

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

In the Matter of)
)
The Benefits, Challenges and Potential Roles) Docket No. 170105023-7023-01
for the Government in Fostering the)
Advancement of the Internet of Things)
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COMMENTS OF INMARSAT, INC.

Inmarsat, Inc. (“Inmarsat”) hereby responds to the National Telecommunications and Information Administration (“NTIA”) public notice¹ requesting comment on “the issues and proposed approach, current initiatives, and next steps laid out in” the Department of Commerce’s January 2017 green paper “Fostering Advancement of the Internet of Things.”² Inmarsat appreciates this opportunity to update NTIA on its Internet of Things (“IoT”) activities as well as to respond to the findings and proposals of the Green Paper. As Inmarsat suggested in its comments in response to NTIA’s April 2016 Request for Comments, NTIA should bear in mind the essential role of satellite communications in realizing the full potential of the IoT.³ Whether through directly connecting devices to the Internet, providing backhaul connectivity for IoT networks, or delivering ancillary services to connected devices and vehicles, robust and diverse

¹ NTIA, *The Benefits, Challenges, and Potential Roles for the Government in Fostering the Advancement of the Internet of Things*, Docket No. 170105023-7023-01, Request for Public Comment, 82 Fed. Reg. 4313 (Jan. 13, 2017) (“Public Notice”).

² Department of Commerce Internet Policy Task Force & Digital Economy Leadership Team, *Fostering Advancement of the Internet of Things* (Jan. 2017) available at <https://www.ntia.doc.gov/other-publication/2017/green-paper-fostering-advancement-internet-things> (“Green Paper”).

³ See Comments of Inmarsat, Docket No. 160331306-6306-01 (June 2, 2016) (“Inmarsat 2016 Comments”).

satellite technology will be key enabling IoT development and deployment. Recognition of this fact should inform NTIA's assessment of the benefits of IoT and its policy recommendations.

Satellite-Delivered IoT Solutions

IoT is a hotbed of technology, service, and product innovation. This especially true in the satellite sector which has long been a global leader in developing machine-to-machine ("M2M") and IoT solutions. Even in the less than nine months since NTIA last sought comment on the state of the IoT industry, there have been significant advancements in satellite-delivered IoT applications. Inmarsat's participation in NTIA's IoT activities has been driven by the company's own commitment to IoT, which illustrates the fast-pace of development in the IoT sector today and the diverse roles satellite technology can play. To highlight a few recent developments:

Inmarsat-Actility Global LPWAN Network – Just this month, Inmarsat and Actility announced the launch of the first global IoT network to allow customers to bring to market IoT solutions tailored for their business needs anywhere in the world.⁴ The solution leverages Inmarsat's global connectivity as backhaul connectivity Actility's LoRaWAN low power wide area network ("LPWAN") technology to provide an end-to-end solution for customers anywhere in the world without the need for pre-existing network infrastructure. The first three applications deployed on the global network demonstrate some of the versatility of the Inmarsat IoT platform: one is an asset tracking solution tracking the location, movement, health, and other statistics of cattle on a remote ranch in Australia; the second, an agribusiness solution monitoring water levels in reservoirs and soil moisture at the roots of plants in a large, remote palm oil plantation in Malaysia to deliver water to where it most needed; and finally, remote monitoring of oil

⁴ James Atkinson, Inmarsat and Actility team up for global LoRaWAN IoT network, Wireless Magazine, <http://www.wireless-mag.com/News/44156/inmarsat-and-actility-team-up-for-global-lorawan-iot-network-.aspx> (Feb. 13, 2017).

platform processes where cellular coverage is patchy or non-existent to identify potential failure points and avoid downtime.

Vodafone IoT Roaming Agreement – In October 2016, Vodafone announced that it signed a roaming agreement with Inmarsat to enable international satellite and cellular roaming connectivity for IoT devices.⁵ The partnership increases flexibility and coverage for IoT customers, enabling them to connect all of their assets on one global platform without dealing with the expense and complexity of dealing with multiple connectivity partners or roaming agreements.⁶ The integrated service allows IoT devices to use the Inmarsat satellite network for direct access to the Internet when cell connectivity is unavailable, taking advantage of Inmarsat’s global coverage and high network availability, even in extreme environmental conditions, to help truly realize the potential of the Internet of Everywhere. Potential applications include applications include smart grid, pipeline monitoring, fleet tracking, secure banking and point of sale, water management, and turbine monitoring, among others.

Connected Car – Inmarsat is on the leading edge of developing holistic connected car solutions that integrate satellite and terrestrial technology to deliver diverse, reliable services over the most effective and efficient network path. At the 2017 Consumer Electronics Show, Inmarsat and Continental collaborated to showcase the capabilities of satellite communications

⁵ Press Release, Vodafone, Vodafone signs roaming agreement with Inmarsat for Internet of Things communications, <http://www.vodafone.com/business/press-release/vodafone-signs-roaming-agreement-with-inmarsat-for-internet-of-things-communications-2016-10-20> (Oct. 20, 2016).

⁶ Vodafone, *Vodafone IoT satellite service*, <http://www.vodafone.com/business/iot/vodafone-iot-satellite-service> (last visited Feb. 19, 2017).

and global over-the-air (“OTA”) updates to power the connected car.⁷ Inmarsat’s network service provides a two-way data connection combined with a global broadcast capability that enables rapid, responsive and efficient OTA software and map updates for vehicle systems with virtually unlimited scalability to deliver content to multiple users. With the push of a button, customers can deliver updates—deploying security patches or new functionality—across all vehicle systems for all of their vehicles globally over a single network. In addition to managed security services, the Inmarsat solution can provide GNSS augmentation achieving substantial gains in accuracy and reliability of navigation and location services, and vehicle telematics. Intelligent routing over satellite and terrestrial wireless networks (including mobile and unlicensed) will enable vehicles to achieve the best quality of service, least cost, and highest availability.

These three examples illustrate the diversity of ways that satellite technologies are helping to drive IoT innovation and adoption. But even these are only a handful of the potential applications for satellite-delivered IoT in the U.S. For example, satellite connectivity also can play a key role in improving/maintaining remote and/or critical infrastructure, environmental protection, disaster response, and border security among other applications. In any instance where highly-reliable, secure IoT communications are required, whether or not other communications networks are available, satellite systems should be considered as an option.

Inmarsat Participation in NTIA’s IoT Initiative

As an industry leader in IoT, Inmarsat appreciates the open, consultative manner in which NTIA has proceeded in its IoT inquiry, and has been proud to participate in each step along the

⁷ Press Release, Inmarsat, Inmarsat and Continental cooperate for holistic vehicle connectivity, <http://www.inmarsat.com/news/inmarsat-continental-cooperate-holistic-vehicle-connectivity/> (Jan. 6, 2017).

way. In June, 2016, Inmarsat responded to NTIA's previous request for comments with a submission highlighting the role of satellite connectivity in delivering the IoT.⁸ In that filing, Inmarsat discussed several examples of M2M and IoT applications enabled by satellite services as well as the key advantages of satellite technologies—their ubiquity, reliability, seamlessness, and versatility—that make them indispensable to the IoT.⁹ Inmarsat also offered several policy recommendations, including that NTIA bear in mind the spectrum needs of satellite broadband technologies, that any policies related to IoT should be technology neutral to the greatest extent possible, and that policy approaches should reflect the fast-moving and innovative nature of the IoT sector by emphasizing industry-driven, multistakeholder processes and eschewing prescriptive regulatory approaches.

Inmarsat also participated in the Department of Commerce workshop delving deeper into some of the question raised by the responses to the earlier public notice, where the company had the opportunity to exchange ideas with government and industry thought-leaders from across the IoT ecosystem. Most recently, Inmarsat has participated actively in NTIA's ongoing multistakeholder process on IoT security upgradability and patching,¹⁰ where Inmarsat shares its perspective as a global satellite system operator and IoT solutions provider. Inmarsat looks forward to the outcome of the multistakeholder process as well as the proposed next steps outlined in NTIA's Green Paper, which both have the potential to contribute beneficially to further development of advanced, effective, and secure IoT applications.

⁸ See Inmarsat 2016 Comments.

⁹ *Id.* at 2-5.

¹⁰ See NTIA, Multistakeholder Process; Internet of Things (IoT) security Upgradability and Patching, <https://www.ntia.doc.gov/other-publication/2016/multistakeholder-process-iot-security>.

Reactions to the Department of Commerce IOT Green Paper

The Green Paper opens with a recognition of the important role of government “to establish and support an environment that allows technology to grow and thrive,” including by “encouraging private sector leadership in technology and standards development, and using a multistakeholder approach to policy making.”¹¹ Inmarsat shares this view, and in the remainder of these comments, the company suggests some ways the U.S. government can beneficially continue in this role, with consideration for the importance of satellite technology to delivering the IoT.

Inmarsat agrees that the four broad areas of engagement identified by NTIA (Enabling Infrastructure Availability and Access, Crafting Balanced Policy and Building Coalitions, Promoting Standards and Technology Advancement, and Encouraging Markets)¹² each are important areas where the government can have a positive impact. In further exploring these areas, and consistent with Inmarsat’s June 2, 2016 comments, NTIA and other Federal actors should ensure that their activities are technology neutral and inclusive of technologies beyond traditional terrestrial wired and wireless systems, such as satellite.

Enabling Infrastructure Availability and Access – As the Green Paper explains, “IoT will depend upon both public and private communications networks, and will use various wireline and wireless modes, including satellite, often in combination or on an interdependent basis.”¹³ Inmarsat appreciates the Department’s identification of the key role of satellite communications infrastructures in facilitating the continued development and deployment of the IoT. The growth

¹¹ Green Paper at 2.

¹² *Id.* at 3.

¹³ *Id.* at 16.

of IoT will also place new demands on access to spectrum, which will require both that additional spectrum resources be made available and that existing spectrum resources are used effectively and efficiently.¹⁴ In considering spectrum requirements for IoT, NTIA and other Federal agencies should keep in mind the spectrum needs of satellite systems, as satellite systems are not just more robust and reliable than terrestrial wireless alternatives, but often can be more efficient as well. Satellite spectrum supports IoT systems in all environments, not just those with the latest (expensive and susceptible to natural and man-made disruption) terrestrial wireless infrastructures. Additionally, satellite systems are extremely efficient users of spectrum. Using global data broadcast technologies, satellite systems can deliver important content, like OTA security updates, to practically unlimited numbers of devices simultaneously across wide geographic areas—something that would cause unacceptable congestion on many wireless networks, where devices are even within range of those networks. In promoting expanded IoT infrastructure and innovative spectrum management, the Department’s efforts both should ensure participation of satellite industry voices and should emphasize the key role of satellite technology in delivering IoT solutions.

Crafting Balanced Policy and Building Coalitions – Inmarsat supports the Department’s continued fostering of an enabling environment for IoT technology to grow and thrive, its emphasis on cybersecurity, and in particular its commitment to promoting technology-neutral standards.¹⁵ The Department should continue its successful practice of convening multistakeholder processes that bring together experts from across the ecosystem to address challenging questions related to emerging technologies. In the cybersecurity area, in particular,

¹⁴ *Id.* at 17-18.

¹⁵ *Id.* at 43.

these sort of flexible, non-prescriptive approaches have been effective. The Department’s approach of identifying discrete areas of focus for deep dives, such as the current emphasis on security upgradability and patching, is positive, but must bear in mind the wide diversity in the IoT market, ranging from consumer wearables, to connected vehicles, to massive enterprise systems, and everything in between. Security needs and priorities, as well as risk tolerances and cost sensitivities, will vary dramatically from one market or industry to another. What might be acceptable or feasible for a consumer product in the home, for example, may not be viable for a fleet of connected cars that must receive OTA patches simultaneously whether garaged or on the road. This heterogeneity in the broad umbrella category that we call IoT both suggests a need for additional study, and further reinforces the importance that security recommendations draw upon flexible, industry-driven best practices that can evolve with—as opposed to predetermining the evolution of—IoT products and services.

Promoting Standards and Technology Advancement – The Department of Commerce, both through the technical work of the National Institute for Standards and Technology (“NIST”) and through the policy work of NTIA, have an important role to play in promoting the development of industry-driven standards development efforts. Inmarsat agrees with the Department’s emphasis on “an industry driven, private sector-led consensus-based approach to standards development.”¹⁶ In pursuing this vision, the Department should ensure that any working groups, initiatives, and other technology development programs it supports are broadly inclusive of various technologies and networks. As demonstrated by Inmarsat’s own experiences in the IoT market,¹⁷ there is substantial promise in integrating different network technologies and

¹⁶ *Id.* at 47.

¹⁷ *See supra* pp. 2-4.

topographies into a single seamless user experience. As such, the Department should look to promote technological development work on network softwarization and other innovative mechanisms for integrating diverse wired, wireless, and satellite networks. Inmarsat also supports the Department’s continued engagement internationally to communicate the value of industry-led, consensus-based standards development and flexible best practices.¹⁸

Encouraging Markets – In the Green Paper, the Department observed that the “manufacturing sector appears to have the most to gain from the adoption of IoT.”¹⁹ Inmarsat agrees that the automation and process monitoring of connected devices can bring about substantial benefits in terms of efficiency, waste reduction, and productivity in the manufacturing sector, but these benefits are far from limited to factories and similar industries. The Department should encourage further research and exploration of how IoT systems, including LPWAN, can be used in various sectors including agriculture, transportation, and e-government or smart city applications. Inmarsat agrees with the Department’s proposal to leverage the government’s role as an IoT consumer to drive innovation, security, and adoption of IoT.²⁰ The Department also should recognize that many of these services, such as utility and smart city solutions, will be deployed at the enterprise or municipal level. As such, the Department should promote consideration of support for pilot programs, grants, or research initiatives exploring use of IoT solutions, especially in smart society applications, and in industries like energy and agriculture.

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¹⁸ *Id.* at 48.

¹⁹ *Id.* at 8.

²⁰ *Id.* at 53-54.

In conclusion, Inmarsat appreciates the opportunity again 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 the Department begins to act upon the proposals set forth in the Green Paper, it should ensure that its efforts fully reflect the diverse and critical roles of satellite technologies in this innovative space.

Respectfully submitted,

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