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Lamar Smith, Chairman

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Statement of Space Subcommittee Chairman Brian Babin (R-Texas)
In-Space Propulsion: Strategic Choices and Options

Chairman Babin: We are on the cusp of a giant leap in space transportation technology. Advances in in-space propulsion systems hold the promise of radically altering space exploration. Breakthroughs will allow for faster travel, larger payloads, and greater efficiency. All of this will allow humanity to access the far reaches of the solar system. This is clearly a subject that excites the imagination.

NASA has led the way in developing in-space propulsion since its inception. The Space Electric Rocket Test (SERT-1), as well as the Deep Space 1 (DS1) and Dawn missions laid the foundation of electric propulsion. The Nuclear Engine for Rocket Vehicle Applications (NERVA) program demonstrated the viability of nuclear thermal propulsion. These investments have ensured U.S. leadership in in-space propulsion, which is important for not only civil space missions, but also national security missions and commercial applications. Commercial in-space propulsion systems, operating at kilowatts of power, are a relatively mature technology today: In 2015 Boeing began offering the first all-electric commercial satellites.

Because of these successes, we stand on the threshold of a new era. One in which in-space propulsion and power systems could grow to a scale and sophistication that would support human spaceflight and exploration.

NASA is currently developing in-space power and propulsion systems that are an order of magnitude more powerful than modern commercial systems.

Originally developed for the cancelled asteroid retrieval mission, this system will now be appropriately incorporated into NASA's exploration architecture and may be used on NASA's Deep Space Gateway.

Similarly, developing this technology has taught us valuable lessons that will inform the next generation of in-space propulsion, which will send humans to Mars. NASA's Human Exploration Mission Directorate is supporting research on three new in-space propulsion technologies. These systems operate at hundreds of kilowatts of power which is another ten times more powerful than the systems under development for use around the Moon, and could be used on a Deep Space Transport system for missions to Mars and beyond.

The next-generation in-space propulsion technologies under development by three of today's witnesses will be critical to ensuring that the exploration of Mars is possible,

sustainable, and affordable. I hope that their testimony can help the Committee better understand the unique mission options that each technology will offer.

As important as these developments are for the Journey to Mars, the most exciting payoffs may come from the ability to develop these new engines even further. As discussed in NASA's Technology Roadmaps, scaling up the power levels another order of magnitude and building systems that will operate with thousands of kilowatts of power will significantly transform how humanity explores the solar system. These systems could even put the outer planets within reach of human explorers.

To be clear, these developments are not simply about human spaceflight; rather it is an across-the-board change in technology on par with the jump from sailing vessels and steam-powered ships. That long-term vision is still quite a ways off and will require further work, but the promise is exciting.

Smart investments, focused exploration goals, and constancy of purpose will maintain US leadership in not only in-space propulsion, but also space exploration more broadly.

Our witnesses today can help us better understand how all of these efforts fit together. I look forward to hearing about how in-space propulsion can expand our reach. Advancements in these technologies will literally open up a universe of possibilities.

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