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before the
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Reauthorizing the Vision for Space Exploration

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Chairman Nelson, Ranking Member Vitter, and Members of the Subcommittee, thank you for inviting me here today to present my views on the future of our human spaceflight program as you consider legislation to reauthorize NASA. Before we discuss those issues, I would like to offer some thoughts on NASA's past as we celebrate its 50th anniversary this year.

In 1957, the Soviet Union launched Sputnik. As someone who was present at the time, that event had a tremendous impact of the psyche of our nation in the midst of the Cold War. Our country responded, first with the creation of NASA from the old NACA, then with the launch of the first U.S. satellites and the initiation of the Mercury program. President Kennedy's lunar challenge to a novice space industry was issued when we had only 20 minutes of human space flight experience. Achieving the lunar goal within the decade of the 60's was possibly the greatest technical and scientific challenge of our age.

Meanwhile, the Soviets were moving aggressively ahead with their own human space flight program, starting with the orbital flight of Yuri Gagarin when we had yet to launch our first astronaut.

The Space Race was on! The U.S. was at least 2-1/2 years behind at the start; however, America's capacity as a free nation provided the inventions, the new technology and the talented people to put us on the path to catch and then surpass

the Russian space efforts. With the Gemini 76 mission rendezvous in 1965, we had moved into the leadership position in space and the lunar target was firmly in our sights.

By the end of the 1960s, we had moved ahead with successful moon landings. Our country was united in its goal, steadfast in its purpose, and unwavering in its commitment at a time when we were facing division and turmoil in other parts of our society. That united effort put America in the lead position as the dominant space power. This leadership continued through the latter part of the 20th century as we moved on to develop the Shuttle, initiate construction of the International Space Station, launch the Hubble Space Telescope, and send rovers to Mars, among many other space accomplishments. However, I caution those on this Subcommittee, others on the Hill and space industry leaders…our leadership role cannot be taken for granted. We face a new challenge that is even greater than what we faced during the Cold War.

Over the past 50 years…our country has profoundly benefited from the space program in more ways than it is even aware. In a recent report, the Space Foundation estimated that the value of the world space economy is $250 billion. So many industries – telecommunications, agriculture, medicine, Earth observation, public health and safety to name a few – have advanced and grown due to development of space technologies. Our aerospace industry is the envy of the world, employing 650,000 Americans in high-wage, high-skill jobs. It is one of our few industries that actually enjoys a trade surplus with our foreign competition. Every time NASA accomplishes a great achievement, the interest of our young people in pursuing a career in science and engineering spikes upward. When those kids graduate from college, they may not all end up working in the space program, but many of them end up with leading commercial technology businesses in Silicon Valley and elsewhere. Lastly, and perhaps most importantly, space plays an integral role in our national security, demonstrated most recently in our conflicts in Afghanistan and Iraq.

So, that brings to me to where we are today and for the foreseeable future. Space is no longer about the United States and Russia. The Europeans, Japan, Canada, India, and China all have active space programs, some working in cooperation with ours; others pursuing their own national objectives separately. Iran, Syria and North Korea are among the other countries that are aggressively pursuing space capabilities.

NASA plans to shut down the Space Shuttle in just over two years. By 2010, the Shuttle will have served our nation with distinction for thirty years. Its final missions have been dedicated to finalizing construction of our National Laboratory in space, the International Space Station, a truly global collaboration. Still, it's an effort largely led and financed by the U.S.

NASA is now in the process of developing the next-generation human space flight vehicle, called Project Orion, and its launch system, Ares I. These systems are based largely on proven technologies and systems derived from the Space Shuttle and Apollo programs. In my view, this is a sensible approach from both a cost and schedule standpoint, and one well thought through by Administrator Griffin and his team. The ultimate goal is to return to the moon and to establish a lasting human presence on its surface. The moon remains relatively unexplored and also presents new and interesting scientific prospects, whether it's greater research into its unique geology or use as a fixed platform without atmospheric interference for a new generation of space telescopes. It is an exciting and dynamic initiative.

The funding stream that has supported the Shuttle will be redirected to the major development phase of Projects Orion and Ares. However, this approach, as laid out in the Vision for Space Exploration, will lead to the creation of roughly a 4 ½ year gap—at least! This decision and impractical, shortsighted approach was not driven by the current NASA leadership, but rather by the preceding regime in close coordination with "bean-counters" from the Office of Management and Budget.

These decision-makers believed that grounding America's human space transportation and losing tens of thousands of aerospace jobs across the U.S. was desirable in the interests of essentially flat annual budgets. That's irresponsible, and an unreasonable budget level for an agency that currently represents only 6/10ths of 1 percent of the entire federal budget. The decision to limit NASA to this very meager budget has been well characterized by Senator Nelson as "spaceflight on the cheap." You cannot safely, efficiently and successfully do "space flight on the cheap." While I believe the goals of the Vision for Space Exploration to push to the moon and beyond, and the subsequent endorsement of those goals in the NASA Authorization Act of 2005, are the right approach, I find it disturbing that the Administration budget requests have been well below those called for in the 2005 Authorization Act. The budget resources do not match the goals and requirements, and further reductions, such as the FY'07 budget shortfall of $577 million, set NASA and its programs up for failure.

During this gap period, we will have a $100+ billion orbiting lab that will be ready for all of the innovative microgravity research in human health effects, materials science and other areas that have been planned for a long time. But we will have no way to get our crew to it and home again, except on a Russian Soyuz. For that access now, while NASA still has the Shuttle available, we are paying the Russian Space Agency $780 million and getting a waiver from the prohibitions in the Iran-Syria-North Korea Nonproliferation Act, a law designed to discourage nations from cooperating with dangerous programs of countries that are state sponsors of terrorism. Russia has been a reliable ISS partner, but the Russian Space Agency is under-funded and facing aging infrastructure issues, as well. Memories of accidents and safety issues onboard the *Mir* are still with most of us, as well of the more recent troubles experienced by the Soyuz, making a second ballistic re-entry just a few weeks ago. When this issue U.S. reliance on Russia was raised in hearings earlier this year, Administrator Griffin testified that it was "unseemly in the extreme." I completely agree.

But there is an even bigger challenge in the future of our space program. China is the new competitor in this second Space Race and the country that poses the greatest threat to our leadership. China has publicly declared a goal of establishing a permanent manned base on the moon. When it is not putting our orbiting assets and those of other countries at risk by testing anti-satellite weaponry in violation of international protocols, China is successfully completing orbital human space flights. In 2004, more than 600,000 students graduated with engineering degrees from institutions of higher learning in China, compared to 70,000 in the U.S., as reported by the National Academy of Sciences. That's eye opening, but even more so is the fact that China also actively uses covert means to access U.S. technology and scientific information. An April 3, 2008 cover story in the *Washington Post* references ten cases in the past year alone where alleged Chinese agents have been arrested or sentenced for the illegal export of sensitive U.S. technologies. Reportedly, Shuttle technologies were a target of this espionage activity. As reported in the Wall Street Journal and Aviation Week, among other major publications, China is importing "ITAR-free" satellites and other space technologies from a European company, thereby evading U.S. export controls that are intended to safeguard our national security. China is also developing its Long March 5 rocket that will be capable not only of delivering people to the moon, but also landing nuclear payloads anywhere in the United States.

It is time for our country and our nation's leaders to tune in to these facts and back off of their naïve views of "space on the cheap" – other countries are making the necessary resource investments; and it's time to do the same before the option to respond is no longer an option.

It is important to look at the issues and challenges facing our space program with clear eyes if we are going to be successful in solving them. We need to limit the duration of the U.S. human space flight gap and prevent it from growing, to forestall the hemorrhaging of our talented and experienced aerospace workforce

and supplier network. The only approach is to provide additional funding, as the Senate has tried to do in the last couple of years, to accelerate development of the new vehicle. I commend many here on Capitol Hill and thank them for their efforts to reimburse NASA for money lost due to Hurricane Katrina and Return to Flight costs. Their efforts to request the additional funding are exactly the kind of support and leadership we need on the Hill, particularly when there are competing national priorities and their colleagues, who oppose the support, would rather leave our nation's budget lingering in a Continuing Resolution. Administrator Griffin has testified that an additional $2 billion in funds spread equally over this year and next would enable the agency to cut 18 months off of its delivery time. That would narrow the gap to around 3 years. That is far from ideal, but it reduces our reliance on Russia significantly and may be a short enough time frame to prevent wholesale loss of critical aerospace skills.

We will be facing a change in the Presidency in just a few short months. I know all three major candidates have taken varied and often vague positions on our space program, as tends to be the case during election season, but it is important that the party taking office recognize the need for continuity in NASA leadership, and make a firm commitment to provide the necessary funding for our nation's "independent" human space exploration programs. The architecture and program plan for Projects Orion and Ares are sound and any further redesign and debate will only result in incurring more costs and widening the gap. Program restructuring and design changes were major factors in delayed development of the ISS. With this gap looming, we don't have the liberty of unnecessary changes in program direction and mid-course correction.

My last recommendation is aimed more at NASA than the Congress. Our space agency has a public support, or approval rating, of around 70%...a rating that would leave many politicians envious. Additionally, NASA has one of the highest public profiles of any in the federal government and its website is one of the most frequently visited. Within its means, the agency has been reasonable in its public

relations efforts and effective at leveraging “space” to build partnerships with Hollywood to get its message out, but on this issue of Shuttle retirement, the gap, and development of the new vehicle, the public is blissfully unaware. Maybe the media with its short-term focus shares some blame, but I believe the agency can do more to educate the public about what looms ahead. Part of that mission also entails better outreach, particularly to young people who communicate in much different ways than just a few short years ago. I’ve never believed that nonsense about young people no longer being excited or “inspired” about space. When a kid learns about some of the exciting missions the agency is working on, tours the space centers, meets an astronaut, or views the bold and beautiful images of outer galaxies captured by the Hubble, they light up in the same way that kids did in the heyday of Apollo. More creative and less traditional communications efforts have started, but NASA needs to move more quickly into all mediums of communication, fully embracing opportunities offered by YouTube, MySpace and Facebook, as well as continuing to leverage the traditional outreach of speakers bureaus, career fairs and the co-op and internship staffing programs.

Thank you again for inviting me to testify and I stand ready to answer any questions you might have.