

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

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In the Matter of	)	
	)	
Iridium Constellation LLC	)	File No. SAT-MOD-2017 _____
	)	
Application for Modification of	)	
Authorization (Call Sign S2110)	)	

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**APPLICATION OF IRIDIUM CONSTELLATION LLC  
FOR MODIFICATION OF AUTHORIZATION**

Iridium Constellation LLC (“Iridium”) hereby seeks to modify<sup>1</sup> the authorization for its “Big LEO” band non-geostationary satellite orbit (“NGSO”) constellation (call sign S2110).<sup>2</sup> Specifically, Iridium seeks authority to extend the license term for its first generation (Block 1) satellites until July 31, 2019, so that it has sufficient time for its new Iridium NEXT constellation to become fully operational, including having a full complement of Iridium NEXT spare satellites in orbit. Accordingly, Iridium also asks that, until July 31, 2019, it be permitted to continue to use a storage orbit for Block 1 satellites to serve as spares, and to maneuver satellites within the constellation’s spare and operational orbits as needed to ensure continued service across the entire globe.

Iridium has completed the first three of eight scheduled launches of Iridium NEXT, the company’s groundbreaking advanced satellite constellation. Iridium NEXT will provide the infrastructure for innovative technologies such as Aireon LLC’s ADS-B service and Iridium

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<sup>1</sup> See 47 C.F.R. § 25.117.

<sup>2</sup> See *Iridium Constellation LLC Application for Modification of License to Authorize a Second-Generation NGSO MSS Constellation*, 31 FCC Rcd 8675 (2016) (“*Iridium NEXT Order*”).

Certus<sup>SM</sup>, which will provide superior call quality, more bandwidth, and higher throughput speeds for customers.

The ongoing, real-time replacement of Iridium’s Block 1 satellites with Iridium NEXT – an entirely new global satellite constellation -- is a complex, and indeed unprecedented, engineering feat. One important component of this ongoing effort has been the Commission’s decision to grant Iridium special temporary authority for 180 days (the “180-day STA”) to keep up to 12 of its healthiest Block 1 satellites in a 760 km storage orbit as spares, and to maneuver its Block 1 satellites within the constellation as needed to ensure robust global service.<sup>3</sup> The STA allowed Iridium to mitigate the risk inherent in launching a new constellation by keeping the most robust satellites in operational mode at all times while Iridium engineers remove other satellites from service and prepare them for de-orbit.

Iridium engineers will require the same flexibility until the entire Iridium NEXT constellation is in orbit and operational. Therefore, Iridium requests authority to keep up to eighteen satellites in a storage orbit, and to maneuver satellites within the constellation, as needed. The number of Block 1 satellites actually in storage orbit will fluctuate as Iridium NEXT satellites are launched and ultimately will decrease as they are deorbited under Iridium’s approved orbital debris mitigation plan.

Iridium also asks to extend the license term for Block 1 satellites by eighteen months, until July 31, 2019. More than three years ago, the Commission set the Block 1 license term to expire January 31, 2018 based upon then-current estimates of Iridium NEXT deployment. Since then, circumstances beyond Iridium’s control delayed the initial launch of Iridium NEXT satellites and required Iridium to alter schedule for the fully deployment of the constellation.

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<sup>3</sup> See Iridium Constellation LLC, SAT-STA-20170421-00065 (granted June 7, 2017).

Granting the requested modification is in the public interest because it will ensure the continuity of robust service for Iridium’s customers. To the extent necessary, Iridium requests waiver of the requirement to provide electronically a completed FCC Form Schedule S.<sup>4</sup>

**I. DESCRIPTION OF THE AUTHORITY REQUESTED**

On January 1, 1995, the FCC authorized Iridium’s predecessor-in-interest to launch and operate an NGSO constellation of 66 satellites along with 12 in-orbit spares.<sup>5</sup> On May 22, 2014, the agency extended the license term for this constellation to January 31, 2018 “based upon Iridium’s description of the planned deployment of its second-generation satellites.”<sup>6</sup> On August 1, 2016, the Commission authorized Iridium to construct, deploy and operate its second-generation satellite constellation, Iridium NEXT, with 66 space stations and up to 15 “second-generation in-orbit spare satellites.”<sup>7</sup> Specifically, the grant “is based on a planned one-for-one substitution of first-generation satellites by second-generation satellites, but does not preclude Iridium seeking authorization at a later date to retain some first-generation satellites as spares.”<sup>8</sup> On June 7, 2017, the agency’s grant of the 180-day STA permitted Iridium to retain up to 12 Block 1 satellites in a 760 km storage orbit for availability as spares and to maneuver its Block 1 satellites within the constellation.<sup>9</sup>

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<sup>4</sup> Except as identified herein, the technical information previously provided to the FCC is not changing and is incorporated by reference. *See Iridium NEXT Order*; SAT-MOD-20131227-00148; SAT-AMD-20151022-00074.

<sup>5</sup> *See Application of Motorola Satellite Communications, Inc.*, Order and Authorization, 10 FCC Rcd 2268, ¶ 25 (IB 1995).

<sup>6</sup> Iridium Constellation LLC, Stamp Grant, File No. SAT-MOD-20101001-00207 (granted in part May 22, 2014).

<sup>7</sup> *Iridium NEXT Order*, ¶¶ 45-47.

<sup>8</sup> *Id.*, ¶ 5 n.22.

<sup>9</sup> *See supra* n.3.

First, Iridium seeks authority to maintain the engineering flexibility enabled by the 180-day STA throughout the launch of the Iridium NEXT constellation by keeping as many as 18 Block 1 satellites in a storage orbit upon their substitution by a second-generation satellite. After arriving in the 780 km mission orbit and completing in-orbit testing, second-generation satellites replace first-generation satellites in specific orbital planes and slots. Under the 180-day STA, Iridium has moved some of the replaced first-generation satellites to a storage orbit of approximately 760 km. There, these first-generation satellites can serve as spares to support Iridium's phased deployment of Iridium NEXT. While positioned in storage orbit, the first-generation satellites will not be co-located and will not be part of Iridium's operational constellation.<sup>10</sup>

Iridium's decision about which satellites to replace first is based on the overall health and safety of the operating constellation. With each launch, up to ten Iridium NEXT satellites go to one of the six planes in which the Iridium constellation operates. Because Iridium's launch provider can deliver ten satellites at a time to a given orbital plane, some Block 1 satellites that are operating most efficiently and have ample fuel will be replaced early in the process, and thus would be useful as spares. Iridium intends to place in storage orbit satellites whose communications and other systems are functioning well, and that have enough fuel to (a) move to a storage orbit, (b) move back into a mission orbit if needed, and (c) deorbit in a timely way after they are no longer needed in the mission orbit.

For example, the first Iridium NEXT launch in January 2017 was to plane number 6. Following appropriate maneuvers, in-orbit testing, and activation of these Iridium NEXT satellites, Iridium moved four replaced Block 1 satellites to the temporary storage orbit and

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<sup>10</sup> Cf. File No. SAT-MOD-20120813-00128.

deorbited three other Block 1 satellites immediately from mission orbit.<sup>11</sup> Subsequently, as anticipated in the 180-day STA application, Iridium deorbited the Block 1 satellite SV077 from the storage orbit on August 23, 2017. The remaining three satellites in the storage orbit will be maintained as spares for a longer period of time pending the successful launch and operation of additional Iridium NEXT satellites. The plan for each plane is similar.

Second, the modification application seeks continuing authority, as granted in the 180-day STA, to maneuver certain Block 1 satellites, after replacement by Iridium NEXT satellites, to a new slot where they will replace less robust first-generation satellites.

Finally, Iridium requests authority to extend its Block 1 license term to July 31, 2019. The Commission first set the January 31, 2018 Block 1 expiration date in May 2014. Since then, circumstances beyond Iridium's control, such as delays with components and launch providers,<sup>12</sup> pushed back the anticipated launch schedule, and Iridium requires more time to complete the complex transition to Iridium NEXT.

## **II. GRANT OF THE MODIFICATION WILL SERVE THE PUBLIC INTEREST**

### **A. Standard of Review.**

In evaluating space station modifications, “the Commission has determined that spacecraft design decisions should be left to each space station licensee, because the licensee is in a better position to determine how to tailor its system to meet the particular needs of its customer base.”<sup>13</sup> This “flexible” policy “allow[s] satellite operators to respond promptly to

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<sup>11</sup> In the first launch, one Iridium NEXT satellite filled a vacant slot and two others are drifting to an adjacent plane.

<sup>12</sup> Peter B. de Selding, *Component Issue Delays Iridium Next Launches by Four Months*, Spacenews.com (Oct. 29, 2015), available at <http://bit.ly/2yM6AzX>; Briang Berger and Jeff Foust, *SpaceX Falcon 9 rocket and Amos-6 satellite destroyed during static-fire test*, Spacenews.com (Sept. 1, 2016), available at <http://bit.ly/2gfiZpb>.

<sup>13</sup> *DigitalGlobe, Inc.*, Order and Authorization, 20 FCC Rcd 15696, ¶ 9 (I.B. 2005).

changing technological . . . conditions.”<sup>14</sup> Accordingly, “[i]f a [modification] proposal will not cause interference to other licensed operations, the Commission generally authorizes it if it is otherwise in the public interest.”<sup>15</sup>

**B. Grant of this Modification Request Will Serve the Public Interest.**

As the Commission has said, Iridium NEXT will “provide mobile voice and data services to end users on a network with improved voice quality and enhanced data transmission speeds.”<sup>16</sup> Allowing Iridium the flexibility sought in this modification application will backstop Iridium’s phased transition to Iridium NEXT and its provision of these service enhancements. Use of the storage orbit will also provide time separation between the deorbits of the first-generation satellites and ensure the availability of engineering resources needed to coordinate the safe movement of multiple satellites.

Moreover, the storage orbit and request to maneuver first-generation satellites is temporary, and the satellites Iridium chooses for use as spares will be those with the highest functioning systems on all measures. As Iridium subsequently launches second-generation satellites, Iridium will de-boost and de-orbit the first-generation satellites on a rolling basis. When the entire Iridium NEXT constellation and spares have been launched, tested and demonstrated to be operating successfully, there will be no need for Block 1 satellites in-orbit.

By extension, grant of Iridium’s Block 1 license term to July 31, 2019 serves the public interest. Iridium began its phased launch of second-generation satellites with the successful

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<sup>14</sup> *Assignment of Orbital Locations to Space Stations in the Domestic Fixed-Satellite Service*, Memorandum Opinion and Order, 3 FCC Rcd 6972, ¶ 2 (1988); *see also DigitalGlobe, Inc.*, ¶ 9.

<sup>15</sup> *DigitalGlobe, Inc.*, ¶ 9 (citing *EarthWatch Inc.*, Order and Authorization, 16 FCC Rcd 15985, ¶ 10 (I.B. 2001)).

<sup>16</sup> Iridium NEXT Order, ¶ 1.

launch and delivery of 10 satellites in January 2017. Since then, Iridium has successfully launched 20 additional satellites—10 in June 2017 and 10 in October 2017—and expects additional launches every few months until the entire constellation is in orbit. Grant of the extension, in combination with the storage orbit and maneuverability authority sought herein, will provide Iridium’s engineers with the flexibility to continue to complete the extraordinary transition to Iridium NEXT safely and efficiently, and will ensure continuity of service for Iridium’s users, including the critical needs of the U.S. military and the public safety community.

Grant of this modification also poses no interference risk. The proposed location of the first-generation spare satellite orbit ensures safe station-keeping without any overlap in orbital position. Further, upon replacement by a second-generation satellite in the mission constellation, a first-generation satellite will suspend mission operations and will not be co-located and operated in tandem with the second-generation satellite.

**C. Iridium Will Continue to Comply with the Approved Orbital Debris Mitigation Plan.**

In 2014, the Commission issued a revised orbital debris mitigation plan for Iridium’s Block 1 satellites.<sup>17</sup> Under the revised plan, the agency allowed Iridium to extend the post-mission atmospheric re-entry period to up to 25 years for up to ten satellites, while the rest of the Block 1 fleet remained subject to the up to one-year re-entry period approved in 2002. Iridium has abided by the re-entry periods set forth in this plan. As of this filing, Iridium has commenced deorbit of seven Block 1 satellites.

The flexibility sought by this modification will not affect Iridium’s continued compliance with its existing orbital debris mitigation plan. Specifically, Iridium will continue to comply with its authority to deorbit no more than ten Block 1 satellites under the approved atmospheric

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<sup>17</sup> See generally Revised Orbital Debris Order.

re-entry period of up to 25 years. Iridium will use all available fuel to achieve the lowest perigee altitude possible for each deorbited satellite. Indeed, Iridium anticipates that many of the ten satellites approved for an atmospheric re-entry period of up to 25 years will achieve a perigee altitude resulting in atmospheric re-entry in just a few years. Similarly, Iridium anticipates that many of the remaining satellites permitted to deorbit in up to a one-year period will achieve a perigee altitude resulting in atmospheric re-entry within mere months.

As noted, Iridium will keep only a limited number of the most robust Block 1 satellites in storage orbit following their replacement by Iridium NEXT satellites. These Block 1 satellites will be the least likely to suffer an anomaly that would diverge from the approved orbital debris mitigation plan. In sum, Iridium will continue to meet or exceed the deorbit parameters set forth in its existing, approved deorbit plan.

### **III. REQUEST FOR WAIVER**

To the extent necessary, Iridium requests a waiver of the Section 25.117(c) requirement to provide FCC Form Schedule S.<sup>18</sup> The Commission may waive its rules for good cause shown.<sup>19</sup> The FCC typically exercises its discretion to waive a rule when the particular facts make strict compliance inconsistent with the public interest.<sup>20</sup> In addition, the agency may take

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<sup>18</sup> 47 C.F.R. § 25.117(c). Iridium will, however, prepare and file a Schedule S in the event the Commission determines that such a submission is necessary.

<sup>19</sup> 47 C.F.R. § 1.3.

<sup>20</sup> The Commission has considerable discretion as to whether to waive its rules. *See Office of Communication of United Church of Christ v. FCC*, 911 F.2d 803, 812 (D.C. Cir. 1990) (upholding the Commission’s grant of a waiver “[g]iven the deference due the agency in matters of this sort”); *City of Angels Broadcasting, Inc. v. FCC*, 745 F.2d 656, 663 (D.C. Cir. 1984) (noting that the scope of review of a waiver determination by the Commission “is narrow and constrained”).

into account considerations of hardship, equity, or more effective implementation of overall policy on an individual basis.<sup>21</sup>

Good cause exists to waive the requirement for Iridium to submit a FCC Form Schedule S with this modification application. Given the short-term nature of the modification and the request for flexibility in maneuvering Block 1 satellites, the burden associated with completing an electronic FCC Form Schedule S outweighs any benefit. Moreover, the technical information already on file for the Iridium Block 1 spacecraft remains unchanged by this modification request. For these reasons, good cause exists, to the extent necessary, to grant a waiver of the requirement to provide FCC Form Schedule S.

#### IV. CONCLUSION

For the reasons set forth above, Iridium respectfully requests that the Commission grant this modification application.

Respectfully submitted,

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<sup>21</sup> *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969), *cert. denied*, 409 U.S. 1027 (1972); *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).



## 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 foreign ownership in excess of twenty-five percent 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) 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*.<sup>22</sup>

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<sup>22</sup> Consistent with FCC foreign ownership rules and policies applicable to publicly traded companies, Iridium’s foreign ownership assessment is based on its exercise of diligence to identify all known or reasonably shown to be known foreign voting interests and its knowledge of privately issued shares held by foreigners. *See Review of Foreign Ownership Policies for Broadcast, Common Carrier and Aeronautical Radio Licensees under Section 310(b)(4) of the Communications Act of 1934, as Amended*, 82 FR 18580 (2017).

**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/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/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/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/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/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: 12.66% (of Iridium Communications Inc.)  
Equity Interest: 13.71% (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/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