

**Remarks**  
at the  
**Mars Society Convention**

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Good morning, and thank you very much for inviting me to be the warm-up act for Elon Musk.

But before we get to that, let me say that it's good to be among fellow space travelers like the Mars Society. You all want to turn the stuff of science fiction into reality, as do I. Many of you are fellow engineers and scientists with whom I share a common passion, for which the Crew Exploration Vehicle, and the Ares crew and heavy-lift launch vehicles, are only the first steps on a long journey to the Moon, Mars, and future destinations in the solar system.

So, allow me a few minutes to share some of my thoughts for your consideration about where we are and where we are going in this

journey. I know that some of you are frustrated by how arduous our journey has been even to this point, and by the many challenges we still face before embarking on mankind's first journey to Mars. As someone who has devoted his career to the space business, I share these frustrations. But I also think that a bit of perspective might be in order.

This morning, I hope to provoke some thinking among you, as members of the Mars Society, to try to look at NASA's overall mission, rather than at the single goal of a voyage to Mars.

Many of you know that I am an admirer of NASA's greatest Administrator, James Webb. Webb once characterized his role during the Apollo program in the following way: "The process of management became that of fusing at many levels a large number of forces, some countervailing, into a cohesive, but essentially unstable whole, and keeping it in the desired direction." This is it, exactly, and that perspective serves me well today. There are many disparate goals held by NASA's numerous stakeholders, and we try – very hard – to move the agency forward in a manner which promotes unity among, rather than division between, these stakeholders. It is not easy.

If the blunt truth be told, prior to the loss of the Space Shuttle *Columbia* a few years ago, NASA suffered from a long period of benign neglect by both the public and our government stakeholders concerning the broader purposes of our nation's space enterprise, especially human spaceflight. NASA's last mission to the Moon was in 1972, and our nation, as a matter of policy at the highest levels, had chosen to confine itself to low Earth orbit ever since. As I have said on many, many previous occasions, I believe this to have been a crucial strategic mistake for our nation.

We have come a long way since the dark days of the *Columbia* accident in building a consensus as to what goals are worthy of our nation's civil space program. After a lengthy national discourse, the bold challenge of the President's Vision for Space Exploration was endorsed by the Congress in the NASA Authorization Act of 2005. I firmly believe that the Vision is the proper lasting legacy for the astronauts who perished in the *Columbia* accident. It sets a course in space for our generation and, indeed, future generations. The law charges the NASA Administrator to "establish a program to develop a

sustained human presence on the Moon, including a robust precursor program, to promote exploration, science, commerce, and United States preeminence in space, as a stepping-stone to future exploration of Mars and other destinations.” This is wonderful direction. It tells NASA to make the United States, once again, a spacefaring nation. Nothing more is necessary, and nothing less is appropriate.

The law charges NASA to carry out certain specific programs with the following milestones:

- Return Americans to the Moon no later than 2020;
- Launch the Crew Exploration Vehicle as close to 2010 as possible, and not later than 2014;
- Increase knowledge of the impacts of long duration stays in space on the human body using the most appropriate facilities available, including the International Space Station; and
- Enable humans to land on and return from Mars and other destinations on a timetable that is technically and fiscally possible.

With this, NASA's stakeholders at the White House and Congress have provided clear direction on the policies and programs that the Agency must carry out. And so, while some of you might wish it to be otherwise, NASA's strategic goals are neither solely nor initially focused upon Mars. We are charged with carrying out a broad portfolio of missions in space exploration, scientific discovery, and aeronautics research. With the resources projected to be available to NASA over the next five years, properly balanced with our other national priorities of Earth and space science as well as aeronautics research, NASA is on course to complete the International Space Station by 2010 and to bring the CEV on-line no later than 2014.

This is a national imperative. With the retirement of the Space Shuttle by 2010, a far more urgent concern to me than a future mission to Mars is taking steps to ensure that we have a smooth transition from the Space Shuttle to the CEV, and to commercial cargo and crew transport services to the International Space Station. Thus, we plan to award a contract for the design and development of the CEV next month, and in the coming weeks ahead, we hope to enter into Space Act

Agreements with commercial firms to demonstrate Space Station re-supply capabilities. As I have said previously, if cost-effective commercial services are demonstrated to support the ISS, NASA will welcome and use them.

So, let me be clear about what is at the forefront of our attention at NASA. The greatest management challenge we face over the next several years is the safe and effective transition to the new Exploration systems by completing the remaining Space Shuttle missions for the assembly of the International Space Station, followed by retirement of the Space Shuttle in 2010 to allow greater focus on missions beyond LEO. We now have a clear goal for the future. Our current activities can and must be focused to advance that goal. The remaining ISS assembly missions and Space Shuttle flights will allow us to advance knowledge and help train the next generations of space explorers.

And, more broadly, I believe that the most important aspect of the International Space Station is the tried and tested partnership that has been forged among the spacefaring nations of Canada, Europe, Japan,

Russia, and the United States. This partnership has endured tremendous hardships, and stands by itself as a monumental international accomplishment. We can learn from this experience, and expand on its positive aspects as we move forward to the Moon and Mars.

At this stage in the development of our plans, it is important that NASA not prescribe roles and responsibilities for future international partnerships. Instead, we have defined a minimalist Exploration architecture with the CEV, the crew- and heavy-lift launch vehicles, and a lunar lander, as the first critical elements, with the hope that international and commercial partners will want to augment these capabilities with their own. We're already collaborating with other nations on a series of satellite missions to map the resources of the Moon, and I hope that we'll collaborate on even more missions to the Moon and Mars.

This year, we've hosted workshops in order to discuss with our international partners, scientific communities, and commercial interests what each of us might do, and what we might do together, in exploring

and utilizing the Moon. I hope to issue a plan later this fall based on the feedback from those workshops. One of the main reasons why these discussions for future collaborations in exploiting the Moon have been so fruitful is that, despite many trials and tribulations, the United States has shown itself to be a good partner on the International Space Station. We need to continue that.

Also this year, we've celebrated the 30<sup>th</sup> anniversary of the Viking mission, and begun to lay the groundwork for the robotic missions to Mars in the next decade, building on the results from the Mars Rovers and Mars Reconnaissance Orbiter. Next year, I hope to make plans as to how to carry out manned missions to Mars, building on the heavy-lift launch vehicles, landers, and other capabilities from the lunar exploration architecture. We will especially call for the support of our international partners for this long-term endeavor, as we build on the relationships forged in assembling the International Space Station.

This morning, onboard the Station, American astronaut Jeff Williams and German astronaut Thomas Reiter are preparing for a six-



hour spacewalk to install equipment and experiments around the outside of the ISS. This spacewalk is being choreographed by Russian Commander Pavel Vinogradov who will remain onboard the ISS and will be televised by cameras on the Canadarm-2. Today's spacewalk exemplifies how nations work together at their best. We make it look easy...perhaps even too easy, to those who are not steeped in the risks of the space business. However, this spacewalk is not simply science fiction. The International Space Station is our nation's most technically challenging project, and this spacewalk is one small step forward toward exploration.

The ISS is a scientific and engineering test bed that we must use before embarking on long journeys to Mars. In fact, the NASA Authorization Act designates the U.S. segment of the Space Station as a national laboratory, and I am actively seeking partnerships with other Federal agencies, like NSF, NIH, and the DoD, and commercial entities who would use the ISS for their own experiments while NASA focuses its research directly on Exploration-related missions.

For example, we know that a crew on such a long journey to Mars will need a great deal of self-sufficiency as we break the apron-strings of Earth. A three-person crew onboard the Space Station requires approximately 5000 pounds of water each year. However, by developing and testing environment and water recycling capabilities for the ISS, the future logistics resupply required will be significantly less. This will have far-reaching implications for future Mars missions. Likewise, learning to use resources on the Moon and Mars must prove far more economical than bringing those resources with us on the journey.

In situ resource utilization, maintenance and logistics, international partnerships, and the leveraging of commercial space capabilities will help sustain this Vision for Space Exploration, and they are all being tested onboard the International Space Station.

The priorities for NASA are clear. In the wake of the *Columbia* tragedy, our national leadership realized that human spaceflight is today one of those strategic capabilities that define a nation as a superpower.

And I must ask each of you this: Is it possible to envision a future in which America is considered to be a leader in the world, if others can and do conduct exploration and research on the Moon, Mars and beyond, and we cannot? International cooperation, leavened by a healthy dose of competition, is what makes America the greatest country in the world. The ultimate goal of the Vision for Space Exploration is not to impress others, or even merely to explore the Moon or Mars, but rather to advance U.S. scientific, security, and economic interests through leadership in the grandest expression of human imagination of which we can conceive.

We are turning science fiction into reality. We do what others dream.

Thank you.