

**Remarks by the Honorable Sean O'Keefe
NASA Administrator
SMART Tech Trends Conference
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Thank you Congressman Murtha (Congressman John Murtha D-PA) for that very generous introduction and good morning everyone.

It's a tremendous honor to be introduced by someone who not only is one of the most widely respected members of Congress on technology issues, and a great supporter of NASA, but who is also a good friend.

It is a real pleasure for me to be here in Pittsburgh, a city that become an impressive high-tech force to be reckoned with, in this great new convention center, to participate in the SMART Tech Trends Conference.

Now obviously technology development is a key focus of the Bush Administration, and I applaud the efforts of "Strengthening the Mid-Atlantic Region for Tomorrow" for all that you are doing to promote economic growth and prosperity for millions of people.

At NASA, we are trying to do our part; in the past fiscal year NASA funded \$2.2 in science and technology research and development efforts here in the Mid-Atlantic states.

Indeed, among the many engines helping to propel us into the future, NASA is at full throttle.

And looking forward to a promising future in the dynamic Mid-Atlantic region and in outer space, I'm eager to speak to you today about our nation's new vision for space exploration, and what it will mean for the future of American innovation and technology development.

There is one thing about working at NASA I can guarantee you. With the help of people like those of you in this room who are constantly pushing the technology envelope, we certainly go to some interesting places.

At this very moment 250 miles above us, our Expedition Nine crew members onboard the football field sized International Space Station, cosmonaut commander Gennady Padalka and U.S. Science Officer Mike Fincke are working hard on micro-gravity research that will help pave the way for future missions beyond low earth orbit.

While all our astronauts are remarkable folks, I know people in these parts take special pride in the accomplishments of Air Force Lieutenant Colonel Mike Fincke. Mike was born here in Pittsburgh 37 years ago and grew up a few miles away in Emsworth.

Mike is your typical underachieving astronaut type. He's flown in over 30 different aircraft types and likes to collect his academic degrees in twos. He graduated from MIT with bachelor degrees in Aeronautics and Astronautics and Earth, Atmospheric and Planetary Sciences. Mike went on to receive a Master's in Aeronautics and Astronauts from Stanford and in Physical Sciences from the University of Houston.

Six weeks ago Mike became the first astronaut to become a father while in space, when his lovely wife Renita gave birth to a girl, Tarali, which means star in Renita's native land of India.

Tarali has a little brother, Chandra, whose name means Moon.

In less than three months Mike is going to see his baby daughter for the first time when he and Gennady return to Earth after their six-month tour of duty.

In the meantime, our two intrepid space explorers continue to conduct research spanning across such scientific disciplines as human physiology, genetics, plant biology, earth observations, physics and cell biology.

From these experiments, scientists are learning better methods of drug testing, developing models that predict or explain the progress of disease; investigating how to use microbes to make antibiotics; and determine how to improve manufacturing processes. In short, this research is helping to better all of our lives.

To help advance our new exploration objectives, Mike and Gennady are also learning a great deal about the physical and psychological challenges of living and working in space, gaining knowledge that will help pave the way for future human exploration of the solar system.

We fervently hope this research will also help people here on Earth. We know that in the six months that our Expedition crews typically spend onboard the Space Station our crew members typically lose about 30 percent of their muscle mass and about 10 percent of their bone mass in this zero-gravity environment. Fortunately, they recover this mass when they return to Earth. But with the future needs of long-duration space flight in mind, we are working hard to learn how we might arrest this pattern.

Now think about what a solution to this condition might mean to the millions of people--our parents and grandparents-- who lose bone mass as a result of the natural aging process, and suffer through the pains associated with osteoporosis. That is one of the reasons why we conduct our ambitious research and exploration activities in space.

Of course our exploration reach also extends to the surface of Mars, where our twin energizer robots, Spirit and Opportunity, continue to build on their already scientific return.

To say the least, these little rovers that could have vastly exceeded our wildest expectations.

Opportunity, which is exploring an area called Meridiani Planum around the Challenger Memorial Station has really hit the scientific jackpot. It has discovered clear evidence that the landing site was once on the shoreline of a salty sea. This evidence suggests that Mars was a different place not that long ago.

For all the productive work these robots have performed on the Martian surface since January, and will continue to perform as we extend their missions hopefully into October, a human explorer would be able to collect the same amount of material as Spirit and Opportunity have collected in a single day.

Further, using his or her cognitive skills, our Mars explorer would be able to quickly spot those areas of the surface that are most promising for investigation and inquiry, such as the El Capitan outcropping where Opportunity was able to find evidence of ancient water on Mars' surface.

But, at present, humans can't get there.

Until we conquer the human endurance challenges I mentioned, and develop propulsion and power generation options, our only bet is to continue these robotic precursor missions.

By doing so, we are developing the "advance guard" for human exploration.

Mars is not the only place in the solar system that is drawing NASA's attention these days. Our ambitious Cassini-Huygens mission has been safely in orbit around Saturn for a month and its four-year exploration of the planet, its rings, moons and magnetosphere is well underway.

We look forward to next January 14 when the Huygens probe will descend into the liquid atmosphere of Saturn's mysterious moon Titan, a moon whose atmosphere may hold the secrets to Earth's early atmosphere from which life itself sprung forth billions of years ago. You are going to see some fantastic science results when this event happens.

Incidentally, the 14th day of January has some importance to us in the NASA family. For it was on January 14th earlier this year that President George W. Bush came to NASA headquarters to announce a new vision for space exploration.

And as the above examples demonstrate, NASA is already hard at work advancing the objectives of extending our exploration reach back to the Moon, to Mars and beyond.

We are tremendously excited about the new exploration challenge that President Bush has given us. The President has provided us with a new set of compelling, achievable and responsible goals for the space program.

I'd now like to show you now a brief video that highlights the space exploration vision and what NASA will do to implement it.

Last month, a Presidential Commission, capably led by former Undersecretary of Defense and Secretary of the Air Force Pete Aldridge, issued a very comprehensive and constructive report that will help NASA manage and organize our future exploration activities, and help get us to a transition from an "Age of Sail" to an "Age of Steam."

Let me provide you with a few highlights from the report.

First and foremost, the members of the Commission, comprised of a distinguished group of

public servants, scientists, military and business leaders, gave their full endorsement to the Vision for Space Exploration.

The members of the Commission stated the new space agenda will significantly help the nation protect its technological leadership, economic vitality, and physical, economic and military security.

The commission identified 17 enabling technologies they feel are critical to realizing these exciting exploration objectives. They include:

- Affordable heavy lift capability
- Extremely lightweight and advanced structures that will be the building blocks for advanced spacecraft
- A next-generation, high-acceleration, high life-cycle, reusable in-space main engine
- Advanced power and propulsion

- New cooling technologies, as well as propellant storage and transfer in space
- Next-generation telescopes and detectors
- Formation flying
- High bandwidth communications, including optical and high-frequency microwave systems
- Entry, descent and landing
- Recycling of oxygen, carbon dioxide and water
- New spacesuits for use on other planets
- Autonomous systems and robotics
- New temperature and radiation-hard sensors for scientific data collection and analysis
- Space medicine
- New spaceport and range support facilities for the Crew Exploration Vehicle
- Automated rendezvous and docking, and;

- Developing the capability to "cut the cord" with Earth for space logistics

This will be our emphasis in the time ahead.

They proposed that we adopt a "go as you can afford to pay" approach for funding the vision, and endorsed our sustainable and affordable approach to achieving our exploration aims.

Significantly, we will work to achieve steady progress in reaching our exploration objectives--one mission, one voyage, one landing at a time.

This has definitely gotten a lot of folks excited throughout the country. Indeed, we are highly gratified by a recent Gallup Poll that shows seven out of ten Americans support this vision.

Let me now turn to what this means for the nurturing of a new generation of skilled scientists and engineers here in the Mid-Atlantic Region and around the country, and the resulting development of

new technologies that will promote economic growth over the long run.

We believe the exciting potential of our space exploration initiative will help reverse a decade long trend of declining interest by students in math, science and engineering fields, and help refresh NASA's talent pool and our national technology base overall.

From NASA's self-interested perspective, we are facing the graying of our workforce. One-fourth of our workforce will be eligible for retirement in the next five years.

And while employment opportunities in science and engineering are expected to increase at a rate almost four times greater than for all other occupations throughout this decade, enrollment in science and engineering college courses has been in decline.

But this has broader national implications as well, implications that should particularly interest this audience.

A new report by the National Science Board says the nation is losing "a long-distance race" to maintain its edge in human scientific resources.

The Board pointed out that the U.S. ranks 17th among nations surveyed in the share of 18 to 24 year-olds who earn natural science and engineering degrees, trailing Taiwan, South Korea, Italy and Ireland. Now I'm very proud of my Irish heritage, but it disturbed me that we are trailing them in this important category.

A regeneration of our nation's commitment to exploration and discovery will help reverse this trend.

I'm convinced we are setting the stage for a space program that will boost the opportunities we will have to become a smarter, safer, healthier and more intelligent world.

And if we do it right, on a scale never seen before in the history of the planet, at a pace hardly thought possible.

We are quite 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 important advances in computing and electronics, the potential spinoff benefits from this broad based exploration program could be considerable.

Since that time, cataract detection, heart pumps and safer aircraft are all examples of NASA technologies used to advance our exploration goals being applied to productive use in society.

As I mentioned earlier....we're putting a lot of effort in reaching out to our next generation of explorers.

And educators will tell you that you have to start young.

We're quite excited, for example, about a new NASA-sponsored program called Explorer Schools. This program is joining educators, administrators, students, and families from 100 middle schools across the country in sustained involvement with NASA's research, discoveries and missions.

Among our trailblazing Explorer Schools are the North Smyrna Elementary School in Smyrna, Delaware, the Eastern Middle School in Silver Spring, Maryland, Woodbury New Jersey's Evergreen Avenue Elementary School and the Greencastle-Antrim Middle and High Schools in Greencastle, Pennsylvania. At Explorer Schools like these we make an effort to ask educators what they need to bring math-science to life.

I should also mention that thanks to new legislation the President recently signed, NASA is

beginning a new Scholarship for Service Program, which will provide financial assistance to promising undergraduate and graduate students and an opportunity to work for NASA. In this way, we intend to truly build up the bench strength of our agency. So send us your best and brightest students from Carnegie Mellon, Penn State, Gannon, Princeton, Rowan, Johns Hopkins, the University of Maryland and your other great centers of learning. We will give them challenges that will help them stretch their abilities and realize their dreams.

In closing, the President has described a promising vision for our future in space. As he's said, the cause of exploration is not an option we choose; it is a desire written in the human heart.

We are just at the beginning of this journey, and we are facing the future with a combination of wonder and humility as we strive to extend our

exploration reach to heights unimagined and into frontiers unknown.

Once again I thank you for the opportunity to speak this morning, and I look forward to taking your questions.