Transitioning to a Next Generation Human Space Flight System
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Mr. John Karas
Vice President, Space Exploration Lockheed Martin

Testimony of
Mr. John Karas, Vice President and General Manager, Human Spaceflight,
Lockheed Martin Space Systems Company
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Good afternoon, Mr. Chairman, Sen. Hutchison and distinguished Committee Members.

I am honored to appear before you today to discuss a critical process of transition that lies before us in the next several years. We should all work together to understand the impact that such a transition will have on key NASA Centers, their employees, their contractors and their communities. Our collective skill in negotiating that transition will determine whether or not America retains its hard-earned mantle of leadership in space science and exploration.

There is a concern that budget pressures may threaten our ability to execute a smooth and timely transition from Space Shuttle operations to a fully developed system of new launch and exploration vehicles. If key schedule milestones are to be met, it is important that all of us in industry and in the government reach agreement on a number of issues. Many of these issues are a product of the tension between long-term budget uncertainties and program technical, schedule, and cost performance.

Working closely together, NASA and the Lockheed Martin Orion team have sought to identify the key ingredients of a successful program and to ensure that they remain part of the recipe. We have imposed rigorous cost controls in order to keep the overall program within the budget constraints set by Congress.

While there are differences of opinion about some elements of the way forward, there is substantial agreement about the priorities: safe and successful flyout of the Shuttle; and safe, successful, smooth, and affordable transition from Shuttle to the next-generation human spaceflight system. Although Lockheed Martin is now responsible for development of Orion, we also have a vested interest in the successful flyout of the Shuttle. Not only are we a parent company of United Space Alliance, the company responsible for Shuttle operations, but we also build the External Tank, providing support to the Shuttle program in Texas, Florida, and Louisiana. We're as committed at the front end as we are at the back end.

As we contemplate next steps, the NASA/industry team must accept an important reality: there WILL be an uncomfortable gap between the last Shuttle flight and the first Orion flight. The march of time and the pressure of budget realities virtually guarantee it. Our job is to minimize the gap, develop work-around strategies and execute our development plan as flawlessly as possible.

Some of the work will have to be done serially, some of it will overlap, and some of it will be done in parallel. An example of parallel tasks is the need to continue flying the Shuttle safely while we develop its replacement. In order to do so successfully, we must continue to inspire, motivate and reward the Shuttle workforce while at the same time identifying, recruiting and retaining the new skills and workers that Orion will require.

Similarly, NASA and its prime contractors must provide a programmatic and technical roadmap to key suppliers, one that encourages them to invest in future capabilities while continuing to produce defect-free support for existing systems.

The workforce and the supplier base are both particularly vulnerable to gaps in development, production and operations schedules. Once the pipeline of projects begins to run dry, individuals and businesses begin to head for the exits. As tribal knowledge fades and spare parts dwindle, the risks to existing programs mount and the possibility of new ones diminishes.

Lockheed Martin has recent experience with this kind of dilemma. We have served as the prime contractor on numerous spacecraft development and operations programs that have completed their life cycle over the past 50 years, repeatedly facing the challenges of transitioning skilled workforce and facilities across programs. During the transitional phases of the Titan and Atlas space booster programs, we gained valuable insight into the most productive ways to achieve mission success while making changes in workforce, facilities and processes.

In 1993, Martin Marietta Corporation bought General Dynamics Space Systems Division, and in the mid-90's, moved the Atlas operations from San Diego to Denver. This involved the relocation of people and tooling, the construction of facilities and the seamless handoff of work-in-progress between two sets of workers hundreds of miles apart.

During this transition and workforce relocation, our launch operations team was able to conduct 12 successful Atlas missions. Furthermore, all of the Atlas hardware built during the transition passed inspection and flew successfully on subsequent missions. At the same time, we developed new Atlas variants, incorporating a planned set of improvements, and significantly reduced operations costs. This evolutionary process inspired the Atlas workforce to remain with the program through the challenges of relocation and uncertainty. NASA is off to a good start in much the same way, with the development of Orion, Ares I, Ares V, and the Earth Departure Stage.

As the prospect of downsizing and skill mix adjustments looms in the closeout of Shuttle operations, lessons that we learned at the end of the Titan program are also applicable. In its final years of operation, Titan IV was called upon to launch some of this nation's most important national security payloads. It was vitally important to maintain a dedicated, skilled workforce as we reached the last missions of the program. Through a combination of re-training and Mission Success incentives, we achieved 100% Mission Success through the end of the Titan IV program. Many of the highly-skilled employees that remained on the program to the end are now valued members of the Lockheed Martin Orion team.

What are the keys to success? Good planning, obsessive attention to detail, and most importantly, good change managers to lead during this time of uncertainty.

One element that both the Atlas transition and the Titan closeout had in common was the sense of continuity. The workforce in each case was given clear, honest information about the road ahead. They knew the role that they would play, the importance of the mission, the outlines of the plan, and the arrangements that would protect their jobs or provide for follow-on opportunities. No one had to fear the future.

If the Shuttle-to-Constellation transition is to enjoy the same level of success, we will need to provide the NASA and contractor workforce with a similar sense of continuity. We will need to communicate our plans for them and for their workplaces. And we will need to take visible steps to mitigate transition-related impacts on job stability.

While the NASA/industry team must develop and execute this transition plan, Congress plays an important role as well. Assured funding and consistent program authorization are key ingredients in providing continuity in program planning. To this end, we commend this Committee for your last Authorization Bill, and urge full support for your FY08 NASA

Authorization.

But it is unlikely that the pressures on Congress will abate anytime soon. Yet there are measures that can be taken to "smooth out the oscillations" as we engineers might say. For example, in bidding for the Orion program, the Lockheed Martin team focused on what we call the "Southern Crescent" approach. Since we knew that low cost would be a crucial element of a winning proposal, we sought to identify cost mitigators that would not jeopardize mission success. The location, condition and particular strengths of the NASA Centers became a key consideration in the proposed siting of Orion work. We fashioned a proposal that leveraged the pre-existing skilled workforce and facilities, the willingness of local communities to invest in the retention of key enterprises, and the logistical advantages conferred by geography. The presence of unique facilities, experienced workers and supportive communities at each NASA Center provided a "win-win" solution.

While our teammate, Orbital is working closely with Langley Research Center on the Launch Abort System and we are working with Glenn Research Center on the Orion Service Module, we and our teammates have located our crew capsule development activities near the southern NASA Centers. This strategy enables us to leverage the invaluable, recent human space flight experience, both within NASA and among the many NASA suppliers in the communities. Lockheed Martin's Orion Project Office and our design and development team are located near JSC in Texas. We are building the Orion structure at the Michoud Assembly Facility in Louisiana. Orion cable harnesses and ground support equipment are being developed and built at Stennis in Mississippi. And Orion final assembly, test, and launch operations will all take place at KSC in Florida. As part of this continuing strategy, we are already working as a subcontractor on the Commercial Orbital Transportation System at Michoud and on the Ares I-1 Avionics Integration contract at Marshall Space Flight Center. Lockheed Martin and our Orion teammates Hamilton Sundstrand, Honeywell and United Space Alliance, are busy with important roles on Shuttle at JSC and KSC. These contracts provide us with unique insight into the dimensions of the workforce transition challenge and facilitate a smoother transition for our second-tier suppliers. We are already identifying opportunities for crossover employment and retraining that can be an element of our workforce utilization strategy.

As we face this transition challenge, care must be taken to keep the promise of these Centers and not squander the institutional and individual competence that has been built up over the years. It is important to ensure clear, open communication with the workforce and the community. The NASA workforce and their community supporters are mature and realistic. If dealt with in a forthright fashion, they will want to stay on the team and be a part of NASA's future. As we strive to meet strict cost standards, it only makes sense to avail ourselves of existing skills, experienced workers and already-capitalized facilities. To further enable a smooth transition, we must ensure that NASA's premier facilities are maintained and that obsolete facilities are retired. We encourage expanding NASA's Enhanced Use Lease authority to guarantee the most efficient use of NASA's human space flight facilities.

To assure successful transition, there must be more than just good intentions. Reliable closeout schedules, retraining opportunities and "bridging" work on other projects are ways in which to preserve workforce loyalty and performance. The Orion team and the NASA Centers are committed to using best practices in managing the human spaceflight transition.

Some of these best practices are proven human resources techniques: skills assessment and inventory, career and vocational counseling, job tracking and database management, skills refreshment and retention, incentive programs, community outreach and local economic development partnerships.

Even with the most effective transition strategies, there will be some inevitable attrition of the workforce. The demographics ensure that we are on the threshold of a significant surge in retirements. Two imperatives arise from this fact: one, knowledge capture and

retention must be accomplished proactively through mentoring programs, exit interviews and archiving; second, recruitment must be synchronized and integrated with attrition projections to ensure continuity and knowledge transfer. Performance metrics must be carefully monitored to anticipate and mitigate performance variances in this critical transition period.

Skill mix is one of the most delicate issues that industry must confront. Many find it hard to understand that a contractor could be laying some people off while hiring others at the same time. This process, essential for the health and vitality of the industrial base, can have harsh human consequences. To some extent, retraining and rotational assignments can reduce the need for skill-mix job actions. But the transition from Shuttle to Orion, and the transition from Orion development to Orion operations, will necessarily entail some skill mix adjustments.

We expect to deal with this challenge, in part, through effective community relations. We at Lockheed Martin and our industry teammates have established highly effective relationships with universities, four-year and community colleges, job counselors and state and local government officials. Working with local economic development organizations, we have forged partnerships with the University of Houston, the University of Texas/El Paso, the University of Central Florida, Brevard Community College and a host of other institutions. In the past, workers found themselves adrift without a lifeline when layoffs occurred. Today, with the help of enlightened managers, these community partnerships can provide a more transitional process, combining severance packages, retraining funds, resume preparation and job counseling that often return workers back to the workforce with little or no disruption. While it is in our interest to retain and retrain proven workers, we must also streamline our operations and find new, more efficient ways to accomplish our mission.

Change presents both risk and opportunity. I have spoken of the risks of an ill-conceived transition process for human spaceflight. But the opportunities are well worth remembering. We must encourage a new generation to take up the exciting challenge of space exploration. Powered by new technology, imagination, and Jolt Cola, the next space adventurers will need our help to gain a foothold in the future. At this point, we are finding that recent engineering graduates are clamoring to work on the Orion program. This is a refreshing change, since a decade ago, graduates were leaving the space industry in favor of the exciting opportunities offered by the dot-coms. Congress can maintain this momentum by assuring a sustained investment in people, facilities and technology.

America's most insightful philosopher, Yogi Berra, is reputed to have said "Making predictions is difficult, especially about the future." While I can't predict exactly how the vision for space exploration will turn out, let me say that I am confident in the feasibility of our plan, the competence of our workforce, the maturity of our technology and goodness of our objective. Given the necessary resources, a stable budget, and the continued support of the Congress, I have no doubt of our ultimate success.

Thank you for the opportunity to provide my statement on this important topic. Lockheed Martin appreciates the Committee's interest in maintaining United States leadership in space exploration. We look forward to continuing to work closely with you on these important issues and I look forward to your questions.