

Witness Testimony
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House Committee on Science and Technology

Decisions on the Future Direction and Funding for NASA: What Will They
Mean for the U.S. Aerospace Workforce and Industrial Base?

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I am very pleased to have been invited to testify at the 10 December 2009 Congressional Hearings relative to NASA's programs and budget.

I have spent almost my entire 40-year career with Moog Inc. as an engineer and technologist. For the past 15 years, I have concentrated on developing Moog strategies and technology plans with our managers, engineers and technologists. Since Moog has had an over 40-year relationship with NASA as a supplier of control components and systems, a significant piece of our plans relate to our NASA work. These technology plans have enabled us to develop a very clear understanding of the relationship between the technologies we develop for NASA projects and the growth in Moog's other aerospace businesses.

Beginning with the Gemini Program in the 1960's, Moog has supplied the actuators to steer NASA's launch vehicles' rocket engines. Subsequently, we have supplied ever more sophisticated control components for the Apollo and then the Space Shuttle. For the Space Shuttle, we also supplied actuators for the flight control surfaces that guide the orbiter's flight path during the time it flies like an airplane. The technologies we developed and the experience our engineers gained provided the foundation, knowledge and heritage to begin developing similar control components for military and then commercial aircraft. Most recently, we have become the supplier of the complete flight control systems for the DOD's F-35, Boeing's 787, and Airbus' A350. Our experience on the Space Shuttle was clearly the essential starting point for Moog to have developed the technical experience and enabled us to have been selected as the supplier for the flight control systems for these programs.

In addition, Moog has developed a variety of other control components and systems with NASA for other launch vehicles, and various deep space and orbiting satellites such as Mars Science Laboratory and DAWN. As with the rocket engine steering controls, these NASA programs have always been the most challenging and pushed the envelope. Moog's NASA experience on all these applications has enabled us to also provide the world's best technologies for similar applications on DOD and commercial launch vehicles, all types of satellites and various missile interceptors. NASA has a history of setting very ambitious goals that drive the need for new

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technologies, designs and capabilities that are beyond what the Commercial space projects are willing or able to undertake. Once the capability and reliability of the components are demonstrated on NASA projects, the Commercial space suppliers are then confident in using these components on their vehicles. Not only Moog's technologies benefit from these NASA projects. Our products incorporate technologies and components from several hundred companies. While some of these components are relatively standard, our innovative solutions for NASA require the majority of our vendors to push their designs to a higher level as well. So the benefit of the NASA programs becomes very widely spread. While I do not profess to be familiar with all aspects of the NASA vehicles, I am familiar with the technologies and components adjacent to our components. I can see the companies supplying these adjacent components have also similarly benefited from their NASA work.

It is no accident that the USA aerospace prime contractors and the hundreds of subcontractors have developed leadership positions on the vast majority of the relevant technologies. The NASA programs have clearly enabled USA companies to develop and maintain these leadership positions. A leadership position can be measured as a combination of performance, reliability, weight and cost. It is also clear that the Chinese, having watched NASA's successes, have embarked on a very ambitious manned space program. Their expectation is for their space program to provide Chinese aerospace companies with the experience to challenge the USA's leadership in commercial space and commercial aircraft.

NASA's Constellation Program is the next chapter. NASA's goals for the Constellation Program will again challenge all the suppliers to imagine, develop and create the next generation of space-related technologies.

The fundamental question Congress needs to address is:

Does Congress want to continue to consistently fund NASA programs such as Constellation to maintain the USA's leadership position in aerospace technologies?

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The key word in that question is “consistently”. The relevant technologies are embodied in the engineers and technical staff who work on the NASA programs. Technologies are documented in drawings and reports. However, the application of the technical knowledge is totally dependent on the people who have developed the technology. Without consistent funding by NASA, companies are not able to keep the engineers and technical staff employed. If funding is inconsistent, technical capabilities wither as people move on to other programs or to other companies.

One of our major concerns relative to the Constellation Program is that having already been awarded a number of contracts for the Constellation Program, we have hired a large number of engineers and technical staff to support our contractually-obligated schedules set by NASA's current schedule. If the Constellation Program's funding is reduced and stretched out, we will have to lay-off a number of these people. We have a core group of people who have spent the past 20 or 30 years working on space-related programs. A number of these people will be retiring in the next several years. The new people we have hired to work on the Constellation Program are the next generation who need to learn from the senior people and then become the core group to apply their skills to the next generation of commercial space, military space, and other aerospace applications.

As with our experience on previous NASA programs, we continually grow by moving into adjacent technologies to our current core capabilities. The Constellation Program has provided us the opportunity to again expand our technical capabilities. We were surprised in several competitions that companies who had previously supplied specific technologies to NASA had either declined to bid, because they no longer have the ability to design the required components, or that they apparently submitted a weak technical proposal. This is an additional indication that consistent NASA funding is required if the USA is to maintain and advance its aerospace technology capabilities.

The Constellation Program is at a critical decision point for the country and specifically for the Congress. On one hand, you can decide to fully and consistently fund the Constellation

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Program and the USA can maintain its leadership position in aerospace technology. On the other hand, you can decide to select one of several seemingly lower cost options. In which case, I strongly believe the USA will rapidly lose its leadership position, most likely to the Chinese.

Thank you for this opportunity to testify.