Before the
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
Washington, DC

In the Matter of	)	
	)	
The Benefits, Challenges and Potential Roles for the Government in Fostering the Advancement of the Internet of Things	)	Docket No. 160331306-6306-01

COMMENTS OF INMARSAT, INC.

Inmarsat, Inc. ("Inmarsat") hereby responds to the National Telecommunications and Information Administration ("NTIA") public notice seeking comment on the potential benefits and challenges of Internet of Things ("IoT") technologies and the role the U.S. Government should play in this area.[1] As NTIA continues in this process, it should keep in mind at every step the essential role of satellite services in making possible the full benefits of the Internet of Things. This recognition of the need for robust, diverse satellite services to enable IoT development and deployment should inform both NTIA's assessment of the benefits of IoT and its policy recommendations.

Importantly, the Internet of Things is not a vision of the future—it has already arrived. Satellite service provider, and in particular mobile satellite service ("MSS") operators, have been enabling the IoT reality for years through machine-to-machine ("M2M") applications. These solutions have long driven efficiency in numerous critical industries, promoted scientific and

[1] National Telecommunications and Information Administration, The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things, *Notice, Request for Public Comment*, Docket No. 160331306-6306-01, 81 Fed. Reg. 19956 (2016).

environmental research, and enabled businesses to track, manage, and optimize resources across the globe. For example:

- Inmarsat's M2M capabilities enable accurate monitoring and adjustment of water management systems, transmitting sensor data to improve visibility of changes in water levels and water quality.
- Inmarsat M2M enables oil and gas pipeline operators to monitor for corrosion and other risks along their pipelines, simultaneously minimizing risk and costs while improving safety and security.
- MSS technologies allow for fleet management, whether a fleet of garbage trucks moving across the city or airplanes moving across the globe; and advanced asset tracking enables businesses not only to know where cargo is, but also the status of its contents and to unlock a container remotely upon reaching its final destination.
- Satellite services like Inmarsat's are critical to smart grid implementations, automating monitoring and control of the distribution network and managing efficient delivery of power to consumers.

These are only a few of the myriad IoT applications already being supported by Inmarsat and other satellite service providers. The satellite industry has been on the cutting edge of IoT technology for years, and satellite connectivity will continue to drive innovation in this space.

The Beneficial Role of Satellite Connectivity in Delivering the IoT

Satellite connectivity, whether as a backhaul solution or as the access network for connected devices will be an essential component of future systems enabling the Internet of Things. Indeed, it is not a stretch to say that is no IoT future without satellite. Because of their ubiquity, reliability, seamlessness, and versatility, satellite services will be key to unleashing the benefits and value of IoT in the near- and mid-term future.

Ubiquity. Terrestrial wireless infrastructure is designed to serve populations, not geographies, leading to the networks being most prevalent in urban areas and often largely non-existent in rural and remote areas. One of the key benefits of M2M and IoT systems are the abilities to monitor, track, and control assets in real-time in remote areas where manual

inspection and operation would be difficult or uneconomical. The reduced cellular coverage outside the densest population centers limits its ability to facilitate asset connectivity. This problem is exacerbated for international businesses, due to the national nature of most cellular deployments. Satellite systems suffer none of these challenges. Inmarsat's global satellite network provides service worldwide, meaning that its coverage extends to rural and urban areas alike, as well as across the oceans and the skies. That is why Inmarsat refers to its M2M and IoT strategy as the "Internet of Everywhere."

Reliability. Reliability is another key differentiator for satellite-delivered IoT solutions. Because they do not rely on an extensive physical network of towers and other local facilities, satellite services are less vulnerable to damage to physical infrastructure, particularly in times of emergency or disaster. Inmarsat can offer businesses 99.9% availability over its satellite and ground network due to this lack of vulnerability coupled with the strength and resilience of its network. Similarly, Inmarsat's user terminals are rugged, discreet, and specifically designed to operate for long periods of time without maintenance or manual inspection, adding an extra layer of reassurance.

Seamlessness. Another reason why satellite systems offer such effective platforms for IoT applications is the uniformity of experience across the satellite footprint. Systems like Inmarsat's, which has a worldwide communication footprint, seamlessly can connect all compatible devices, even if they cross national borders, without the need to pay roaming fees or build in antennas to communicate with systems from various providers using incompatible technologies. Moreover, unlike cellular systems, where technology upgrades happen gradually, hitting the population centers first, performance in a satellite system typically is largely

consistent across a satellite's footprint creating a seamless experience that benefits technology developers and users alike.

Versatility. The versatility of satellite communications systems is another aspect making them a key enabler of IoT. Satellite system designs vary in terms spectrum, orbit, constellation size, services, and myriad other aspects, which facilitate a wide variety of solutions. For example, amongst satellite operators, Inmarsat has the most diverse portfolio of connectivity offerings in the IoT space, from low-data rate messaging services, typically used in industries like transportation for tracking and monitoring vehicles and cargo, to broadband IP connectivity, useful for real time monitoring and control of assets, or as a backhaul solution for low-power wide area networks ("LPWAN") or other applications.

The satellite industry has a long history of integrating its connectivity solutions into other systems and partnering strategically with manufacturers and service providers to deliver tailored end-to-end IoT solutions. Inmarsat is working with a number of key solutions providers to certify and collaborate on applications. For example, Inmarsat recently announced its membership in the LoRa® Alliance, a non-profit organization that promotes the connectivity standard LoRaWAN for LPWAN.[2] This partnership means that assets that use the LoRa standard can now be connected over Inmarsat's global networks for seamless integration and interoperability, even in areas where cellular or terrestrial coverage is unavailable or unreliable.

Inmarsat has also announced a partnership with Actility, the industry leader in LPWAN, which combines Inmarsat's connectivity with Actility's IoT management platform to connect

[2] Press Release, Inmarsat, Inmarsat joins the LoRa® Alliance, http://www.inmarsat.com/news/inmarsat-joins-lora-alliance/ (Feb. 8, 2016).

and manage objects anywhere on the planet.[3] Through its partnership with Actility, Inmarsat's satellite system will provide backhaul for a wide range of IoT and M2M applications, including:

- Utility management and smart grid
- Infrastructure remote fault detection
- Street light management
- Environmental monitoring
- Waste management
- Smart agriculture

Beyond backhaul applications, mobility services provided over satellites also are a critical component to current and future IoT applications. As described above, MSS providers have long been indispensable in diverse M2M applications. Similarly, MSS is already an essential platform for government Unmanned Aerial Systems (UAS) operations. As commercial UAS and connected car technologies proliferate, the reliability and ubiquity of MSS will be the only way to ensure their effective operation, whether through command-and-control functions, telematics, over-the-air system updates, or enhanced navigation capabilities.

Policy Recommendations

As detailed above, satellite communications are a key enabler of the IoT future. But to reach the full potential of these technologies, satellite systems require adequate spectrum resources to support current and future services. As various U.S. government agencies consider policies to promote development of "5G" and other wireless technologies, they should bear in mind the essential role of satellite broadband technologies and ensure that both operational

[3] Press Release, Inmarsat, Inmarsat and Actility partner to deliver single, global platform for Internet of Things (IoT), http://www.inmarsat.com/press-release/inmarsat-actility-partner-deliver-single-global-platform-internet-things-iot/ (Feb. 19, 2016).

satellite systems as well as those under development have ample spectrum available to continue innovating in this sector.

Policies related to IoT should also be technology neutral to the greatest extent possible, and at a minimum should recognize the diverse roles satellite solutions can play in enabling IoT. Satellite connectivity can function at every level of the IoT service delivery chain, from backhaul to wireless networks to the access network for IoT devices themselves. As U.S. government agencies consider policies, establish working groups, or otherwise take actions in this area, they should ensure that these actions contemplate satellite industry participation in IoT and do not presuppose any particular technological solutions.

Overall, policy approaches should reflect that the IoT sector, while already established and boasting a substantial existing base of devices, is undergoing rapid innovation seeing additional terminals and applications being added monthly. New technologies and platforms are under development, and governments should be reticent to take an overly regulatory approach at this critical evolutionary stage. In particular, technologies and solutions should be industry-driven, and where standards are required they should be developed through open participatory processes. Similarly, security in IoT is essential. Without sufficient trust in IoT devices and platforms, consumers will reject them, and their development will be stunted. However, experience has shown that approaches to the fast-moving area of cybersecurity are best developed in industry-driven, multistakeholder contexts that are nimble, leverage the best available expertise, and develop flexible approaches that can be implemented according to a business's specific needs and circumstances.

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In conclusion, Inmarsat appreciates the opportunity to provide NTIA with information about the benefits and development of IoT, and to offer recommendations on ways the U.S. government can help realize this vision. As described above, satellite communications already are, and will continue to be, a key enabling platform for the Internet of Things. As NTIA proceeds to a green paper on this matter, it should ensure that its observations and recommendations fully reflect the diverse and critical roles of satellite technologies in this innovative space.

Respectfully submitted,

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