TESTIMONY TO THE COMMITTEE

ON

SCIENCE, SPACE AND TECHNOLOGY

SPACE AND AERONAUTICS SUBCOMMITTEE

MARCH 21, 2024

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Chairman Babin, Ranking Member Sorensen and Committee Members, I am pleased to have the opportunity to present my views on NASA's Science Mission Directorate.

Great organizations achieve great accomplishments. NASA's Science Mission Directorate (SMD) has a legacy of great accomplishments. My examples of great accomplishments by SMD are Viking, Hubble, James Webb Space Telescope and hopefully Mars Sample Return (MSR). Others might select a different set with equal merit. It would also be a mistake not to recognize the incredible contributions of projects from the Sounding Rocket and Balloon Program, to projects such as the Parker Solar Probe and Weather Satellites.

What are the characteristics of projects that result in great accomplishments? Today projects such as JWST and MSR originated from Decadal Surveys. The National Academies Decadal Surveys are comprehensive surveys of a scientific discipline such as Astronomy and Astrophysics to identify the Number 1 priority project for development by NASA. The Surveys provide a mechanism for the scientific community to speak with one voice in identifying the best of the best.

Projects that result in great accomplishments travel extremely difficult development paths. Projects in this

category push the boundaries of what is possible. This aggressive approach is necessary to obtain extraordinary scientific results such as the JWST results that are being experienced today. The difficult development paths these projects follow are populated with incredible engineering, cost and management challenges. Most, if not all, are threatened by cancellation.

So, what are the keys to the success of these projects that must test the limits of what is possible? Clearly, the exceptional people that make up the project organizations in NASA, academia and industry are key. Superior leaders are required to provide bold and visionary leadership. Leadership that recognizes corrective action and not cancellation is necessary to achieve great accomplishments. These scientists, engineers and leaders do not simply walk in off the street. They are the result of rigorous "hands on" development and being trusted with significant early career responsibilities. NASA has a history of exceptional employee development. This development effort will be even more important as SMD pursues more challenging projects in the future.

Next I would like to discuss MSR. Today, MSR is in the balance as to whether it will be allowed to follow the path necessary to become an SMD great accomplishment: or will

it become a monument to a missed opportunity? I do not want to minimize the technical, cost and management problems identified by the Independent Review Board (IRB). The problems are significant, as are NASA's and our country's budget challenges.

MSR is identified as the #1 priority in the last two Planetary Decadal Surveys. The expectation is clear that when the samples are analyzed in the highly capable earth based laboratories, MSR will join the SMD legacy great accomplishments. Today the future of MSR is in the hands of NASA, Congressional and Administration leaders. Bold, visionary leadership is needed to put MSR on a path to success.

The future of SMD is populated with incredible opportunities. Many are focused upon civilization's great question "Are we alone?" We must continue to improve our project management capabilities to realize the potential that the future holds. My thoughts on some of the required improvements are:

Cost Estimating: Better cost estimating of "Most Probable Cost" and not relying upon "Lowest Credible Cost" for early decision making is required.

Systems Engineering: Improved systems engineering is needed to develop architecture and interfaces that are the "simplest" possible to achieve project objectives.

Employee Development: Developing scientists, engineers and leaders will continue to grow in importance. Contracts with industries that focus upon buying services as opposed to hardware, systems integration, operations, etc. minimize development opportunities.

SMD Strategy: A balanced SMD strategy is a worthy objective; however, implementing projects such as Viking, Hubble, JWST and MSR will likely not be possible without accepting some impact on other activities. This should be acceptable to achieve great accomplishments.

Project Management: Future projects will require the full capabilities of NASA. This includes NASA Senior Management, the Science Mission Directorate and the NASA Centers including Center Directors, Project Managers and their respective organizations.

The hallmark of a great organization is the willingness to accept difficult challenges to achieve great accomplishments. I believe SMD is such an organization and that the future of SMD will be bold, exciting, scientifically rewarding and a source of great national pride.