

**Before the  
DEPARTMENT OF COMMERCE  
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION  
Washington, D.C. 20230**

In the Matter of )  
 )  
Development of the Nationwide ) Docket No. 120928505-2505-01  
Interoperable Public Safety Broadband )  
Network )  
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**COMMENTS OF IRIDIUM SATELLITE LLC**

Iridium Satellite LLC (“Iridium”) hereby submits comments in response to the National Telecommunications and Information Administration’s (“NTIA’s”) *Notice of Inquiry* seeking comment on behalf of the First Responder Network Authority (“FirstNet”) on the conceptual network architecture of the FirstNet Nationwide Network (“FNN”).<sup>1</sup> Iridium applauds FirstNet’s recognition that its network should leverage the reliability, redundancy, and ubiquity of mobile satellite communications to ensure maximum network resiliency during times of emergency.<sup>2</sup> Indeed, the recent devastation of Hurricane Sandy, which caused widespread loss of power and disruption to commercial communications infrastructure, demonstrates the importance of identifying resilient and redundant network paths to ensure the continuous operation of critical public safety communications. Iridium’s satellite communications services were essential to

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<sup>1</sup> *Development of the Nationwide Interoperable Public Safety Broadband Network*, National Telecommunications and Information Administration, U.S. Department of Commerce, Notice of Inquiry, Docket No. 120928505-2505-01, 77 Fed. Reg. 60680 (Oct. 4, 2012) (“*NOI*”).

<sup>2</sup> 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](http://www.ntia.doc.gov/files/ntia/publications/firstnet_fnn_presentation_09-25-2012_final.pdf) (“FirstNet Presentation”); *Meeting of the First Responder Network Authority*, National Telecommunications & Information Administration (NTIA), September 25, 2012, Washington, DC, *available at* [http://www.ntia.doc.gov/files/ntia/publications/firstnet\\_board\\_9-25-2012\\_transcript.pdf](http://www.ntia.doc.gov/files/ntia/publications/firstnet_board_9-25-2012_transcript.pdf) (“Transcript”).

organizations and individuals operating in the areas affected by Sandy in the hours and days immediately following the storm when some terrestrial systems were unavailable.

Iridium is the only mobile satellite communications provider capable of providing service to all parts of the globe, allowing it to serve remote domestic and international areas that other telecommunications operators are unable to reach. Iridium's robust mobile satellite service ("MSS") system delivers indispensable communications services to the public safety users at all levels of government. Key to Iridium's appeal for public safety users is its network of low earth orbiting satellites and resilient ground infrastructure, which contains multiple layers of redundancy and backup protection for all critical features to ensure network reliability even during and after emergencies that disrupt all terrestrial wireless communications.

**I. IRIDIUM PROVIDES CRITICAL COMMUNICATIONS SERVICES DURING AND AFTER MAJOR EMERGENCIES.**

Iridium agrees with NTIA that the FNN should "leverage the significant investments and combined efforts of the public sector and the commercial wireless industry to achieve the major elements of the nationwide wireless network called for under the Act, including ubiquitous coverage, reliable, redundant, and interoperable service, at reduced costs and with accelerated availability."<sup>3</sup> The goals of FirstNet -- ubiquity, reliability, and redundancy -- are also the hallmarks of Iridium's service. Indeed, Iridium's Mobile Satellite Service is a unique commercial system, as demonstrated by its extensive use by first responders in the wake of disasters and other emergencies that disable other commercial networks, and the widespread reliance of the United States military on Iridium's services. That is why Iridium strongly supports the proposals made in the September 25, 2012 presentation to FirstNet's Board of

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<sup>3</sup> *NOI*, 77 Fed. Reg. at 60681.

Directors (the “FirstNet Presentation”) to utilize mobile satellite communications as a crucial part of the FNN architecture.

Iridium’s robust and proven system satisfies FirstNet’s statutory mandate to “[l]everage existing infrastructure” by “enter[ing] into agreements to utilize . . . existing commercial or other communications infrastructure . . . .”<sup>4</sup> Through its MSS system, Iridium and its partners have played a vital and growing role in communications during national and international emergencies, including during Hurricanes Katrina and Rita and the earthquakes in Haiti, Chile, and Japan. Iridium’s robust MSS system provides these critical communications services to first responders, the Federal Government, aid organizations, and private users.

Notably, in the aftermath of Hurricane Katrina, Iridium worked quickly to get mobile satellite communications equipment into the hands of first responders at the federal, state and local levels. To meet the skyrocketing demand and ensure that equipment was delivered to critical service providers in a timely fashion, Iridium immediately adopted an around-the-clock manufacturing schedule. Within the first seventy-two (72) hours of the disaster, Iridium traffic in the affected region increased more than 3,000 percent, while the number of Iridium subscribers increased more than 500 percent. Notably, Brigadier General Mark A. Graham recognized the critical importance of Iridium satellite communications in his testimony before the Senate Committee on Homeland Security and Government Affairs when he noted that in the aftermath of Katrina,

“All of our command and control nodes were used to coordinate and synchronize our 24-hour evacuation operations. We provided our own communications using Iridium satellite phones and intermittent Blackberry coverage. During the evening of Thursday, September 1, the OCP was augmented with an additional 28 soldiers and Department of the Army civilians from Fifth U.S. Army. This allowed us to

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<sup>4</sup> 47 U.S.C. § 1426(c)(3).

better maintain 24-hour operations. Utilizing this network, by the end of the day on September 1, we had evacuated approximately 15,000 displaced persons out of the City of New Orleans.”<sup>5</sup>

Iridium’s services have also played a vital role in preparing for domestic emergencies. For instance, since 2003, the U.S. National Oceanic and Atmospheric Administration (“NOAA”) has depended on Iridium’s services to operate its tsunami warning system, which utilizes satellite data links to transmit real-time data from deep ocean buoys. This warning system allowed NOAA to monitor the tsunami heading towards Hawaii after the Chilean earthquake as well as the aftereffects of the Japanese earthquake. In addition, Iridium currently provides critical backup and support services to MedSTAR Health with satellite phones and airtime for MedSTAR Health’s facilities in the Washington, DC region, enabling existing systems to be used even when traditional phone service is unavailable. Iridium’s automated tracking and voice services were also installed in MedSTAR Health’s transport helicopter fleet, enabling MedSTAR Health to view the location and status of its fleet and allow its helicopters to communicate with hospitals.

Iridium’s satellite communications network was also deployed in innovative ways to assist in the cleanup and recovery effort after the April 2010 explosion of the Deepwater Horizon oil rig and the subsequent oil spill in the Gulf of Mexico. By incorporating Iridium satellite transceivers into robots and buoys that can be deployed on site, researchers and other relief workers were able to monitor and track the movements of the oil spill in real time, greatly improving the efficiency of cleanup efforts.

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<sup>5</sup> *Hurricane Katrina: Managing the Crisis and Evacuating New Orleans: Hearing Before the United States Senate Committee on Homeland Security and Government Affairs*, Testimony of Brigadier General Mark A. Graham, 109<sup>th</sup> Congress (February 1, 2006).

On the international stage, after the devastating earthquake in Haiti, Iridium and its partners delivered communications services critical to the coordination of relief and rescue efforts. Relief organizations—including United Nations agencies, the American Red Cross, FEMA, the U.S. Department of Defense, the U.S. State Department, the Mexican Red Cross and others—relied on Iridium handsets and equipment for their communications needs in Haiti. Similarly, in the aftermath of the earthquake in Chile in February 2010, Iridium’s services proved to be essential. Indeed, Secretary of State Hillary Clinton personally delivered twenty (20) satellite phones to Chile within days of the earthquake.<sup>6</sup>

Iridium also assisted in reestablishing domestic and international communications in Japan following the devastating earthquake and tsunami in March 2011. To ensure that Iridium services reached critical government, military, and first responder users as quickly as possible, Iridium worked directly with Japan’s major telecom company, KDDI, to ensure activation of the Iridium systems already in place in Japan and ship thousands of new handsets to appropriate personnel.

**II. LEVERAGING IRIDIUM’S MOBILE SATELLITE NETWORK SERVICE WILL ENSURE THAT FIRSTNET WILL PRODUCE A UBIQUITOUS, RELIABLE, REDUNDANT NETWORK.**

Iridium applauds FirstNet for recognizing that utilization of mobile satellite networks that have already proven invaluable in aiding emergency communications “solves several critical issues” in the deployment of the FNN, specifically ubiquity, reliability, and redundancy.<sup>7</sup> To be

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<sup>6</sup> See Sarah Miller Llana, *Chile Earthquake: Hillary Clinton Arrives With Satellite Phones*, The Christian Science Monitor, March 2, 2010, available at: <http://www.csmonitor.com/World/Americas/2010/0302/Chile-earthquake-Hillary-Clinton-arrives-with-satellite-phones>.

<sup>7</sup> FirstNet Presentation, at 20.

successful, the FNN must do something that no other communications network has ever accomplished: it must provide reliable, robust communications services across the entire country, from densely packed urban communities to the most sparsely populated rural environments. This is truly a daunting task, as FirstNet’s Chairman Sam Ginn illustrated when he remarked that “[t]his is the most complicated telecom project in the nation’s history, without question.”<sup>8</sup>

Chairman Ginn explained that one fundamental challenge before FirstNet lies in the fact that the network must “cover every square meter of this nation and do it effectively.”<sup>9</sup> As Jeffrey Johnson, Craig Farrill, and other members of the Board acknowledge, there is no practical way to accomplish this goal without relying on satellite technology.<sup>10</sup> That is because only satellite has the twin traits of nationwide ubiquity and fundamental reliability that are essential to providing service under the most challenging circumstances. FirstNet was correct to highlight the importance of leveraging the benefits of mobile satellite services in its FirstNet Presentation and at the September 25, 2012 Board meeting. As it continues to refine its network concept, FirstNet should keep in mind that satellite connectivity will be an essential component to fulfilling its statutory mandate to “ensure the safety, security, and resiliency of the network.”<sup>11</sup>

**Ubiquity.** FirstNet has been instructed by Congress to impose “substantial rural coverage milestones as part of each phase of the construction and deployment of the network.”<sup>12</sup> This is

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<sup>8</sup> Transcript at 6.

<sup>9</sup> *Id.*

<sup>10</sup> *See, e.g., id.* at 37 (“There’s no way you could cost-effectively cover a state like [Oregon] with just ground-based architecture.”); *id.* at 38 (“[T]here could be no terrestrial mobile system out there and [a police officer] has no choice but to jump from his FirstNet choice and then go straight to mobile satellite.”).

<sup>11</sup> 47 U.S.C. § 1426(b)(2)(A).

<sup>12</sup> 47 U.S.C. § 1426(b)(3).

understandable, as public safety’s mission does not stop at the city limits. However, whether because of challenging terrain or infeasible economics, terrestrial wireless networks do not cover every corner of the country. Iridium strongly agrees with FirstNet that mobile satellite systems can help provide “[g]roup communications on a nationwide scale” and that “[u]biquitous US coverage [will be] provided through satellite network integration.”<sup>13</sup> As described above, Iridium is the only mobile satellite communications provider capable of providing truly global service. Indeed, Iridium’s unique network architecture allows it to provide service to remote areas – including Alaska, Hawaii, and the Polar Regions – that other mobile networks and MSS operators are unable to reach, furthering FirstNet’s goal extend coverage “into unserved/underserved rural areas.”<sup>14</sup>

***Reliability and Redundancy.*** In its presentation on the nationwide network concept, FirstNet articulated a vision of achieving reliability through multiple network diversity in which the FNN could reach unprecedented levels of reliability by providing multiple alternative paths for communication, including mobile satellite.<sup>15</sup> Iridium firmly agrees with FirstNet that mobile satellite networks provide “high reliability and redundancy.”<sup>16</sup> All manner of emergencies, from earthquakes and tornadoes to man-made disasters, have the potential to disrupt terrestrial communications networks. However, Iridium’s unique network facilities allow it to continue operating during and after emergencies that would shut down terrestrial operators or other MSS providers dependent on gateways in affected areas.

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<sup>13</sup> FirstNet Presentation, at 20.

<sup>14</sup> *Id.* at 20.

<sup>15</sup> *Id.* at 11.

<sup>16</sup> *Id.* at 21.

Iridium's satellite constellation currently consists of sixty-seven (67) operational satellites, plus in-orbit spares, operating in near circular low earth orbits approximately 483 miles above the earth's surface.<sup>17</sup> Each satellite in Iridium's constellation communicates with other nearby satellites in adjacent orbits, handing off voice or data communications from one spot beam to another within the satellite footprint and from one satellite to the next as they pass overhead. Thus, voice and data communications are relayed around the orbital network without touching ground until the point at which they are transmitted to an Iridium gateway and transferred to the public switched telephone network.

Iridium's network architecture provides inherent advantages in both performance and reliability as compared to other MSS operators. Notably, since more than one satellite is typically available from any given location on earth, there is a high degree of overlap and redundancy built into the system, minimizing missed connections and dropped calls. In addition, each satellite has multiple layers of onboard redundancy for critical system components and an onboard fault detection system to identify and mitigate any anomalies that may occur.

Moreover, in the event that a satellite or network link does malfunction, Iridium's network architecture ensures that: (1) inter-satellite traffic can be expeditiously re-routed to undamaged pathways within the constellation; (2) in-orbit spares can be repositioned quickly and effectively to address any coverage gaps; and (3) any actual service outage will be highly localized.

Iridium's unique low-earth orbit satellite network is supported by an extensive, interconnected ground-based network that provides terrestrial connections for satellite voice and data communications as well as command, control, and network support services. Iridium's

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<sup>17</sup> In July, 2012 Iridium commenced operating a pair of co-located satellites in plane 4, slot 7 of its NGSO constellation pursuant to a grant of special temporary authority. *See* FCC IBFS File No. SAT-STA-20120716-00116.

terrestrial network includes multiple layers of redundancy and backup systems for all critical functions to ensure the reliability of the network as a whole. Notably, each Iridium ground station has an uninterruptible power supply that maintains power to critical systems in the event of a commercial power outage and an independent diesel generator capable of providing power to critical systems for an extended period of time. Iridium's terrestrial network also has redundant fiber loops in place connected to several different public switched telephone networks and internet carriers to mitigate the risk of failure from a single terrestrial network provider.

The twin hubs of Iridium's terrestrial network are the Satellite Network Operating Center ("SNOC") in Leesburg, Virginia and Iridium's primary gateway facilities in Tempe, Arizona ("Gateway"). The SNOC serves as the nerve center of Iridium's state of the art satellite network. The SNOC is connected to Iridium's terrestrial network via a dedicated fiber-optic system which directs and carries data to remote antennas and other ground-based facilities. The SNOC and its staff provide 24/7 monitoring and control over all network elements, including the satellites, ground sites and interconnections as well as trending and performance analyses to ensure quality of service requirements are met. Iridium also has a backup command center with fully redundant functionality.

The Gateway is the landing point for Iridium's commercial voice and data traffic, providing connections to the public switched telephone network and the Internet cloud. The Gateway is constantly monitored by a team of highly skilled engineers and technicians to ensure that the quality and reliability of all of Iridium's network connections are consistently maintained. Iridium also has a back-up gateway in Alaska to protect network communications in the event of a localized emergency outage in Arizona. Indeed, by operating a centralized gateway and SNOC with geographically separate back up facilities, Iridium ensures that its

network operations will not be affected even by localized disasters that could disrupt its terrestrial infrastructure in a given area.

### **III. CONCLUSION.**

Iridium applauds FirstNet for recognizing the crucial role mobile satellite networks play in providing communications services to the Federal Government and first responders during numerous national and international emergencies. The FirstNet Presentation rightly identifies that the ubiquitous, reliable, redundant service provided by mobile satellite networks such as Iridium's are critical to achieving the statutory objectives of the nationwide public safety network.

Respectfully submitted,

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