

Remarks
Center for Strategic & International Studies
Workshop on Space Exploration and International Cooperation

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It can be argued that the most important recent development in the arena of international affairs was the release, in January 2004, of the President's new civil space policy, the *Vision for Space Exploration*. The policy clearly has profound implications for the international space community. But if we believe that space will be a key frontier of human activity for centuries to come, then the Vision has sweeping consequences for all mankind. Thus, this workshop on Space Exploration and International Cooperation, here at the Center for Strategic and International Studies, provides a most appropriate venue for the theme I will explore in my comments today, the promotion of international cooperation through activities that will have lasting consequences for societies throughout the world.

We are here to address the sustained international cooperation that will be generated by the Vision. My own purpose is to describe the framework which will support NASA's efforts to obtain meaningful international participation as we work to carry out its goals. These partnerships will take many forms, befitting the varying levels of interest and means among nations around the world. But one thing is clear from the outset: The United States, working alone, cannot fulfill the sweeping goals of the *Vision for Space Exploration*. We must maintain the strong international partnerships that have been built during the Space Station era, and must extend those partnerships even more broadly, to enable a robust human space exploration program. Human space exploration will be a delicate flower indeed if it enjoys the commitment and support of only one of the nations of Earth.

And likewise, if we are to make the expansion and development of the space frontier an integral part of what it is that human societies do, then these activities must assume an economic dimension as well. Sooner rather than later, government space activity must become a lesser rather than a greater part of what it is that humans do in space. To this end, it is up to us at

NASA to use the challenge of the Vision to foster the commercial opportunities which are inherent to this exciting endeavor.

It is often helpful to use the lessons of history to help inform the choices of today, particularly where global issues as energy, health, technology, trade and economics, and now, human spaceflight are concerned. One lesson from history that may engage this audience goes back a full half-century, to the Eisenhower administration. Indeed, it goes back even further, drawing upon lessons from Eisenhower's own service as a young Army officer.

While Eisenhower is not noted as a great champion of the space program, it remains true that he played a pivotal role in establishing NASA, and for working in a bi-partisan fashion with then-Senate Majority Leader Lyndon Johnson to craft an Agency charter that remains incredibly relevant to the work we conduct today. That charter, part of NASA's founding legislation, compels us among other things to:

- Explore, use, and enable the development of space for human enterprise;
- Advance scientific knowledge and understanding of the Earth, the Solar System, and the Universe and use the environment of space for research; and
- Cooperate with other nations and groups of nations.

It is rare for a historian to label Eisenhower's two terms as "visionary". But one can certainly find in NASA's enabling legislation and such landmark policy initiatives as "Open Skies," "Atoms for Peace," and "People-to-People" diplomacy, evidence of a visionary thinker who looked well over the horizon and crafted wise policies that fueled global economic progress, and brought our world safely through one of its most dangerous periods.

Another rarely acknowledged visionary aspect of Eisenhower's presidency was a policy innovation known as the National Interstate and Defense Highways Act. This is legislation that has profoundly altered the way our people travel, conduct business, and live throughout the United States.

To Eisenhower, the subject of highways – more broadly interpreted as transportation infrastructure – was of compelling interest. Back in 1919, as a young Army captain, he joined the Army's first transcontinental motor caravan, a trip from Washington, D.C. to San Francisco. On the poor roads of that time, the caravan averaged five miles per hour and took 62 days to cross our continent.

Eisenhower never forgot that trip; subsequently, during World War II he observed how Germany's extensive autobahn network greatly enhanced the mobility of the allied armies when

we began the final push, 60 years ago, to eliminate the Nazi regime. And so it was that one year into his presidency, Eisenhower used his State of the Union Address to call for the creation of a national network of interstate highways, one that would contain 41,000 miles of new roads. Eisenhower would push hard for the enactment of this system, saying later that without the united forces of our communication and transportation systems, our country “would be a mere alliance of many separate parts.”

Today, a half-century after this major commitment of our nation’s resources and energies, we have the modern interstate highway system. And just as important as those multi-lane roads with the green signs to which we’ve all become accustomed are the more than 15,000 exit ramps and interchanges that were built into this system. It is at these interchanges where gas stations, rest stops, hotels, restaurants, stores, many other businesses, and full communities took root. Because most of us have never traveled through an America which is not linked by the system, it is hard today to imagine the economic leverage that our nation has derived from its interstate highways. That visionary focus on the proper role of government in creating crucial core infrastructure has paid dividends for decades to America’s wellbeing.

And that is the context in which we should view NASA’s new architecture for space exploration, and the new generation of spacecraft which comprise that architecture. The Crew Exploration Vehicle, the associated Crew Launch Vehicle, and later the Heavy Lift Vehicle, will be the 21st century space equivalent of our interstate highways. This is the core infrastructure that will enable us to travel from the surface of the Earth to the Moon, Mars, and the near-Earth asteroids. And, as with our interstate highways, it is at the off-ramps of this system, for example the first base camp on the lunar surface, where the best opportunities for international cooperation will occur.

When NASA unveiled the new space exploration architecture to the U.S. Congress, our international partners and the public in September, we specified in some detail how we will get back to the Moon, and how the key elements of the lunar return strategy led toward the approach for getting to Mars. Clearly, the hardware is important, and consideration of how we will approach the design of the next system to take us beyond low Earth orbit is a crucial first step.

But if we focus too much on the hardware, we run the risk of forgetting that the real excitement lies not in the trip, but at the destination. So let’s think for a moment about what we will need at our first destination, the lunar surface. The plan we have developed offers, even on

the first lunar return mission, four times the lunar surface exploration capability of the last and most ambitious Apollo mission, Apollo 17. It does so at 55 percent of the cost expended through the first lunar landing mission, Apollo 11. It meets the presidential goal for human lunar return, can be accomplished within the Administration's fiscal guidelines and, at this basic level, can be accomplished by the United States alone.

Some have noted these features and taken them as evidence of a failure of imagination at NASA, or that we do not seek international partnerships for exploration, or that there is no room for commercial providers in the Vision. Nothing could be further from the truth.

Our plan derives its form in recognition of the fact that, for the foreseeable future, by far the biggest "barrier to entry" for lunar and Mars exploration will be the size and cost of the transportation systems required to take people beyond Earth orbit. This is the key enabling technology for space exploration, one that the United States must and will continue to develop and maintain. Moreover, within the community of spacefaring nations today, America alone can bring to bear the discretionary financial resources to provide the man-rated, heavy-lift transportation systems required for this task.

But with this task accomplished, our presently foreseeable fiscal resources will be exhausted. We will not, by ourselves, be able to conduct the robust program of lunar surface exploration and exploitation that a world with a surface area the size of Africa merits. We will not, by ourselves, be able to take advantage of what lies at the exit ramps of the new "interstate highway".

The development of crucial infrastructure such as lunar habitats, power stations, scientific laboratories and facilities, radio and optical telescopes, manned and robotic surface rovers, unmanned logistics and resupply vehicles, communication and navigation systems, *in situ* resource utilization equipment, and long-duration life support systems will, if it is to occur at all, result from a great exploration partnership between nations. The "interstate highway" that we develop can carry international crews to the Moon, and later to Mars, to work on cooperative goals at research stations of international design and construction, possibly in much the same fashion as occurs in Antarctica today. Quite likely these efforts will be aided and abetted by commercial providers offering service for a fee; with the right incentives, this can be made to happen sooner rather than later.

Let me be clear that, despite the ideas offered above, we are not prescribing the form such international contributions must take, nor that of any potential commercial providers. Knowing our limitations, we deliberately did not attempt to lay out a NASA-approved master plan for the infrastructure required for lunar exploration, which would then be prescribed for any putative partners. Rather, it will be for NASA to work with the space agencies of interested nations to find ways reach common objectives. It will be required of NASA that we be open to commercial offerings in preference to the development of government-only systems, whenever possible. If exploration is to become “what NASA does”, we must recognize that in a world of limited resources we must, to quote Ben Franklin, “all hang together, or most assuredly we will all hang separately”.

We know from decades of international cooperation in space activities – most prominently on the International Space Station – that this approach to lunar exploration can work. We can recognize that, despite some difficult circumstances and many lessons learned on all sides, the international partnership formed to develop the ISS has been one of the programs best and most enduring features. And just as in the case of 20th century Antarctic research, some of the most creative approaches to 21st century lunar, and subsequently Mars, exploration will arise out of similar future international collaborations.

That’s our logic: Because it must be done and because we can do it, NASA will provide the essential transportation nodes – the 21st century space highway. We will work with international and commercial partners to figure out what we can collectively accomplish at the exit ramps. We seek to collaborate, not to prescribe. In these ways we hope to promote common space exploration objectives and cooperative or complementary space exploration missions, along with the development of breakthrough technologies that will open up many opportunities for exploration and discovery.

So what’s the next step in this regard? We intend to engage other nations on a bilateral and multilateral basis in more serious discussions as to how we can form productive partnerships to advance the objectives of the Vision. Exploratory discussions so far have been very promising, but it is up to us at NASA to demonstrate interest in an open and collaborative dialogue as to what we might do together, and how and when we will do it, as we move beyond low Earth orbit. This call for substantive dialogue should surprise no one, but perhaps we at

NASA need to emphasize it more, lest others fill the void with their own interpretations of our intentions.

We would also like to see more progress on scientific data-sharing agreements between those countries that have under way or are planning missions to map lunar resources and identify potential landing sites for future explorers. In this regard, we must thank the Indian Space Research Organization for hosting two NASA instruments on its first lunar mission, Chandrayaan. We are also pleased to be working with our Russian colleagues, who are providing a neutron detector on our own Lunar Reconnaissance Orbiter. With other lunar missions soon to be launched by the European Space Agency, Japan, and China, I believe that it is incumbent on all of us to share the scientific data to be gained from these missions. Beyond this first slate of missions, as we plan for robotic and human landings on the Moon, our countries need to establish the necessary communications and navigation standards for our cislunar operations architecture. Again, as President Eisenhower said, the unification of communications and transportation systems is critical.

Thus far, I've spoken about international cooperation in terms of government-to-government partnerships. But I'm confident there will also be significant opportunities in our space exploration work for international commercial providers. Later today, NASA's Exploration Systems Mission Directorate will hold an Industry Day to discuss our plans for the Crew Exploration Vehicle and International Space Station crew transfer and cargo resupply with potential contractors. U.S. industry teams bidding on these procurements may choose to leverage the capabilities of international aerospace firms as members of their teams, consistent with existing U.S. law and policy. Where commercial providers are concerned, the market will be the best mechanism to decide the outcome. Government programs should not be used to pick winners, but to reward them.

We have developed our plans for implementing the Vision for Space Exploration recognizing that its expense cannot be born by the American taxpayer alone. Once we make the key investment in space infrastructure, we must rely upon international cooperation and the ingenuity of the private sector to help us realize the full potential of our nation's commitment to expanding our exploration reach to the Moon, Mars and beyond.

We have a lot of work ahead of us to make this happen, and now is the time to engage in substantive dialogue about what we can collectively do to establish new beachheads in space. I intend to be personally engaged in many of these discussions.

I wish to thank the Center for Strategic and International Studies for sponsoring this workshop, which promises to provide an important venue for aiding this dialogue. I thank you for the opportunity to speak to this distinguished gathering, and I look forward to working with many of you in the future as we continue this journey.