

U.S. Senate Committee on Commerce, Science, and Transportation, Subcommittee on Aviation and Space

November 5th, 2019

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Intensifying and targeting NASA-University partnerships for our space future

Full Committee Chairman Wicker, Full Committee Ranking Member Cantwell, Chairman Cruz, Ranking Member Sinema, and Members of the Committee, thank you for allowing me to speak today. I am testifying in my personal capacity. I am the co-chair, with university President Michael Crow, of the Interplanetary Initiative at ASU, and I am the Principal Investigator of the NASA Psyche mission, the 14th in the Discovery program.

We have a vision an optimistic human space future, we, in this room, have this vision, where we are an interplanetary species, and where our space exploration improves society on Earth and our knowledge and care of Earth itself. Becoming multi-planetary in mind and in reality is essential for the continued growth of civilization.

To achieve this future we need all stakeholders moving fast. Two of the most critical stakeholders in this space future are NASA and American universities. Our partnership, the partnership between universities and NASA, is central and crucial to the future of space exploration and settlement.

NASA partners with universities in many ways, though the most common is through research grants and project contracts. But to speed forward in the way we must to reach the Moon and Mars, we need to focus and hone these partnerships.

Here are three key examples of university-NASA partnership needs:

1. **Workforce development:** we need talent to support the growing aspirations of our nation, and to work with other countries as the world's continued leader in space. Therefore, education has to be future-facing, and workforce-oriented.
2. **Returning to the Moon**, this time to stay, will require more than just engineers, astronauts, and scientists; it will require medical professionals, legal and policy experts, architects, writers, philosophers, and business leaders. Much of the research among these disciplines takes place in universities.
3. **The stakeholder triangle of NASA – universities – private sector** is necessary for our space future requires the full involvement of. Non-profit universities are uniquely placed to communicate the needs, create rapid responsive teams, and transfer the research and technology intellectual property produced at universities through partnership with NASA into the private sector, to the great benefit of both the space industry and the American taxpayer.

Now is the time to grow our partnerships in these more fruitful, targeted ways: Now is the time to set up University Affiliated Research Centers and other such mechanisms to speed up the development of specific solutions, and accelerate the flow of knowledge and technology to NASA and to the private sector.

ASU is here to meet this challenge with a student population of 100K+ and as the #1 ranked school for innovation, five years in a row. Under president Michael Crow and his vision for the New American University, ASU is redefining the landscape of public higher education. It's a more inclusive and collaborative model than any other university. We are here to solve real-world problems, and educate for the future. Our partners value our ability to meet their needs, and on their schedule.

A vibrant, deep workforce is critical to our future. And the age of the Prussian-style compliant industrial workforce is over. We don't need to train better sitters-still, better passive listeners. We need to change the nature of education from a fixation on a specific content memorization to the ability to problem-solve, assess data, and work effectively in teams, both sharing information and giving and receiving feedback. This is the education of the future: Educating for the processes, the transferrable skills, that every person needs for work and life, and to speed forward the economy of the future, which is filled with jobs that don't exist today.

ASU has created the Interplanetary Initiative to specifically meet the needs of aerospace and execute on the vision of the administration. For three years we have been developing the most innovative ways to build research teams that are effective, rapid, and interdisciplinary, and we've developed really new educational programs that create collaborative problem-solvers for the future workforce. We identified many of the big questions that we will have to answer to achieve our space future. And we've begun the work to answer those questions.

Together with our sister universities ASU can accelerate space development in the following ways:

- Connecting universities, NASA, and the private sector for knowledge sharing and rapid targeted innovation – being system integrators, but even more, creating and deploying the teams to solve the greatest challenges
- Developing core technologies needed to support the mission
- Training the future workforce

We're ready now. Let's go to space together.

Comment on university-led space missions

As you all know, NASA flies both flagship missions, that are organized from NASA Headquarters, and competed missions, which are led by scientists either at universities or at labs or NASA

centers. Each has its purpose and place in our exploration of space. Flagship missions are critical for stimulating development of new technology and for fulfilling the most complex of planetary goals.

Flagship missions can engage a broader swath of the community through competed calls for instruments. These calls can bring new groups onto missions, but the project scientist then has the challenge of organizing and uniting disconnected sub-teams.

Competed missions have the advantage of being conceived of, budgeted, and planned as a whole from the beginning. Flagships, in comparison, are planned in segments and not under a single person's uniting vision.

University-led competed missions, in particular, are regularly coming in on time and on or even under budget. These are sometimes the results of that single uniting leadership. Both the science vision, the results, and the correct scheduling and budgeting make it clear that university-led missions are a critical part of the NASA portfolio.