Testimony of
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Committee on Science, Space and Technology
United States House of Representatives

Mr. Chairman and Members of the Committee, thank you for the opportunity to appear today to discuss NASA's Commercial Crew Program. My name is George Sowers and I am the Vice President of Business Development and Advanced Programs for United Launch Alliance. I was educated as a physicist but have spent my career designing, developing, building and launching rockets. I was the chief systems engineer for the development of the Atlas V rocket.

Introduction

My company, the United Launch Alliance, LLC was formed in 2006. ULA's heritage reaches back 50 years to the beginnings of the space age and human spaceflight. The formation of ULA brought together the launch industry's two most experienced and successful launch vehicle teams and two of its most dependable launch vehicle families, the Atlas and the Delta. Our history spans over 1300 successful space launches including historic achievements as a part of the nation's first two human spaceflight programs, Mercury and Gemini. At the height of the space race, it was an Atlas rocket that launched John Glenn into orbit and America into a proud space future. Since then, we've delivered payloads with unprecedented reliability and unparalleled performance – helping America become the world's leading space-faring nation.

Our current customers are the Department of Defense, the National Reconnaissance Office, NASA, and commercial satellite system providers. ULA was formed to provide the highest reliability launch services to these customers while lowering cost through the consolidation of infrastructure.

Since its formation nearly five years ago, ULA has conducted 54 launches, almost one a month, with 100% mission success. ULA is entrusted with safely delivering the nation's most critical missions to support the warfighter, the intelligence community and national decision makers. Within the last year, we successfully completed the most ambitious launch campaign in the history of the National Reconnaissance Office, putting up five nearly priceless, irreplaceable satellites in seven months. ULA has proven it can reliably deliver critical missions safely and on schedule. Schedule reliability is also critical for many missions and each of the dozen missions performed by ULA in the last year has occurred within a day or two of its planned launch date.

The evidence of ULA's success is literally on orbit. Every GPS satellite, every missile warning satellite, nearly every intelligence collection satellite, weather satellite, and military communications satellite and nearly every major NASA science mission has been launched—successfully—on a ULA or ULA heritage product. As a result, America has been able to push the frontiers of innovation and discovery; has the most capable spy satellites in the world; has the best satellite navigation system ever imagined; and has more rovers on, and more spacecraft orbiting distant planets than anyone else.

We are currently in the midst of an unprecedented launch campaign for NASA's science program. So far, ULA has successfully completed three of five planned missions, including the launch of the Juno spacecraft to the planet Jupiter in August and the launch of the Grail spacecraft to the moon in September. Our next launch in the campaign occurs within the next week with the launch of the NPOESS Preparatory Project (NPP), a precursor to the next generation weather satellite. We'll finish up the year with the launch of NASA's Mars Science Laboratory, an SUV sized rover powered by a nuclear battery that may discover the first signs of life on another planet.

ULA's rockets are the most reliable in the world and we're routinely tasked with launching the most challenging missions imaginable. Five years ago, the fastest object ever created by man, the Pluto New Horizons spacecraft, was launched on an Atlas. Two years ago, we worked with NASA to guide a Centaur upperstage into the moon, proving that there was indeed water hidden in its deep craters. The missions performed by the Delta IV heavy, the nation's most capable launch vehicle, are incredibly complex, but classified. We are currently working with NASA to potentially use the Delta IV heavy to launch the Orion spacecraft on its first uncrewed test flight.

Why Commercial Crew?

I'd like to start by commending this committee for having the foresight and vision in its 2008 NASA Authorization Act to help spur a commercial crew capability for the International Space Station, and its subsequent support in the 2010 NASA Authorization bill. Nearly 50 years after Glenn's first flight, these efforts are helping unleash a new space race—this time it's an all-American space race to help us further unlock the boundless possibilities of the space frontier.

ULA strongly supports both Congress' and NASA's efforts to develop a commercial capability to meet U.S. obligations to deliver crew to and from the International Space Station. In my mind, there are three main reasons for the nation to invest in commercial crew and together they form a compelling argument.

First, the nation needs this vital capability. Now that the shuttle is retired, our nation is wholly dependent on the Russians to transport our own crews to and from the ISS. Currently, the Government of Russia is NASA's sixth largest contractor, receiving over $350M per year. Not only does this represent thousands of high tech jobs sent overseas, but it's ceding our leadership as a space-faring nation. Furthermore, the Russian Soyuz vehicle now represents the only means to send crew to the station. The recent failure of

that normally reliable craft reminds us that the very existence of the ISS is now in jeopardy, and that we are reliant on a single fragile lifeline that we have little insight into or control over.

We should have an urgency to get a commercial service up and operating as quickly as possible to close the Human Spaceflight "Gap." I have no doubt that the U.S. aerospace industry (represented by the companies here today) is up to the task. We have the ingenuity and the inventiveness necessary to meet this national imperative.

The second reason the US Government should invest in commercial crew is that the private sector has the expertise to provide crew transportation safely and can provide the best value to the taxpayer. The companies competing for the commercial crew service include those with decades of experience in NASA's human spaceflight program, such as Boeing. Newer companies bring fresh ideas and the entrepreneurial spirit like Sierra Nevada, Blue Origin and SpaceX. The private sector already possesses the world's most reliable rocket with the Atlas V.

Affordability is maximized by several factors. Specifically, the private sector can bring efficiencies in development and operations, spurred by competition, unobtainable in a government owned and operated system. In ULA's case, the government can take advantage of the billions we and the Air Force have already invested and the synergy and cost sharing with other users of those rockets like the DOD, NRO, NASA science and commercial companies.

The third reason the US Government should invest in commercial crew is to stimulate and promote commercial human spaceflight—a policy consistently supported by numerous Congresses and Administrations, including in the NASA Authorization Act of 2010 and the most recent National Space Policy. We believe this is the right policy and that free and competitive markets create the most efficient conditions for promoting economic development.

As an example, my good friend Bob Bigelow is a visionary with a dream of a fleet of private space stations. His customer base will be countries that want a space program but cannot buy or beg time on the ISS. But Bob needs a safe and affordable transportation system to orbit. NASA is in a unique position to create a transportation system that can address the nation's needs for access to ISS, while also providing an opportunity to unleash the power of the US entrepreneur in Low Earth Orbit.

We don't know if ideas like Bob Bigelow's are viable. There is extremely high uncertainty in this market and NASA shouldn't build its program assuming it materializes. But if a market does emerge, everyone will benefit: new jobs will be created and the Government's prices will go even lower, across both the civil and military sectors.

ULA support to Commercial Crew

Through NASA's investments in the Commercial Crew Development (CCDev) program, the private industry is making great progress in developing a crew delivery capability. ULA is proud to have been chosen by three of the four CCDev contractors (Sierra-Nevada, Blue Origin and Boeing) to provide launch services using the Atlas V launch system. We and our customers believe the Atlas V is the right launch vehicle to help establish commercial human spaceflight. From its roots as the launch vehicle for the manned Mercury program in the 1960's, each new generation of the Atlas system has demonstrated advancements in reliability and performance. The Atlas program has a record of 98 consecutive successes, best in the world. Today's Atlas V is the culmination of decades of improvements and lessons learned. The Atlas V has launched 27 times with 100% success. A list of those launches is included in Table 1. It is the only rocket certified by NASA to launch Category 3 missions, a category reserved for NASA's most important science missions, like Juno and the upcoming Mars Science Laboratory. It is the only rocket in the world certified to launch nuclear payloads to orbit, and it's entrusted to launch many of our nation's most critical national security missions.

The next step for Atlas is to launch humans. If NASA's commercial crew program is to be successful, every effort must be undertaken to ensure the highest possible level of safety and reliability. A key element of this is the rigorous process of human system certification. Under a Space Act Agreement with NASA, we are conducting a comprehensive assessment of the Atlas design against NASA's stringent human certification requirements. This entails a part-by-part, system-by-system review of the design, analysis and test pedigree of the Atlas. We are also performing a detailed analysis of the hazards faced by the crew and their mitigation as well as a Probabilistic Risk Assessment for the launch of crew. My expectation is that the Atlas will fare very well. This is because of the rigor and attention to detail we applied during the original design and development process as well as the flight demonstrated performance of the system through 27 successful missions.

We are also making excellent progress on the relatively few modifications to the Atlas required to accommodate human launch. These include the development of the emergency detection system (EDS), a health monitoring system that will provide a signal to the spacecraft to abort if a launch vehicle failure is imminent. A prototype of this system was demonstrated last year in our high fidelity systems integration lab, correctly detecting a wide range of potential failures and sending the abort signal in time to ensure a safe abort. We are progressing on the design of the modifications required at the launch pad to accommodate getting crew into and out of the spacecraft. And we're working with several spacecraft providers on the details to integrate their systems to the Atlas.

Looking to the future, we believe NASA's recently announced plans for the Commercial Crew Integrated Development Contract (CCIDC) strikes the right balance between a commercial approach delivering innovation and affordability and the appropriate level of certification and oversight necessary to ensure safety. The importance of insight and rigorous certification criteria has been highlighted by the recent Soyuz failure. For new,

unproven vehicles, you need the rigor even more, in addition to establishing a track record of demonstrated and repeatable success.

With adequate funding, Atlas could be ready to support test flights in 2014 and operational flights in 2015.

Conclusion

In conclusion, we strongly believe NASA's commercial crew program is vital to maintain our nation's leadership in human spaceflight. The US private sector has the expertise and experience to create safe and affordable crew access to the ISS and potentially stimulate an entire new economic sector with thousands of high tech jobs. Affordability is greatly enhanced by the use of Atlas which leverages synergy with the DOD, NRO, NASA Science and other users. With adequate funding, we can be ready to launch crew within three to four years.

Thank you again for inviting me to testify. I look forward to your questions.

Table 1. Atlas V Launch History

DATE	CONFIGURATION	MISSION	CUSTOMER
21 Aug 2002	Atlas V 401	Hotbird-6	Eutelsat
13 May 2003	Atlas V 401	Hellas-Sat-2	Hellas-Sat
17 July 2003	Atlas V 521	Rainbow I	Echostar
17 Dec 2004	Atlas V 521	AMC-16	SES Americom
11 Mar 2005	Atlas V 431	Inmarsat 4 F-1	Inmarsat
12 Aug 2005	Atlas V 401	MRO	NASA
19 Jan 2006	Atlas V 551	New Horizons	NASA
20 Apr 2006	Atlas V 411	Astra-1KR	SES Astra
8 Mar 2007	Atlas V 401	STP-1	USAF
15 Jun 2007	Atlas V 401	NROL-30	NRO
10 Oct 2007	Atlas V 421	WGS-1	USAF
10 Dec 2007	Atlas V 401	NROL-24	NRO
13 Mar 2008	Atlas V 411	NROL-28	NRO
14 Apr 2008	Atlas V 421	ICO G1	ICO Global Communications
3 Apr 2009	Atlas V 421	WGS-2	USAF
18 Jun 2009	Atlas V 401	LRO/LCROSS	NASA
8 Sept 2009	Atlas V 401	PAN	Lockheed Martin
18 Oct 2009	Atlas V 401	DMSP F-18	USAF
23 Nov 2009	Atlas V 431	Intelsat-14	Intelsat
11 Feb 2010	Atlas V 401	SDO	NASA
22 Apr 2010	Atlas V 501	OTV-1	USAF
14 Aug 2010	Atlas V 531	AEHF-1	USAF
20 Sept 2010	Atlas V 501	NROL-41	NRO
5 Mar 2011	Atlas V 501	OTV-2	USAF
14 Apr 2011	Atlas V 411	NROL-34	NRO
7 May 2011	Atlas V 401	SBIRS Geo-1	USAF
5 Aug 2011	Atlas V 551	Juno	NASA