Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
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Public Notice Seeking Comment on Improving Wireless Network Resiliency Through Encouraging Coordination with Power Companies	)	PS Docket No. 11-60
	)	
	)	
Public Notice Seeking Comment on Hurricane Michael Preparation and Response	)	PS Docket No. 18-339

To: Federal Communications Commission

COMMENTS OF IRIDIUM COMMUNICATIONS INC.

February 8, 2019

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EXECUTIVE SUMMARY

Effective disaster response and recovery begins with effective communications. Iridium Communications Inc.'s ("Iridium's") global satellite communications network of 66-satellites enables unprecedented communication capabilities during even the worst disaster scenarios in the United States and around the world. After disaster strikes, Iridium devices can be deployed quickly and can provide critical connectivity service even in areas without power or ground infrastructure and where traditional communications systems remain unavailable. Iridium provides critical services over its satellite network, including voice, data, and tracking, that can enable disaster response and recovery efforts, including coordination between on-site communication and energy company recovery teams. Iridium works with its commercial and governmental partners before anticipated disasters to help ensure that Iridium devices will be available where they are needed most.

Iridium has a demonstrated track record of supporting rapid disaster recovery efforts in the U.S. and around the world. During Hurricane Maria, Iridium services were used extensively to facilitate response and recovery efforts and in many cases were the only communication services available in affected areas. Iridium devices were used in the immediate aftermath of Hurricane Michael, but in some cases their continued use could have improved communications among recovery crews and facilitated a more rapid recovery. As the Public Safety and Homeland Security Bureau examines ways to improve wireless network resiliency, it should consider the role that effective real-time communications services such as those provided by satellite systems can play during and after disasters strike. First responders already rely on Iridium devices, and recovery crews engaged in restoration of communications and electric power services after disasters may benefit from using such satellite services as well.

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COMMENTS OF IRIDIUM COMMUNICATIONS INC.

Iridium Communications Inc. ("Iridium" or "company") hereby responds to the Public Safety and Homeland Security Bureau's ("Bureau's") Public Notice in the above-captioned docket, which seeks comment on improving wireless network resiliency through encouraging coordination with power companies ("Public Notice" or "Notice").[1] The Public Notice is part of the Federal Communications Commission's ("FCC's" or "Commission's") continuing efforts to improve the reliability and resiliency of the United States' communications networks, particularly during natural disasters and other emergencies, and solicits comments from a variety of stakeholders, including satellite companies.[2] As demonstrated below, satellite services play a critical role in disaster response and recovery, particularly in keeping terrestrial infrastructure companies connected when their networks fail.

[1] *Public Safety and Homeland Security Bureau Seeks Comment on Improving Wireless Network Resiliency Through Encouraging Coordination with Power Companies*, Public Notice, DA 19-13, PS Docket No. 11-60 (rel. Jan. 3, 2019) ("Public Notice"). Iridium also submits these comments as an *ex parte* in response to the Bureau's examination of the response to Hurricane Michael. *See Public Safety and Homeland Security Bureau Seeks Comment on Hurricane Michael Preparation and Response*, Public Notice, DA 18-1176, PS Docket No. 18-339 (rel. Nov. 16, 2018) ("Hurricane Michael Notice").

[2] *Id.* at 2.

I. OVERVIEW OF IRIDIUM'S CAPABILITIES

Iridium is the only commercial provider of communications services offering true global coverage, connecting people, organizations and assets to and from anywhere, in real time. Iridium's L-band satellite network provides reliable communications services to regions of the world where terrestrial wireless or wireline networks do not exist or are limited, including remote land areas, open ocean, airways, the polar regions, and regions where the telecommunications infrastructure has been affected by political conflicts or natural disasters. The Iridium satellite network includes a new $3 billion network of 66 operational satellites with in-orbit spares and related ground infrastructure.[3] The system utilizes a state-of-the-art satellite-to-satellite interlinked mesh architecture to route traffic across our satellite constellation using secure radio frequency crosslinks between satellites. This unique network architecture minimizes the need for local ground facilities to support the constellation, which facilitates the global reach of our services and allows us to offer services in regions where we have no physical presence on the ground. This architecture also allows Iridium to provide service even when local communications and electric power services are unavailable due to natural disasters and other catastrophes. Iridium provides voice and data communications services to individual consumers, businesses, terrestrial infrastructure companies, the U.S. and foreign governments, and non-governmental organizations. Supporting public safety operations is a critical component of Iridium's business.

[3] *See, e.g.*, *Iridium Global Network – Overview: Everywhere Under One Sky*, IRIDIUM, https://www.iridium.com/network/globalnetwork/ (last visited Jan. 22, 2019); *see also Iridium Satellites*, N2YO, https://www.n2yo.com/satellites/?c=15 (last visited Jan. 22, 2019).

Iridium's customer base has grown to over one million mobile-satellite service ("MSS") subscribers using its voice and data services, more than double the 427,000 subscribers it had in 2010.[4] Total subscribers in 3Q2018 were approximately 1,092,000, up from 949,000 for the same period in 2017.[5] Iridium is currently serving approximately 113,000 government subscribers, also a record number.[6]

Iridium has invested heavily in its satellite system in recent years, including $3 billion in the development of Iridium NEXT, a complete upgrade of its first-generation 66-satellite non-geostationary orbit ("NGSO") constellation with nine new on-orbit spares and six new ground spares.[7] With the last launch of ten satellites on January 11, 2019, the full Iridium NEXT constellation upgrade is now complete and fully operational.[8] Iridium NEXT is enabling significant improvements to our legacy system, with faster speeds and new services.

Among the new services enabled by Iridium NEXT is Iridium Certus℠, which will provide broadband satellite connectivity to land, aviation, and maritime customers.[9] Iridium Certus improves communications with the Iridium network and enables everything from

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[4] *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/press-releases?item=176.

[5] *See* Press Release, Iridium, Iridium Announces Third-Quarter 2018 Results; Company Raises 2018 Outlook (Oct. 25, 2018) ("Iridium Q3' 18 Press Release"), http://investor.iridium.com/2018-10-25-Iridium-Announces-Third-Quarter-2018-Results-Company-Raises-2018-Outlook.

[6] *Id.*

[7] *See Iridium NEXT – Overview: Iridium NEXT is Taking Flight*, IRIDIUM, https://www.iridium.com/network/iridium-next/ (last visited Jan. 22, 2019).

[8] *See* Press Release, Iridium, Iridium Declares Victory; $3 Billion Satellite Constellation Upgrade Complete (Feb. 6, 2019), http://investor.iridium.com/2019-02-06-Iridium-Declares-Victory-3-Billion-Satellite-Constellation-Upgrade-Complete.

[9] *See* Press Release, Iridium, Iridium Certus(SM) Goes Live; World's First Truly Global Broadband Service (Jan. 16, 2019), http://investor.iridium.com/2019-01-16-Iridium-Certus-SM-Goes-Live-Worlds-First-Truly-Global-Broadband-Service.

messaging to high-quality voice to high speed internet access, all through the same compact and cost-effective satellite terminal.[10] Iridium Certus will support higher speeds for new products, while providing service continuity and backwards compatibility with our first-generation constellation.[11] Iridium Certus is uniquely suited for safety-of-life services, and can provide the critical communications needs of teams operating where terrestrial infrastructure has failed, including first responders and search and rescue organizations.[12]

II. SATELLITE PROVIDERS LIKE IRIDIUM PLAY A SIGNIFICANT ROLE IN DISASTER RESPONSE AND ARE COMMITTED TO PUBLIC SAFETY

The FCC has demonstrated a critical and continued commitment to enhancing public safety and improving disaster response and recovery for communications networks in recent years. Under Chairman Pai's leadership, the Commission made tens-of-millions of dollars in universal service funds available to expedite recovery efforts in Puerto Rico and the U.S. Virgin Islands after the 2017 Atlantic hurricane season, and sought to expand and improve communications networks on those islands to prevent disasters from having such devastating effects in the future.[13] In Chairman Pai's words, "Our goal should not be just to restore the communications networks that served the islands prior to last year's hurricanes. Instead, we

[10] *Id.*

[11] *Id.*

[12] *Id.*

[13] *Oversight of the Federal Communications Commission: Hearing Before the Subcomm. on Commc'n and Tech. of the H. Comm. On Energy and Commerce*, 115th Cong. (July 25, 2018) (statement of Ajit Pai, Chairman, Federal Communications Commission), https://docs.house.gov/meetings/IF/IF16/20180725/108599/HHRG-115-IF16-Wstate-PaiA-20180725-U11.pdf.

want to create networks that will be more resilient when future storms hit and to expand high-speed Internet access to more Puerto Ricans and Virgin Islanders."[14]

Further demonstrating the FCC's commitment to these efforts, the Bureau released a public notice seeking comment from communications service providers and other stakeholders regarding their response efforts to Hurricane Michael, which caused severe damage in the Florida panhandle in late 2018 ("Hurricane Michael Notice").[15] Commenters who responded to the Hurricane Michael Notice included a variety of entities, including wireless service providers, electric utility companies, cable providers, and broadcasting interests.[16] Although a number of commenters described the use of satellite services to facilitate disaster recovery efforts, those comments focused primarily on the use of satellite systems to restore cellular backhaul.[17] Backhaul restoration is certainly an important role for satellites, but it is by no means the only way that satellite services are crucial during disaster response and recovery when terrestrial communications and energy networks fail.[18]

[14] *Id.*

[15] *See* Hurricane Michael Notice. The Bureau has similarly sought comment on the responses of communications providers to other disasters. *See Public Safety and Homeland Security Bureau Seeks Comment on Response Efforts Undertaken During 2017 Hurricane Season*, Public Notice, PS Docket No. 17-344, 32 FCC Rcd 10245 (2017) (seeking comment on response efforts to Hurricanes Harvey, Irma, and Maria, among others).

[16] *See, e.g.*, Comments of AT&T Services, Inc., PS Docket No. 18-339 (filed Dec. 17, 2018); Comments of Southern Company Services, Inc., PS Docket No. 18-339 (filed Dec. 17, 2018); Comments of National Association of Broadcasters, PS Docket No. 18-339 (filed Dec. 17, 2018).

[17] *See, e.g.*, Comments of Verizon, PS Docket No. 18-339, at 9 (filed Dec. 17, 2018).

[18] This filing builds on Iridium's recently filed comments in the Commission's Communications Marketplace Report proceeding that discuss the important role that Iridium's network plays in the global communications market. *See* Comments of Iridium Communications Inc., IB Docket No. 18-251 (filed Sept. 7, 2018).

A. Satellite Capabilities Before, During, and After Disasters Strike

Satellite operators provide critical and reliable communications services after natural disasters when terrestrial services are often not available or non-existent, and Iridium's NGSO MSS constellation is well-suited for enabling disaster response. Before anticipated disasters strike, Iridium partners work directly with federal, state, and local government emergency management agencies and private disaster response teams to help ensure that they are well equipped in the event local communications infrastructure becomes disabled. 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 emergency response plans.

In addition to operating the Iridium satellite constellation, Iridium functions as a wholesaler of subscriber equipment, and coordinates closely with its network of distribution partners who are on the front lines in terms of device deployment and support. In regions prone to natural disasters, Iridium works with its partners to ensure that they have adequate inventory to meet surges in demand for Iridium GO!® devices, and satellite handsets, like Iridium® 9555, Iridium Extreme®, and Iridium Extreme® Push-To-Talk.[19]

In the aftermath of disasters, Iridium voice and data services provide critical connectivity capabilities to first responders and terrestrial network personnel involved in disaster response and recovery efforts. As Iridium CEO Matt Desch has said, "Having a system that [doesn't depend] on ground infrastructure in a specific place has meant . . . that in just about every big natural disaster, Iridium is the only thing that typically works from anywhere from the first 24 hours to

[19] More information about these products is available on Iridium's website. *See Products*, IRIDIUM, https://www.iridium.com/products/ (last visited Jan. 22, 2019).

the first few days."[20] Allowing users to communicate through the Iridium system without relying on local ground infrastructure is particularly useful in areas hit by major disasters when power or local communications infrastructure remains offline. Apart from satellite phone service, Iridium tracking devices and multi-user push-to-talk services provide essential services during disaster recovery.[21] These "always connected" group communications enable first responders to reliably stay in contact in any location. Iridium partners also continue coordination with non-governmental organizations and first responder organizations following disasters to supplement their communications needs on an ongoing basis.

B. Examples of Satellite Use Cases During Disasters

In a number of recent cases, Iridium devices have played a critical role in facilitating and expediting disaster response and recovery efforts. Iridium was particularly involved in disaster response and recovery efforts during the 2017 and 2018 Atlantic hurricane seasons, including during Hurricane Maria and Hurricane Michael.

Hurricane Maria. In 2017 the island of Puerto Rico was devastated by Hurricane Maria. In the immediate aftermath of the storm over 95% of cell sites were offline,[22] and more than a month after the disaster hit over 75% of the island remained without power and reliable

[20] Chris Gebhardt, *Iridium CEO reflects on past and future use of its satellite constellation*, NASA SPACEFLIGHT, (Sept. 4, 2018), https://www.nasaspaceflight.com/2018/09/iridium-ceo-past-future-satellite-constellation/.

[21] *See Six Reasons to Use the Stronger and More Reliable Iridium Push-to-Talk Service*, IRIDIUM, https://www.iridium.com/blog/2018/10/05/six-reasons-iridium-push-to-talk/ (last visited Jan. 22, 2019).

[22] Ajit Pai, *In the Aftermath of Hurricanes Irma and Maria, Resilience and Challenges in Puerto Rico and the U.S. Virgin Islands*, FCC: FCC BLOG (Mar. 19, 2018), https://www.fcc.gov/news-events/blog/2018/03/19/aftermath-hurricanes-irma-and-maria-resilience-and-challenges-puerto.

communications.[23] This unexpected and unprecedented failure of conventional communications infrastructure keenly demonstrates the advantages of satellite communications systems like Iridium's in the wake of major disasters.

Iridium's network remained fully operational before, during, and after Hurricane Maria. Iridium was likely the only effective means of communication available in large parts of Puerto Rico following the storm.[24] While Iridium generally experiences a spike in use following disasters like hurricanes that falls off after a few days,[25] following Hurricane Maria Iridium devices were still in heavy use as much as four weeks after landfall.[26] In the aftermath, the number of unique Iridium devices in use in Puerto Rico went from an average of ten per day to roughly 5,000 per day during the initial response, with those numbers stabilizing around 2,000 per day during the longer-term recovery efforts.[27] Given the extensive damage to the power grid and communications systems, Iridium devices remained necessary for long-term recovery efforts.[28] This spike in use, and its duration, highlights the severity of the disaster, and the critical need for satellite services like Iridium's to provide communications services and facilitate response and recovery efforts.

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[23] Chris Gebhardt, *Iridium satellite communication aids Caribbean/Puerto Rico recovery efforts*, NASA SPACEFLIGHT (Oct. 28, 2017), https://www.nasaspaceflight.com/2017/10/iridium-satellite-aids-caribbeanpuerto-rico-recovery/.

[24] Gebhardt, *supra* note 20.

[25] *Id.*

[26] Gebhardt, *supra* note 23.

[27] *Id.*

[28] *Id.*

During response and recovery efforts nearly the entire suite of Iridium products and services were in use at some point, including voice, data, and tracking services.[29] Iridium's multi-user push-to-talk services allowed first responders to communicate instantly with everyone on their team rather than relying on satellite phone relays or other tools to share information.[30] Iridium's tracking services allow users to monitor the locations of both human and material assets in real time, which is essential to managing relief efforts and ensuring that help gets where it is needed most. As Iridium CEO Matt Desch described in the aftermath of Hurricane Maria, "It wasn't just satellite phones, it was really our Internet of Things services."[31]

Hurricane Michael. On October 10, 2018, Hurricane Michael made landfall on Florida's panhandle and left considerable destruction in its wake.[32] In addition to destroying numerous homes and businesses, the storm also caused significant damage to local communications infrastructure in Florida, Georgia, and Alabama, with as many as 78% of cell sites reported as offline in some of the most impacted counties.[33] In Florida, Bay County and Gulf County were particularly hard-hit, with a large number of cell sites reported offline over a week after landfall.[34]

While communications infrastructure in the Florida panhandle was not damaged to the same extent as the infrastructure in Puerto Rico, Iridium nevertheless played an important role.

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[29] Gebhardt, *supra* note 20.

[30] *Id.*

[31] *Id.*

[32] *See, e.g.*, Brendan Carr, *Rebuilding After Michael: Lessons Learned from 48 Hours with Telecom Crews*, MEDIUM (Nov. 6, 2018), https://medium.com/@BrendanCarrFCC/rebuilding-after-michael-65b0eed44f26.

[33] *See Communications Status Report for Areas Impacted by Hurricane Michael*, FCC (Oct. 11, 2018), https://docs.fcc.gov/public/attachments/DOC-354510A1.pdf.

[34] *Id.*

As with Hurricane Maria, Iridium experienced a spike in use of its services following landfall.[35] Iridium devices were used by first responders, and Iridium's distribution partners in the area were ready to supply phones as needed during recovery efforts. However, while Hurricane Maria provides an example of where Iridium's services were used extensively and effectively, Hurricane Michael might provide a better example of where Iridium services could have been more and potentially prevented significant delays in recovery efforts.

Many commenters on the Hurricane Michael Notice discussed the problems that they encountered with repeated cuts of their backhaul fiber lines during recovery efforts, often attributed to other recovery teams operating in the same area.[36] Although wireless providers were quick to deploy resources to impacted areas and were able to restore most connectivity within a matter of days, the repeated cuts meant that full network restoration was significantly delayed, sometimes by nearly two weeks.[37] Several commenters describe the critical use of satellite services to help with recovery efforts.[38]

The repeated fiber cuts can be attributed in part to a lack of effective communication and coordination among the various repair crews during recovery efforts. Satellites are uniquely capable of facilitating such communications. If repair crews had more ubiquitously utilized mobile satellite service products, such as phones with Iridium's multi-user push-to-talk service,

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[35] Matt Desch (@IridiumBoss), TWITTER (Oct. 19, 2018, 11:39 AM), https://twitter.com/IridiumBoss/status/1053354924761849857.

[36] *See, e.g.*, Comments of CTIA, PS Docket No. 18-339, at 17-18 (filed Dec. 17, 2018) (noting the impact of inadvertent fiber line cuts by electric utilities on restoration of wireless networks); Comments of Sprint Corporation, PS Docket No. 18-339, at 4-5 (filed Dec. 17, 2018) (noting that Sprint's backhaul provider had its temporary fiber lines cut be other recovery teams); *ex parte* of Uniti Fiber, PS Docket No. 18-339 (filed Jan. 3, 2019) (indicating that Uniti's own fiber lines were cut at least 33 times by power companies during Hurricane Michael recovery efforts).

[37] *See* Comments of Verizon, PS Docket No. 18-339, at 2-3 (filed Dec. 17, 2018) (noting that restoration efforts in Panama City took 12 days due to repeated fiber cuts).

[38] *See, e.g.*, *id.* at 9.

they would have been able to better coordinate their efforts and communicate in real time when working in areas with damaged or unavailable local infrastructure. Such coordination and communication could likely have reduced the frequency of accidental fiber line cuts and could have accelerated the overall Hurricane Michael recovery efforts.

III. IRIDIUM AND OTHER SATELLITE OPERATORS CAN PROVIDE A VITAL LINK IN DISASTERS AMONG WIRELESS COMMUNICATIONS PROVIDERS AND POWER COMPANIES

Satellite communications can facilitate disaster response and recovery efforts at all levels. They can be deployed quickly and can satisfy essential communications needs, even when local infrastructure remains offline. Effective real-time communications in the hours and days following a disaster are crucial to ensuring a rapid response from first responders and the timely restoration of critical communications and electric services. MSS systems are uniquely well-suited for facilitating such response and recovery efforts. They are ubiquitous and resilient, and can ensure that communications among anyone involved in disaster response and recovery, from first responders to repair crews, will not have their efforts limited or inhibited by a loss of conventional telecommunications infrastructure. An Iridium phone with push-to-talk capabilities can be used to ensure that recovery crews from electric utilities and telecommunications providers can communicate effectively even while other means of communication remain unavailable. Such capabilities could help expedite recovery efforts and prevent issues like the recurring fiber cuts that plagued the restoration of communications services following Hurricane Michael. Iridium will continue to provide satellite support to disaster response and recovery efforts, and, with the deployment of a complete new set of satellites and Iridium Certus, Iridium's ability to provide such support is greater than ever before.

The Bureau should consider the role that satellite communications play in promoting effective real-time communications during disaster response and recovery efforts. When

wireless service providers and power companies pre-position assets and resources prior to hurricanes, satellite communications devices could be considered as an important part of the disaster response kit in areas prone to natural disasters.

IV. CONCLUSION

Satellite communications systems like Iridium's MSS constellation play an important role in facilitating response and recovery efforts before, during, and after disasters. The Bureau should keep Iridium's comments in mind as it considers updates to the Wireless Resiliency Cooperative Framework.

Respectfully submitted,

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