Questions for the Record from Senator Deb Fischer
To
Mr. Michael Rapelyea

Question 1. Mr. Rapelyea, as you state in your testimony (page 9), it is estimated that by 2020, there will be over 20 billion connected devices worldwide. As you may know, in March the Senate passed a bipartisan resolution that I introduced, along with Senators Ayotte, Booker, and Schatz, which stressed the importance of developing a national strategy to encourage the Internet of Things, and this is an issue that we continue to follow closely. We hear frequently about how mobile wireless will enable the growth of the Internet of Things, and I believe that is true, but I also think it is important to keep an expansive view of the technologies that will play a role in this evolution. What do you see as the role of satellite in facilitating the growth of the Internet of Things?

Answer: The Internet of Things (IoT) brings together advancements in computing, networking and communications technologies. Among the many things IoT promises are economic growth, increased productivity and new market opportunities. Growth estimates for the 20 developed and emerging economies that generate over 75% of the world's economic output is $10.6T added to their cumulative GDP over the next 15 years.1 Increased productivity results from closer tracking of high valued assets and improved visibility into supply chains that when combinedwith data analytics provide greater operating efficiencies and higher return on invested capital.

- Engine telemetry transmitted from an aircraft, locomotive or oil rig predicts engine failure, isolates the part and alerts service personnel to reduce engine downtime.
- Power line sensor data transmitted to a control center detects changes that signal a power demand by a community.
- Truck or delivery vehicle sensor data and camera snapshots ensure driver safety and proper vehicle operation. Data security is a key component of the machine-to-machine (M2M) communications inherent in IoT. Security requirements vary for wired and wireless connections. A bank ATM machine uses a dedicated wired connection to the bank network. An ATM in a mobile vehicle in remote areas uses wireless connection. In order to ensure transmissions cannot be intercepted, data link encryption is employed.

Satellite delivers secure, wireless M2M communications. Satellites provide coverage to serve areas that are not cost effective to build out terrestrial wired (e.g. fiber) or wireless (e.g. WiFi or cellular) networks. For in-flight aircraft and locomotives traveling in remote areas satellite can be the only option since most terrestrial systems elect to direct antennas toward the greatest number of existing subscribers. When terrestrial service is available, satellite increases reliability by providing a redundant communications link. This is especially important when terrestrial systems become damaged or inoperable due to a natural or man-made disaster.

ViaSat Mobile Satellite Services (MSS) leverages Internet Protocol (IP)-based satellite technologies developed for the US DoD's Blue Force Tracking2 network to improve battlespace communications to reduce casualties due to friendly fire. MSS features and benefits include:

- Data link encryption superior to wireless networks
- Real-time position tracking

- Low user service cost
- Rapid deployment
- Open standards-based IP applies to multiple market verticals

In service since 2013, the DoD network has an installed base of over 70,000 users. ViaSat launched MSS as a separate, commercial variant of the DoD network. This response to the satellite technology for communications mirrors the potential growth of IoT.