voice and data services, Iridium's maritime, aviation, government, and enterprise customers rely on a wide variety of customized applications and devices. For example, Iridium recently received authority from the Commission to provide Aeronautical

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16 *Establishing Rules and Policies for the Use of Spectrum for Mobile Satellite Service in the Upper and Lower L band*, Notice of Proposed Rulemaking, 11 FCC Rcd 11675, ¶ 12 (1996).

17 *Id*.

18 *See In re Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to a Mobile Satellite Service in the 1610-1626.5MHz /2483.5-2500 MHz Frequency Bands*, Report and Order, 9 FCC Rcd 5936, ¶ 3 (1994) ("Big LEO R&O").

Mobile-Satellite (Route) Service ("AMS(R)S"), an aviation safety communication service connecting planes in-flight to each other and to ground stations,[19] and Iridium's services have been approved by the Federal Aviation Administration for use in over-ocean air traffic control data link communications. Moreover, Iridium worked closely with the U.S. Department of Defense to develop Netted Iridium® a satellite-based push-to-talk ("PTT") voice solution to enhance in-theater communications and is currently adapting this technology for commercial use. Iridium's PTT service is secure, offers extensive group management functionality, and has demonstrated the ability to interoperate conventional land mobile radio ("LMR") PTT over Iridium's satellite system.

More than any other provider, Iridium has experience providing mission-critical satellite communications to public safety and government users. Due to its excellent reliability, Iridium's network has played a key role in recovery and response efforts in nearly every major natural or manmade disaster in recent history, including Hurricane Katrina, the 2010 oil spill in the Gulf of Mexico, "Superstorm" Sandy, the earthquakes in Haiti, Chile, and Japan, and the typhoon in the Philippines. In each of these events, demand for Iridium communications significantly spiked in response to the need for reliable communications during times where terrestrial systems were compromised. In the example of the regional humanitarian support in the Philippines, the Iridium system usage increased greater than 150 times average usage immediately after the typhoon as first responders and aid agencies rushed in to support recovery efforts.

Additionally because of its communication capability from anywhere on the planet, Iridium's system has become vital to the day-to-day operations of the U.S. Department of Defense and many other federal bureaus, agencies, and departments, including the U.S. Drug

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[19] *Iridium Constellation LLC*, Memorandum Opinion and Order, 28 FCC Rcd 964 (2013).

Enforcement Administration and U.S. Border Patrol. Furthermore, the First Responder Network Authority ("FirstNet") has recognized as part of its proposed network architecture for the FirstNet Nationwide Network ("FNN") that it should leverage the reliability, redundancy, and ubiquity of MSS to ensure maximum network resiliency during times of emergency.[20]

Iridium's success in the MSS sector has led to steadily increasing demands on its system, and this trend is expected to accelerate with the launch of Iridium NEXT. Since initiating service in 1998, Iridium has emerged as a leader in the field of MSS operations, and remains the only MSS system to provide truly global satellite coverage, including in remote locations such as the polar and oceanic regions. Today, Iridium is one of the largest providers of voice and data mobile satellite service, and ended 2012 with 611,000 total billable subscribers.[21] The growth of Iridium subscribers since the inception of its service demonstrates that the marketplace highly values Iridium's MSS offerings.

This historic growth is expected to accelerate with the deployment of Iridium NEXT. The Iridium NEXT satellite constellation will continue to provide the services offered by the first generation satellites but with increased total and peak network performance enabling enhanced voice quality and substantially improved data transmission speeds. Peak data rates under Iridium NEXT will provide end users with data speeds of 1.5 Mbps downlink and 512 Kbps in the uplink direction, offering a true broadband experience with the unparalleled availability of a global satellite system. Iridium NEXT will be backward compatible with Iridium's current generation

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[20] *See* F. Craig Farrill, First Responders Network Authority Presentation to the Board (Sept. 25, 2012), *available at* http://www.ntia.doc.gov/files/ntia/publications/firstnet_fnn_presentation_09-25- 2012_final.pdf.

[21] Iridium Communications, Inc., Annual Report (Form 10-K) (2012) at 2. ("Iridium 10-K).

services and devices used throughout the world, while also enabling continued innovation and introduction of new services.

To ensure that the public receives the full benefits of a robust, reliable, and problem-free launch, deployment and operation, Iridium has made and continues to make significant investments in building the NEXT satellite system. As of December 31, 2012, Iridium invested $682.9 million in payments to Thales to build the NEXT constellation. It expects to invest approximately $2.2 billion total with Thales Alenia Space of France and Italy to complete the building of the NEXT satellites and the necessary spare satellites.[22] The majority of the Iridium NEXT satellites will be launched by the Space Exploration Technologies Corporation ("SpaceX") of Hawthorne, California. Iridium plans to purchase seven Space X Falcon 9 launches, each of which will carry 10 Iridium NEXT satellites at a cost of $453.1 Million.[23] As of December 31, 2012, Iridium has paid $65.1 million to SpaceX. [24] The launches are scheduled for 2015, 2016 and 2017.[25] To reduce launch schedule risks, Iridium determined that the Kosmotras-marketed Dnepr rocket will provide supplemental launch services for Iridium NEXT. The Dnepr rocket will launch two Iridium NEXT satellites at a time. Iridium agreed to pay $51.8 million for that single launch of two spacecraft and has an option to purchase six Dnepr vehicles to put a total of 12 Iridium spacecraft into orbit, with a further option for six more launches.[26] As of December 31, 2012, Iridium paid $11.2 million to Kosmotras.[27]

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22 Iridium 10-K at 17.

23 *Id.*

24 *Id.*

25 *Id.* at 16.

26 *Id*. at 17.

As demonstrated above, Iridium has a proven record of providing innovative and reliable MSS to serve the mission-critical communications needs of first responders, U.S. Government, diverse commercial users, and the public. Iridium's history of growth is expected to continue and accelerate with the deployment of Iridium NEXT, and Iridium has undergone careful planning and substantial investment to ensure the success of the project. For the foregoing reasons, grant of this application will serve the public interest by allowing Iridium to continue to provide its critical services to a growing customer base.

V. REQUEST FOR TECHNICAL WAIVERS

Under Section 1.3 of the Commission's rules, the Commission has authority to waive its rules "for good cause shown."[28] Good cause exists if "special circumstances warrant a deviation from the general rule and such deviation will serve the public interest" better than adherence to the general rule.[29] In determining whether waiver is appropriate, the Commission should "take into account considerations of hardship, equity, or more effective implementation of overall policy."[30] As shown below, there is good cause for each of the requested technical waivers.

1. Request for Waiver of Section 25.114(c)(4)(vi) and (vii)

To the extent necessary, Iridium hereby requests a waiver of Sections 25.114(c)(4)(vi) and (vii). Section 25.114(c)(4)(vi) requires applicants to submit information addressing the gain of each transponder channel including any adjustable gain step capabilities.[31] Section

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27 *Id*.

28 47 C.F.R. § 1.3.

29 *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

30 *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

31 47 C.F.R. § 25.114(c)(4)(vi).

25.114(c)(4)(vii) requires applicants to submit information regarding predicted receiver and transmitter channel filter response characteristics.[32] The Iridium NEXT satellite system does not have any adjustable gain steps for its receivers since the satellites employ on-board processors. There are also no transponder gains since the satellites employ regenerative payloads and do not have transponders. Such information is not applicable to regenerative payloads. Similarly, predicted receiver and transmitter channel filter response characteristics information is not applicable to the regenerative payloads that are used on Iridium NEXT satellites. Grant of the requested waiver in these circumstances would be consistent with Commission precedent.[33]

2. Request for Waiver of Section 25.210(i)(1)

Iridium requests waiver of Section 25.210(i)(1) of the Commission's rules, which requires that satellite antennas in the Fixed Satellite Service be designed to provide a cross-polarization isolation such that the ratio of the on-axis co-polar gain to the on-axis cross-polar gain of the antenna in the assigned frequency band will be at least 30 dB within its primary coverage area.[34] As explained more fully in the attached Engineering Statement, the 30 dB requirement is not met with regard to the Ka-band feeder link beams for the Iridium NEXT system, which have a cross-polarization isolation of 19 dB, or the telemetry and telecommand beams, which have a cross-polarization isolation of 15 dB.

Good cause exists to waive the cross-polarization isolation requirement of Section 25.210(i)(1) because a failure to meet the requirement does not adversely affect any other operator. The cross-polarization isolation for the Iridium NEXT Ka-band feeder beams is the

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[32] 47 C.F.R. § 25.114(c)(4)(vii).

[33] *Application for Authority to Launch and Operate of ViaSat, Inc.*, File No. SAT-LOA-20070314-00051 (filed Mar. 14, 2007; stamp grant Jul. 18 2007).

[34] 47 C.F.R. § 25.210(i)(1).

same cross-polarization isolation that is used for the currently operating Iridium Block 1 satellites. Like the Iridium Block 1 satellites, the Ka-band feeder link beams for the Iridium NEXT system operate with a single circular polarization in each direction. There is no feeder link frequency reuse through the use of orthogonal polarizations in the Iridium Block 1 or NEXT systems. The Iridium NEXT system uses one polarization in the feeder uplink and downlink.

The Iridium NEXT system does not use the cross-polarization for the feeder links or the telemetry, tracking and control ("TT&C") links and therefore there is no need to have 30 dB of isolation. The TT&C links use omni directional antennas and the earth is seen with a wide view angle from the Iridium orbit (+/- 62.7°) making control of the cross-polarization over this solid angle very difficult. The feeder links use two spatially independent beams to accomplish full frequency reuse in accordance with Section 25. 210(d) and (f) and therefore there is no need to use the cross-polarization for these links.

No self-interference has occurred with Iridium Block 1 nor will occur in Iridium NEXT because of the cross-polarization. Cross-polarization interference from the Iridium NEXT feeder links to other satellite networks is addressed in the normal course of satellite coordination. Grant of the requested waiver in this case would be consistent with prior Commission orders granting waivers of Section 25.210(i)(1).[35]

3. Request for Waiver of Sections 25.114(d)(14)(ii) and 25.283(c)

To the extent necessary, Iridium requests a waiver of Sections 25.114(d)(14)(ii) and/or 25.283(c) to maintain a small residual pressure of gaseous nitrogen and residual fuel at end of

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[35] *See, e.g., Application for Authority to Launch and Operate a Replacement Satellite of Intelsat License LLC,* File No. SAT-RPL-20120326-00061 (filed Mar. 26, 2012, stamp grant July 12, 2012); *Application for Authority to Launch and Operate of DIRECTV Enterprises, LLC,* File Nos. SAT-LOA-20090807-00086 and SAT-LOA-20090807-00085 (filed Aug. 7, 2009; stamp grant Dec. 15, 2009).

life of the Iridium NEXT satellites. Section 25.114(d)(14)(ii) requires a demonstration that stored energy will be removed at the spacecraft's end of life, by depleting residual fuel and leaving all fuel line valves open and venting any pressurized system.[36] Section 25.283(c) requires that all stored energy be discharged at the end of life of the spacecraft.[37]

A detailed description of the Iridium NEXT post mission disposal plan is provided in Exhibit C. As explained in Exhibit C, at the end of operational life, the satellite is commanded into a deorbit maneuver that is referred to as a "depletion burn," in that the intent is to exhaust all available fuel during the maneuver. At the completion of this maneuver, 1.5 kg of inert nitrogen pressurant will remain on the "dry" side of the bladder in the tank, at a residual pressure of approximately 6 bar. Also 1.6 kg of fuel will remain in the propellant lines of the system in vapor form.

Good cause exists to grant the waiver requested because the residual pressurant and fuel will not compromise safe disposal of the spacecraft.[38] The pressurant presents no hazard of escaping or causing later rupture, as it is already at an equilibrium pressure with the vacuum of space. In the unlikely event of a small particle (debris or meteor) puncturing the tank, the residual gaseous nitrogen would be released in a rapid manner, similar to a cold gas thruster. Moreover even in the extraordinarily unlikely event of a particle puncturing both the fuel portion of the tank and the bladder, the result would have no noticeable effect on the orbit of the satellite, or alter the possibility of space vehicle breakup in any fashion. Under such conditions, granting the requested waiver will not undermine the purpose of the rule.

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[36] 47 C.F.R. § 25.114(d)(14)(ii).

[37] 47 C.F.R. § 25.283(c).

[38] *See* Satellite Industry Association, Request for Blanket Waiver of Section 25.283(c) of the Commission's Rules, IB Docket No. 02-54, at 6 (filed Oct. 1, 2010).

Moreover, the presence of residual pressurant and fuel at the end of life of the Iridium spacecraft is consistent with the industry standard for NGSO satellites. Specifically, both Globalstar and Ob3 recently filed applications that requested waivers of Section 25.283(c) due to residual fuel or pressurant.[39] In those cases, the FCC granted the applications but took no action with regard to the request for waiver of Section 25.283(c), instead finding that these operators were subject to direct and effective regulatory oversight from non-U.S. administrations.[40] It would be inequitable for FCC to hold a U.S. licensee to a more stringent standard than non-U.S. licensees serving the U.S. market.

4. Request for Waiver of Section 25.202(g)

As required by Section 25.202(g) of the Commission's rules, and as explained in the Engineering Statement, the Iridium NEXT satellites have band-edge TT&C functions.[41] Specifically, Iridium NEXT will have telecommand carrier frequencies at 29102 MHz and 29298 MHz and the 13 telemetry carrier center frequencies are within 19402.2 to 19406.2 MHz. These TT&C operations are for communication with individual satellites that are within view of the Teleport network. TT&C functions will also be accomplished using the normal feeder link

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39 GLOBALSTAR LICENSEE LLC, GUSA LICENSEE LLC, AND GCL LICENSEE LLCA, Amendment to Application for Modification of Mobile Satellite Service Earth Station and Mobile Earth Terminal Licenses, File No. SES-AMD-20101012-01278 at 2-4 (filed Oct. 12, 2010); O3b Limited Application to Operate a Gateway Earth Station with a Non-U.S. Licensed Non-Geostationary Orbit Ka-band Space Station System, File No. SES-LIC-20100723-00952, Application Narrative at 24, (filed July 23, 2010).

40 *Globalstar Licensee LLC Application for Modification of Non-geostationary Mobile Satellite Service Space Station License*, Order, 26 FCC Rcd 3948, 3961-62 (2011); O3b Limited Application to Operate a Gateway Earth Station with a Non-U.S. Licensed Non-Geostationary Orbit Ka-band Space Station System, File No. SES-LIC-20100723-00952 (granted Sept. 25, 2012).

41 47 C.F.R. § 25.202(g).

communication channels of the Iridium NEXT constellation during normal operations from 19.4-19.6 MHz and 29.1-29.3 MHz.

To the extent necessary, Iridium requests a waiver of Section 25.202(g) for its TT&C operations, which are digitally multiplexed into the feeder link data stream and can be used on any Ka-band carrier. This approach is fundamental to Iridium's management of its constellation as a network and has always been a feature of the Iridium system. By embedding telecommand and telemetry data into feeder link data streams and using its intersatellite links to transport the data, Iridium is able to maintain connectivity in real time with every satellite in its constellation.

Grant of the requested waiver promotes customer continuity of service and avoids unnecessary and costly earth station changes. Iridium's existing constellation uses its feeder link spectrum for TT&C operations.[42] Iridium's continued ability to perform TT&C in the same manner as its existing system will reduce any inefficiencies related to transition to the new system. In particular, Iridium can avoid unnecessary costs that would result from modifying earth stations that currently perform TT&C functions with the Iridium satellites. Moreover, Iridium's existing use of feeder link spectrum for TT&C has not caused harmful interference to other operators in the band, and its continued use of the spectrum for the same purpose will not cause any greater risk of interference in the future.

VI. IRIDIUM AGREES TO PAY ITU COST-RECOVERY FEES

Iridium is aware that processing fees are currently charged by the ITU for satellite filings, and that Commission applicants are responsible for any and all fees charged by the ITU.[43]

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42 *See* File No. SAT-L/A-19941115-00068 at Table R-1 (filed Nov. 14, 1995).

43 *See Implementation of ITU Cost Recovery Charges for Satellite Network Filings*, DA 01-2435 (Oct. 19, 2001) (Public Notice).

Iridium acknowledges and unconditionally accepts this requirement and responsibility to pay any ITU cost recovery fees associated with any ITU filings that the Commission makes on behalf of Iridium. Iridium is submitting separately: 1) an ITU request for coordination that adds information to the HIBLEO-2 filing; and 2) a new Advance Publication for TT&C operation and a Coordination Request for the HIBLEO-2FL2 filing. Iridium requests that these ITU filings be submitted to the ITU Radiocommunication Bureau.

VII. CONCLUSION

For the foregoing reasons, Iridium hereby respectfully requests that the Commission grant this modification application for the Iridium NEXT satellite system.

Respectfully submitted,

IRIDIUM CONSTELLATION LLC

By: */s/ Donna Bethea Murphy*

Donna Bethea Murphy
Vice President, Regulatory Engineering
Iridium Satellite LLC
1750 Tysons Boulevard, Suite 1400
McLean, VA 22102

R. Michael Senkowski
Jennifer D. Hindin
Helen Eisner
Wiley Rein LLP
1776 K Street, NW
Washington DC 20006
Dated: December 27, 2013

Exhibit E
FCC Form 312, Response to Question 34: Foreign Ownership

Iridium Constellation LLC holds a non-common carrier "Big LEO" NGSO space station constellation license. Accordingly, this modification application is not subject to the foreign ownership limitations set forth in Section 310(b) of the Communications Act.

The Commission has approved the foreign ownership of Iridium Holdings LLC (the indirect parent company of both Iridium Constellation LLC and Iridium Carrier Services LLC, which holds a common carrier earth station license) in excess of twenty-five percent and has provided Iridium Carrier Services LLC flexibility to acquire additional foreign ownership subject to certain conditions. *See Applications of Space Station System Licensee, Inc., Assignor, and Iridium Constellation LLC, Assignee, for Consent to Assignment of License Pursuant to Section 310(d) of the Communications Act*, Memorandum Opinion, Order and Authorization, DA 02-307, 17 FCC Rcd 2271 (Int'l Bur. 2002) ("*2002 Iridium Order*"); *Iridium Holdings LLC and Iridium Carrier Holdings LLC, Transferors, and GHL Acquisition Corp., Transferee, Applications for Consent to Transfer Control of Iridium Carrier Services LLC, Iridium Satellite LLC, and Iridium Constellation LLC, Memorandum Opinion and Order*, IB Docket No. 08-232, DA 09-1809 (rel. Aug. 14, 2009) ("*Iridium-GHL Order*"). Since the *Iridium-GHL Order*, any changes to the foreign ownership of Iridium Holdings LLC have been consistent with Iridium Communications Inc.'s status as a publicly traded company and the *2002 Iridium Order* and *Iridium-GHL Order*. [1]

[1] This assessment with respect to the foreign ownership of Greenhill and the public shareholders relies on the detailed analyses conducted by the Altman Group in connection with the *Iridium-GHL Order*. *See Iridium-GHL Order* ¶¶ 41-43 (analyses of foreign ownership attributable to participation of GHQ IPO shareholders and Greenhill).

Exhibit F
FCC Form 312, Response to Question 40:
Officers and Directors of Iridium Constellation LLC

The name, principal business, address, citizenship, and ownership interest of each individual or entity that will directly or indirectly control a ten percent or greater interest in Iridium Constellation LLC is as follows:

Name:	Iridium Satellite LLC
Principal Business:	Holding company and global provider of mobile satellite products and services
Address:	1750 Tysons Boulevard Suite 1400 McLean, Virginia 22102
Citizenship:	U.S.
Voting Interest:	100% (of Iridium Constellation LLC)
Equity Interest:	100% (of Iridium Constellation LLC)

Name:	Iridium Holdings LLC
Principal Business:	Holding Company
Address:	1750 Tysons Boulevard Suite 1400 McLean, Virginia 22102
Citizenship:	U.S.
Voting Interest:	100% (of Iridium Satellite LLC)
Equity Interest:	100% (of Iridium Satellite LLC)

Name:	Syncom-Iridium Holdings Corporation
Principal Business:	Holding Company
Address:	1750 Tysons Boulevard Suite 1400 McLean, Virginia 22102
Citizenship:	U.S.
Voting Interest:	13.7% (of Iridium Holdings LLC)
Equity Interest:	13.7% (of Iridium Holdings LLC)

Name:	Iridium Blocker-B Inc.
Principal Business:	Holding Company
Address:	1750 Tysons Boulevard Suite 1400 McLean, Virginia 22102
Citizenship:	U.S.
Voting Interest:	36.2% (of Iridium Holdings LLC)
Equity Interest:	36.2% (of Iridium Holdings LLC)

Name:	Iridium Communications Inc.
Principal Business:	Holding Company
Address:	1750 Tysons Boulevard Suite 1400 McLean, Virginia 22102
Citizenship:	U.S.
Voting Interest:	50.1% (of Iridium Holdings LLC) 100% (of Syncom-Iridium Holdings Corp.) 100% (of Iridium Block-B Inc.)
Equity Interest:	50.1% (of Iridium Holdings LLC) 100% (of Syncom-Iridium Holdings Corp.) 100% (of Iridium Block-B Inc.)

Name:	Baralonco Limited
Principal Business:	Holding Company
Address:	Craigmuir Chambers P.O. Box. 71 Road Town, Tortola, British Virgin Islands
Citizenship:	British Virgin Islands
Voting Interest:	16.2% (of Iridium Communications Inc.)
Equity Interest:	16.8% (of Iridium Communications Inc.)

Name:	Khalid bin Abdullah bin Abdulrahman
Principal Business:	Businessman and Investor
Address:	Craigmuir Chambers P.O. Box. 71 Road Town, Tortola, British Virgin Islands
Citizenship:	Saudi Arabia
Voting Interest:	100% (of Baralonco Limited)
Equity Interest:	100% (of Baralonco Limited)

Iridium Constellation LLC is a Delaware limited liability company. Iridium Satellite LLC has been designated as "Manager" of Iridium Constellation LLC. The following individuals have been designated as "officers" via special resolution of the Manager:

Matthew J. Desch, President and Chief Executive Officer
Thomas J. Fitzpatrick, Chief Financial Officer and Treasurer
Thomas D. Hickey, Chief Legal Officer and Secretary
Bonnie Shub-Gayer, Vice President, Tax