

Installation of the Inaugural Neil Armstrong Chair in Aerospace Policy
The Ohio State University
Columbus, Ohio, United States of America, 43210
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Dear Friends and Colleagues:

Gifts today are abundant: Your presence. The time you have taken to honor Neil Armstrong. And your participation in this celebration. Thank you. It is an honor to celebrate with you Ohio's history, and to add momentum to Ohio's future in space exploration, as the inaugural Neil Armstrong Chair in Aerospace Policy. I am especially grateful to the Armstrong Family - to Mark, Rick, June, and Carol - to Huntington Bank - to Mr. Steinour and his leadership - to Dean Williams and Dean Brown, and to the Ohio State community for this incredible opportunity. I am humbled by your investments in this endeavor, which will certainly be an enriching journey.

Journeys are long and unpredictable trips into uncertainty. They often start from an ordinary place - for example, a young Albert Einstein riding a train in Germany, watching the clock on the platform as the train pulls away...and wondering. Or on the fresh, green grass of a spring-training baseball field. Often journeys produce results more incredible than one could have ever imagined. In Einstein's case, General Relativity. And in Baseball's case, the astonishing fact that the Chicago Cubs, finally, won a World Series.

John Glenn's journey to space, Neil Armstrong's journey to the Moon, and perhaps each of our journeys in life are similar. We work hard. We struggle. We move forward with hope, despite uncertainty and adversity. And as a result, we grow. We transform ourselves - and the world - often for the better, and often in indescribable ways.

We have seen this play-out in today's discussions. The origins of space exploration include the Nazi's construction and use of the V-2 missile in war, and intense competition between the United States and the Soviet Union in the Cold War. Today, space exploration profoundly impacts our quality-of-life, and that of every other human being on Earth. Space has gone from being an immensely competitive national activity of singular accomplishments, to being a collaborative, international enterprise, essential to nearly every facet of our daily lives.

In the early days, we watched *men* from two countries launch to orbit or to the Moon. By now, we have watched dozens of flights, with hundreds of men - *and women* - from 37 (!) different countries go to orbit.

Communication blackouts were significant obstacles in early spaceflight missions. Today, we have instant, full-time, world-wide communication for anyone with a smartPhone. We have visited with spacecraft every planet in the solar system (yes, including Pluto), and discovered thousands more planets around distant Suns. Several human machines - and a recording of Chuck Berry - have actually left our solar system. We have launched massive telescopes into space. They have revealed to us the origins and

destiny of the Universe. Americans have lived on the International Space Station non-stop for 15-years. We watch geysers erupt on Enceladus (a moon of Saturn) and volcanoes erupt on Io (a moon of Jupiter). We drive vehicles on Mars. We dream of exploring the ocean of Europa (another moon of Jupiter) which we know has *more water than the entire Earth*.

On Earth, people used to 'get lost.' School friends used to 'move away' and be lost to time. Now, thanks to spaceflight, communication and navigation satellites have made it possible to never be lost, and to never be alone again. Millions once gathered in person to watch a rocket launch, camping out for days under a hot Florida sun. Now millions watch the rocket land. On the internet. And in high-definition.

Ohio's past contributions to this journey of space exploration are obvious. Just take the change out of your pocket. Only the most important achievements are minted on our money. The back of our "Ohio State Quarter" - our snapshot among the 50 separate pictures which document contributions from each State to the growth of the United States - displays two things. The first airplane built by two Ohio brothers, and an Ohio Astronaut - our *Apollo* Astronaut - Neil Armstrong. He was born here. He lived here. He taught here. He retired here.

Neil Armstrong and John Glenn continue to inspire Ohio, the State which has produced more men and women to become NASA Astronauts than any other. Ohio - a state that is home to critical NASA and US Air Force space facilities and activities. Ohio - the world's 26th largest

economy. Ohio - the number one supplier to Airbus and Boeing. Ohio - where aviation and aerospace are a source of high-paying and hard-to-export jobs for over 41,000 people. Ohio - where aviation and aerospace generate over \$7.6 Billion dollars of economic activity each year.

What will be minted on the back of the Ohio Quarter *next* time? This is entirely up to us. It will be determined by the people here in this room, and those with whom we choose to work.

We will be propelled by Huntington Bank's investment in The Neil Armstrong Chair at The Ohio State University. This generous investment in our community will be our rocket fuel. Not surprisingly, it is made by bankers, who know exactly the kinds of rewards great investments can yield.

Our journey - like any journey - is not without uncertainty. There has been ongoing malaise and questions in the United States around space exploration. The space shuttle has retired. We cannot currently launch our own astronauts. The next great space telescope is behind schedule and very expensive. What's next: Moon? Mars? Asteroid? Nothing? What about the budget?

These are troubling questions. Nevertheless, the United States and the rest of the world will continue to build and benefit from *civil* space exploration - human spaceflight, planetary exploration, science, earth remote sensing. These non-military, peaceful activities will be more globally cooperative than nationally competitive, and rarely the result of

any nation “going it alone.” In my view, maximum long-term success for the citizens of our country, and of all countries, will require the United States to supply significant leadership around four main themes.

First, the United States government must continue Federal investment to grow a vibrant commercial space market. Healthy commercial markets and vibrant innovation are preconditions for the world’s long-term security and sustainability. Imagine walking through North Market here in Columbus - it is thematically integrated, vibrant, with a wide selection of products and services, available for purchase by anyone, not just the mayor or the city council. The ‘space market’ should also be vibrant and varied - to include space launch, cargo resupply to space outposts, knowledge generated about the Earth from space observations. And these products must be available to, and widely desired by, customers who are not only part of the US Government.

Second, we cannot achieve all US government objectives through the private sector. Nor can we achieve all private sector objectives using the US government. Public and private sectors have appropriate and distinct roles. Think about the Federal Interstate Highway system - no single commercial company can meet the broad range of objectives fulfilled by this infrastructure, ranging from how you got here today, to how your goods get to the grocery store, how we move people and things critical for our security. Therefore, we must also continue the US government’s infrastructure focus, by using today’s International Space

Station, and developing tomorrow's Space Launch System and Orion capsule.

Third, the United States should declare and pursue the Moon as the next waypoint in our extension of human presence into the solar system, as we grow our economic sphere of activity and learning deeper into space. The Moon is an essential proving, and staging ground for further exploration to test our engineering and biological limits - just like when someone learns to drive, they don't start out by taking the family car across the country on their very first trip. Building lunar infrastructure is an essential technical next-step. It is feasible within timescales associated with Federal budgets and election cycles. The Moon is also where the majority of the rest of the world wishes to go, but cannot themselves lead. We have ready-made collaborators. The United States can profit as an anchor tenant of a global "Moon Village," allowing us to share advocate our values, build our economy, push our engineering limits, and project our strength without firing a single shot.

Fourth, the United States should engage in civil space collaboration with the world's emerging or fragile economies. Most people in the world, most of the growth to be seen in the future, and most of our significant challenges and opportunities will come from these emerging and developing economies. Mutual self-interest, engagement, and collaboration in space serves as a major bulwark to fortify strong

relationships on the ground. This is not only important economically, it is equally important to US national security.

When I was ten years old, at the height of the Cold-War, the United States linked an Apollo spacecraft in orbit to the Soviet Union's Soyuz. Two sets of cold-warrior crews, docked together in space, collaborating and living as one - five men who spent most of their careers preparing to kill each other. Why? Our bold leadership act helped pave the way for an end to the cold-war, and for building the collaboration we enjoy today with the Russians on the International Space Station. Russia is currently the only way we can send US Astronauts to the space station, and Russian engines form the basis of the Atlas-V rocket, which launches our most important national security payloads to space. Obviously, our current relationship with Russia is complex. But disrupting collaboration in spaceflight as a result of political differences on Earth remains 'off the table.'

Nowhere in the modern landscape is there a more important place to build positive bulwarks and goodwill than with China. While insisting on complete transparency, and without 'checking our values at the door,' the US must initiate significant civil spaceflight collaboration with China. We must work together with China, across a wide range of opportunity: to solve orbital debris (or 'space junk') challenges in Earth orbit; to improve our collective ability to observe the Earth in order to address world-wide pollution, natural resource, disaster management, water quality, and

agriculture issues; to assure all parties of satisfying their legitimate security needs; and to move human exploration beyond low-Earth orbit. As with Russia and the Soviet Union, building productive Sino-American relationships in space will greatly improve US-China relationships on Earth for the long term.

With these four themes, with time, and with hard work, we have justifiable optimism about the future of US and world-wide space exploration. And so, we have decidedly *not* gathered today to celebrate a past “golden age” of space exploration. In fact, the “golden age” of space exploration begins the moment we walk out that door. This time is now.

As the first holder of the Neil Armstrong Chair, my primary role - at least metaphorically - is therefore quite simple. The Armstrong Chair, in concert with the Battelle Center’s *space innovations student community of practice* and The Ohio State University, is the ‘first stage’ of a booster rocket. Like the mighty Saturn V rocket, which propelled three people, a small lander and spacecraft to the Moon, we “booster rockets” do not make the entire journey all the way to space. We are big. We are powerful. We are a coordinated precision machine. And, yes, we need a lot of fuel. Together, we provide initial guidance and momentum essential for a journey of exploration, undertaken by students and young professionals.

Those of you in the audience today - picture yourself as the commander of your own space mission. You have trained hard. You have been ‘poked and prodded’ more than you care to remember. You have

crashed the simulator - many times. And now, you are seated atop a massive, fueled rocket - hissing, spitting, and groaning on the launch pad - in the initial stage of your own journey of exploration. You are justifiably nervous, a little cramped, and hopefully excited. Through the flight deck window, look up at the Moon and give Neil Armstrong a wink.

Because through today's installation of the Neil Armstrong Chair, we are formally igniting the first stage of your booster rocket, propelling you from this launch pad called "The Ohio State University," onward on your journey into the cosmos.

All systems are go. Explore far and wide. With "*Disciplina in Civitatem*" - knowledge for citizenship. As John Glenn and Neil Armstrong have gone before you, go with dignity. Go with a sense of wonder. Honor their examples of service, accomplishment, and modesty. And arrive at all your destinations as Neil Armstrong himself arrived at the Sea of Tranquility on July 20, 1969: In peace. For all Mankind.

To close, I am deeply thankful to each of you for your time and your presence here today. My family - Mom - thank you for all you and Dad have done for us. Our children - John, Claire, and Jacob - thank you for being the greatest part of our lives, and for the kind people you have become. And, Elizabeth - my wife, my companion, and my best friend - thanks to you most of all.

I have journeyed myself - as explorer, scientist, engineer, executive, and entrepreneur. I have crashed the simulator - and some flight hardware.

I have been propelled and guided by many others: Jerry Fishman, my first mentor at NASA who joins us today; Michael Griffin and Johann-Dietrich Wörner; and now David Williams, Trevor Brown, and Vish Subramaniam.

Today, I continue that journey, by formally becoming part of the first stage of a massive booster rocket to enable *others* on *their* journeys. For this, I owe all of you a great deal. I look forward to fulfilling your confidence and validating your trust, in bestowing upon me the honor of serving as the first Neil Armstrong Chair in Aerospace Policy at The Ohio State University. Thank you.