

**Remarks by the Honorable Sean O'Keefe  
NASA Administrator  
Experimental Aircraft Association  
AirVenture 2004  
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Thank you Tom (Tom Poberezny, President Experimental Aircraft Association) for that very kind introduction.

I want to thank you again for the opportunity to be here and to help you launch the next Century of flight. And I do hope everyone visits the NASA exhibit to see some of our ideas for pioneering that next century.

It's a thrill for me to be in the presence of so many dreamers and doers who have a genuine passion for aviation.

There used to be a saying, as outdated as it sounds today, that "the sky's the limit." Because of what so many members of the Experimental Aircraft

Association have accomplished, rather than being a limit, the sky is an exciting venue for personal transportation and adventure.

And due to the history that Burt Rutan and Mike Melville made with the flight of SpaceShipOne, the heavens above are open to individual and private initiative.

I believe it is a great tribute to the Experimental Aircraft Association and all you stand for that Burt began his association with personal aviation as a 'home builder.'

We welcome the advent of private sector human spaceflight as the Burt Rutans of the world will help open up low Earth orbit for much anticipated commercial activity. NASA was created to break down technical barriers and help make space accessible--if anything, this feat reminds us that we have much work to do to make space accessible but it's a great start.

So to Burt and Mike, who I understand will be here at Air Venture later, we at NASA tip our caps to you.

Today, I'd like to discuss the Nation's Vision for Space Exploration, and what it will mean for the future of American innovation and technology development.

I also want to address NASA's cutting-edge aeronautics research activities, and how this work has relevance both to the future of aviation and our exploration vision.

Our efforts to implement the exploration vision with the support of innovators in the private sector, like those represented at this historic air show, can be quite powerful, as we have seen from the history of the Apollo lunar exploration program.

We are tremendously excited about the new exploration challenge that President Bush has given us. Our country's space program now has a bold new

set of achievable and responsible goals. We now have a focus, a strategy, a direction that is clear and compelling to the American public.

To demonstrate how clear this is, I'd like to show you now a brief video that highlights the Space Exploration Vision and what NASA will do to implement it.

### **Video Presentation**

This has definitely got folks excited around the country as evidenced by the recent poll that shows nearly seven of 10 Americans support the Space Exploration Vision and by the 13 billion hits we've received our web site [www.nasa.gov](http://www.nasa.gov) since January. That's right--13 billion hits, clear evidence that people care and care a lot. We now have specific and exciting exploration goals.

Incidentally, we're quite confident that when we start exploring in earnest one of those goals--the planet Mars -- we will for the first time in space

exploration history use aircraft in Mars' thin atmosphere to help us identify promising exploration targets on the planet's surface.

Dr. Vic Lebacqz, who heads up our Aeronautics Research Mission Directorate is here today. Vic told me a while ago that our wonderful rovers, Spirit and Opportunity, have started the Oregon trail on Mars--and now we need to put contrails over Mars.

Perhaps there is someone sitting in this audience who will design our first Mars exploration aircraft. Do I have any volunteers?

When we do go to Mars and beyond we are confident that our exploration activities will spur technological developments that will lead to new products and services and tangibly improve the lives of people throughout the world.

Just as the Apollo program led to advances in computing and electronics, the potential spinoff

benefits from this broad based exploration program could be considerable.

Since the time of the Apollo era, grooved runways, dramatically improved tires, portable hand-held power tools, hydrogen powered fuel cells, cataract detection, and improved heart pumps were all derived as a result of NASA technology research.

We believe the technology development necessary to execute and implement the Space Exploration Vision will accelerate advances in robotics, autonomous and fault tolerant systems, human-machine interface, materials, life support systems and novel applications of nanotechnology as well as microdevices. Of course, these anticipated technological developments could have important implications for aviation.

We are engaging in a journey, not a race. We succeeded in a race in the 1960's in which the price for coming in second was unacceptable.

This is about a journey. It's about a whole set of development of capabilities and enabling technologies that will permit us to achieve our ambitious exploration objectives.

There is one similarity, however, between our current journey and the space race of the 1960's. One of our key mission goals is to inspire the next generation of explorers. Just as the Apollo program inspired the youth of America and helped nurture a new generation of skilled scientists and engineers, the pursuit of our vision through ongoing activities such as Space Station research, the continued scouting of Mars by Spirit and Opportunity, and Cassini's mission around Saturn--has tremendous potential to motivate young people.

We're working to reach out to this new generation of explorers through a program we started two years ago called Explorer Schools. This program joins educators, administrators, students, and families

from 100 middle schools across the country in sustained involvement with NASA's research, discoveries and mission opportunities.

In starting this program we started with a simple premise--at NASA we have the stuff that brings math and science to life for kids. So we've asked professional educators, "Tell us what you want us to do to help you make your math and science curriculum more relevant and interesting to students?" Based on their advice we are now helping these 100 schools transform the nature of their education curriculum. We are looking to expand the program over time and also develop useful partnerships with different philanthropic and corporate interests.

I might add that through your Young Eagle's program, the KidVenture Gallery, which I look forward to touring later, and the NASA/FAA/EAA sponsored experimental aircraft design competition

for high school and college students--with winners to be announced Friday, you are doing a tremendous job of guiding our youth toward a life-long involvement in aviation and spaceflight.

My two teenage sons participate in the program, but it was 15-year old Andrew Grant became your one-millionth Young Eagle shortly before the Centennial of Flight celebration last year. I can attest to what a fabulous program this is.

Just think what you are accomplishing by connecting young people to the thrills of flight with all these activities.

The occasion of the Centennial reminds us that many of our pioneering astronaut heroes had their lives dramatically altered by the experience of their first airplane ride.

It was an Ohio auditor of county records, Stephen Armstrong, who took his six-year old son, Neil, for the lad's first plane ride in a Ford Tri-Motor

near their home in Wapakoneta, Ohio. As a teenager, Neil like many of your young Eagles, was obsessed with flight; he obtained his pilot's license even before he could drive a car. And a little over 20 years later, in that summer of 1969, as Michael Collins piloted the Apollo 11 spacecraft, Neil Armstrong and Buzz Aldrin guided the lunar module Eagle to the surface, and took humankind's first steps on the moon.

To pay homage to our aviation heritage, Neil and Buzz took with them to Tranquility Base a precious relic from the Wright Brothers' first powered flight in 1903: a piece of the Wright Flyer's fabric and propeller. Yes, we have come a long way since Kitty Hawk, and this adventure without end is just beginning.

About 11 years after Neil Armstrong first flew in a plane, a young girl named Shannon Lucid was living in Shanghai, China with her missionary parents, Oscar and Myrtle Wells. That summer, her

parents took Shannon on a DC-3 transport plane to China's Goolong mountains where her father ministered to Chaing Kai-Shek's troops. As that plane swooped through the mountains to a smooth touchdown on a gravel runway, Shannon thought to herself, "That's the most remarkable thing that a human being can do. I'm going to do that when I grow up." Boy did she ever!

When Shannon was a student at the University of Oklahoma she paid for her own flying lessons, and then became an astronaut. She flew on five Space Shuttle flights, lived six months on the Russian Space Station Mir, and holds the record for the most flight hours in space by any woman in the world. Not a bad return on her \$10 per hour investment in flight lessons don't you think?

Sometimes little things like the simple thrill of a first flight can change the course of history. It certainly changes the lives of these remarkable

people. So I salute EAA's Young Eagles program for what you are doing to engage our future pilots and astronauts in the wonders of flight and encourage you to keep it up!

We're confident that along with your innovative programs, the exciting potential of the exploration vision can help reverse a decade long trend of declining interest by students in math, science and engineering fields, and help refresh not only the talent pool but also our nation's broader technology base.

Now even as we pay attention to assembling the talent pool that will help us explore the solar system and beyond, we are also moving out on the nuts and bolts work of extending our space exploration reach through the step-by-step approach outlined in the strategy.

We have accomplished a great deal in NASA's 45 years, but the laws of physics are still the same.

We still face the same fundamental power, propulsion and human factors limitations we took on when our first astronauts started orbiting the Earth.

Today, we are limited by the immense power it takes to get a spacecraft into orbit, by the long time periods it takes to propel a spacecraft from Earth's vicinity to the planets, and by such human factors challenges as the exposure of astronauts to large doses of radiation, and their loss of bone and muscle mass over time in orbit.

In thinking about our challenges I'm reminded of a remarkable biography that David McCullough wrote about our nation's second President John Adams. McCullough relates how Adams lamented that the USS Constellation, the pride of the new American fleet, and the symbol of U.S. resolve to engage in global commerce and demonstrate our national resolve, lay at anchor in Boston Harbor for

days and days at a time because the weather wouldn't permit it to sail.

We are in the same mode right now with space exploration, in the equivalence of the "age of sail." Conditions must be perfectly right for us to proceed. We must use our talents to overcome those power, propulsion and human factors challenges in order to get to an "Age of Steam." And that's what we mean to do.

The President's Commission on Implementation of the U.S. Space Exploration Policy, just delivered the results of their review last month. Capably led by former Air Force Secretary Pete Aldridge, the Commission gave us a good game plan to successfully meet these exploration challenges.

The Aldridge Commission has proposed that NASA tap into the talents and energies of the private sector as we pursue these exploration objectives.

Specifically, the Commission recommended that NASA encourage a far larger presence of private industry in space operations with the specific goal of allowing private industry to assume the primary role of providing services to NASA, and most immediately in accessing low Earth orbit.

We want the tinkerers and inventors in this audience to be a big part of the upcoming extension of private enterprise into low Earth orbit. And we also want to tap your good ideas and concepts as we develop the space exploration systems of the future. I guarantee you that SpaceShipOne represents just the start of an explosion of citizen-led and citizen-inspired space activities.

Furthermore, drawing on the historic role of the Orteig Prize in inspiring Lindbergh's trans Atlantic flight, and now the X-Prize in encouraging private sector spaceflight, through our new Centennial Challenges program, we want to establish a

competition to stimulate private sector innovation in new space and aeronautics technologies. The Aldridge Commission specifically endorsed this effort. Regrettably, the House Appropriations Committee mark up ....denies this authority if this appropriations bill is enacted.

To be sure, government will still play a major role as we expand our exploration reach. But to do so, we must transform NASA and become a lot friendlier an environment for inventors, entrepreneurs and technology developers. The first step is to simplify our organization. On Sunday, NASA will officially consolidate the work of six enterprises into four mission directorates--exploration systems, space operations, science, and aeronautics research so that we will be better organized for the adventures ahead.

Let me now talk about how the first A in NASA --Aeronautics--fits into our exploration vision, and continues to benefit aviation here on Earth.

Much of the aeronautics research we are doing in human factors, autonomous operations, and uncrewed or uninhabited air vehicles could have direct benefits for our exploration efforts. In a sense, this research uses Earthly applications as an analog for all aspects of space exploration.

I mentioned earlier how we hope to develop scout aircraft for Mars exploration. Well Mars is not the only focus of our extraterrestrial aviation aspirations. Vic and his engineers say that if there is a planet with an atmosphere to fly in, we'll fly in it.

Of course the boost our aeronautics research will give to space exploration is in addition to the benefits the flying public receives from our world-class aeronautical research efforts.

Indeed, many of the aircraft here at Oshkosh can trace the development of many of their components and designs to research conducted by NASA, and its

predecessor, the National Advisory Committee for Aeronautics.

Today, we are making strong investments to help our country meet challenges facing both air and space transportation, to enhance aviation safety and security and to extend the benefits of aeronautics innovation throughout society.

NASA's dedicated aeronautics team is currently working on "smart" materials, actuators and autonomous flight systems that will enable the aircraft of the future to operate with unprecedented levels of aerodynamic efficiencies and control.

We are also working with our colleagues at the FAA on Traffic Management Advisor and Surface Management System tools to reduce arrival and departure delays. The Traffic Management Advisor decision tool can increase capacity by three to five percent per airport. This system is currently

operational in eight FAA Air Route Traffic Control Centers.

Another NASA research effort is focusing on reducing aircraft noise and emissions. We hope to develop near-term technologies that will reduce aircraft noise by 10 decibels, and in the long-term contain aircraft noise within airport boundaries.

On the environmental side we recently completed a sector test of a low Nitrous Oxide combustor design capable of reaching a goal of reducing these emissions by 70 percent. In the long run, we are looking to expand our emissions reduction efforts to include Carbon Dioxide, greater levels of Nitrous Oxide reduction, soot and other exhaust particles with the ultimate goal of a zero emissions aircraft system.

Finally, I'm proud that our scientists and engineers are hard at work, striving to develop technologies to help prevent civilian aircraft from

being used as terrorist weapons. We seek to develop aircraft that are strong enough to withstand explosion damage and land safely were that to be the case. It is our dream that the events that happened on September 11<sup>th</sup> cannot and will not ever happen again. And I'm confident that the men and women of NASA can play an important role in making that dream into a reality.

You have been a wonderful audience today, and I want to end my remarks with these thoughts. The fact that there are so many young people here at Oshkosh participating in this great American event, gives me and I hope all of you cause for hope.

They will be the ones who will head to the skies and the heavens above in the years ahead, and among this next generation of explorers may well be the first explorer to set foot on another planet. They know, as the President said so memorably, "The cause of

exploration is not an option we choose, it is a desire written in the human heart."

The NASA vision is about youth--inspired, hopeful and optimistic about our world and the sky beyond. It is that vision that explains much of who we are -- intrepid explorers, dreamers and visionaries, tireless workers for ideals big and real and meaningful.

Indeed, NASA is family of passionate citizens joined by a clear and constant mission: to enhance the excellence of our world as together we give meaning to the universe and to empower and enrich the lives of all who live there.

In closing, I thank you again for your warm hospitality and for the opportunity to visit Air Venture 2004.