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The Testimony of
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Chairman Brownback, Senator Breaux and Members of the Subcommittee, thank you for inviting me here today.

I am pleased to present testimony to the Subcommittee on behalf of the National Space Society, a nonprofit organization dedicated to promoting space exploration. NSS has approximately 22,000 members around the world, including space professionals, astronauts, business leaders, elected officials, and, most important, everyday citizens without ties to the space industry who support the exploration, development, and eventual settlement of space.

The Subcommittee has asked NSS to provide its perspective on NASA's human space flight programs and how those initiatives relate to efforts to develop new space transportation systems. In our view, access to space is the most critical part of any future space exploration efforts, so I appreciate the opportunity to share our thoughts today.

NASA's Integrated Space Transportation Plan

Robust, low cost access to space is the key to expanding opportunities in space, whether in Low Earth Orbit or beyond. In light of the loss of the Space Shuttle Columbia, it is more important than ever for our nation to address the issue of how we transport people and cargo to and from space. Indeed, although the Columbia investigation and now the war in Iraq occupies the nation's attention, NASA's generally overlooked FY 2004 budget submission contains important elements of an Integrated Space Transportation Plan to begin addressing this critical issue.

The first element of the Integrated Space Transportation Plan is the Service Life Extension Program, which addresses the need to upgrade the Space Shuttle fleet and the infrastructure that supports it. The Space Shuttle is the only vehicle that can complete the International Space Station, so we need to return the fleet to service as quickly as is feasible to let it complete that mission.

Although the original estimates for the Shuttle's cost and performance were very optimistic—which means today we have a system that is significantly more expensive and more challenging to operate than was ever envisioned—the Space Shuttle remains a very unique and important asset in our nation's launch inventory. It combines the capabilities of a heavy lift launch vehicle, a small Space Station, an on-orbit repair depot, and a system that can return cargo to Earth, among other functions.

Its capabilities, despite being conceived 30 years ago, remain unmatched today by any vehicle flying or by anything even on the drawing board. So any mention of a “replacement” of the Shuttle has to be viewed as only a partial replacement, since future vehicles will likely not be as versatile as the Space Shuttle is today.

But we cannot escape the realities of the need for a backup to the Shuttle, regardless of its impressive capabilities. The second element of the plan is to provide a complementary capability to transfer crews to and from the Space Station. The current proposal, called the Orbital Space Plane (OSP), would be launched aboard Evolved Expendable Launch Vehicles developed jointly by the Department of Defense and industry, and which are now operated commercially by Boeing and Lockheed Martin as the Delta IV and the Atlas V, respectively. The requirements laid out by NASA call for the OSP to be able to launch at least four crew members to ISS, stay on orbit for long periods of time, and to serve as a “lifeboat” to evacuate the ISS crew in the case of emergencies, replacing the Russian Soyuz capsules that perform that function today.

While the OSP could serve as a component of a next generation system, it serves only as a complement to—not a replacement for—the Shuttle during this phase of the Integrated Space Transportation Plan. The OSP would relieve much of the Shuttle’s burden of launching crew to and from ISS and allow the Shuttle fleet to focus on the launch of heavy cargo and components, but both vehicles would be flown during this time period. The additional benefit of the development of the OSP or similar vehicle would be its utility in future human missions, all of which will require crew transfer capabilities.

The third element of NASA’s plan is the development of a next generation launch system that would ultimately replace the Space Shuttle, meaning it would launch both crew and cargo. The Next Generation Launch Technology program, which is being conducted jointly with the Department of Defense, is a restructured element of the Space Launch Initiative (SLI), and focuses on new technologies and new systems that can lead to launch systems with much greater reliability and much lower costs than systems today.

The Challenges

These three elements—upgrading the Space Shuttle, developing a backup system to launch crews to and from the Space Station, and investing in next generation launch technologies—are all critical components in a national plan to significantly improve our access to space, and I believe NASA’s initial outline is a prudent step in that direction. However, there are also several critical factors that can be major stumbling blocks to the success of this plan.

First, the loss of Columbia dramatically underscores the urgency to develop a secondary capability to launch crews to and from ISS, and it is not clear that this sense of urgency is shared by all of NASA’s managers at the program level. Additionally, the natural inclination for NASA’s talented engineers will be to develop the latest technology for use in the Orbital Space Plane—but that urge must be strongly resisted. The OSP can be built using today’s technology, and most of the designs under consideration have been studied in several variations for the last 20-30 years. NASA’s stated goal of a fully operational system by 2012 must be accelerated, and it must also be done as simply as possible by focusing on its core mission of launching and retrieving crews.

Second, NASA has to reexamine a backup capability to launch cargo to the International Space Station. A program to do just that—NASA’s Alternate Access to Station initiative—was examining several potential options to launch unmanned cargo to ISS using expendable launch vehicles, but

that program is slated to be terminated this summer without moving into the test or development phase. The AAS program should get a fresh look from NASA so that, when combined with the Orbital Space Plane program, we will have both assured crew and cargo access to the International Space Station. The European Space Agency is working on the Automated Transfer Vehicle, which is designed to be a robotic cargo vessel for ISS. That system may offer the capabilities to fulfill this need, but it is an option which may or may not be viable depending on the state of international affairs. But both the crew and cargo launch capabilities are needed regardless of what long-term choices we make about human space exploration, so it is advisable to fund and begin these programs as soon as possible.

Third, once the Orbital Space Plane and some form of backup cargo capability are activated, the United States will possess a significant launch capability that can meet multiple needs. With these complementary capabilities available, we should not rush to an artificial deadline to develop and field a new launch system. The Shuttle and existing fleet of expendable launch vehicles, coupled with the OSP and a cargo delivery system, can meet many of our nation's needs for the near term, and the Shuttle still possesses capabilities that should be carefully reviewed before we decide to retire the entire fleet. While it is important for us to continue making investments in new launch technology, it is equally important that we develop a strategic plan for our space exploration efforts and not waste time just jumping from program to program.

Fourth, the nascent partnership between NASA and the Department of Defense in developing next generation launch technology should be encouraged and fostered. For years, an adversarial relationship existed between the two agencies, yet the skills and experience each brings to the space arena have been recognized as critical to both civil and national security needs.

Finally, I believe a key yet overlooked element in our nation's space launch capabilities is the Evolved Expendable Launch Vehicle mentioned earlier. Although designed for unmanned missions, the two vehicles represent significant improvements in safety, reliability, and efficiency over their predecessors. Indeed, both the Delta IV and Atlas V represent, in many ways, revolutionary improvements in access to space. These systems are already in production and operation, and they are capable today of meeting the launch requirements for unmanned scientific, national security, and commercial missions. Once modified for human launch requirements, the EELVs will represent a formidable and versatile fleet of vehicles that can fulfill an even wider range of missions. Importantly, by developing a crew and perhaps cargo capability that can be launched aboard EELVs, that improves our nation's competitiveness in the commercial space arena by strengthening the market for those vehicles.

The reason it is important to highlight the potential role of EELVs is because expendable launch systems are usually ignored in the discussion of next generation launch systems—most people assume that only reusable launch vehicles can fulfill that role. But the economics of reusable versus expendable systems is not as simple as it first appears. The key to low cost reusable vehicles is routine use that allows expenses to be amortized over a large number of flights. For an expendable vehicle, the key is low cost production, which can be achieved in part through launch rates that are high enough to maximize the efficiency of the production and assembly operation. Generally speaking, the launch rate for a reusable system has to be very high before it effectively competes with the cost of an expendable launcher. The best option for a next generation system may indeed turn out to be a reusable launch system, but it could also be a further evolution of the EELV or a derivative of the Space Shuttle.

The Future of Human Space Exploration

The choices made today in space transportation investments will obviously impact our capabilities for future space exploration missions, but there are decisions that can and should be made even as we work to develop a long term vision for our future in space. We know that completing the International Space Station requires the Space Shuttle, and that in order to successfully operate the Space Station we need a robust yet simple backup capability for crew and cargo. So those are two elements of space transportation planning that should proceed as quickly as possible and accelerated where feasible.

Beyond those elements, we should carefully consider our next steps. Focusing exclusively on reusable launch vehicles may be the right choice if we seek routine access for crew and low-to-medium weight cargo. But if we opt to launch heavy cargo (such as components for a mission to Mars), then expendable launch vehicles may better fill that role. So the nation needs to develop a long-term space exploration architecture to provide a clear direction for the future to help direct these efforts. NASA has begun an initiative to accomplish this important task, but it needs public and political support to remain a key part of the NASA agenda. Without that underlying vision for tomorrow, it makes it more difficult to make the right decisions today.

So the choice before our nation is complex, but, importantly, it is not an “either-or” proposition. In order to fund future launch systems, we do not have to cannibalize the Shuttle program, and in order to fund the Shuttle we do not have to forgo future investments in next generation launch technology. I also know you have to wrestle with difficult budget choices in a wide range of areas and, as stewards of the public’s money, I know you consider it important to make investments that are worthwhile and have a benefit to the taxpayers.

Space exploration is worthwhile endeavor and a sound investment in the future, and it is an investment that can be made even while meeting other needs in our nation. It is important to invest in the future, and it is important, as a society, to continue opening frontiers. History teaches us that societies that have pushed their frontiers outward have prospered; those that have not have withered and faded into the history books. No society has ever gone wrong opening up the frontier, and we shouldn’t stop now.

Thank you for the opportunity to appear before you today.