

STATE OF NASA
ADMINISTRATOR BOLDEN
Kennedy Space Center, FL

Feb. 2, 2015

Thank you, Bob (Cabana). It's great to be here today at the Kennedy Space Center, where so many giant leaps have been made – and where so many of our future dreams will take flight.

It was just a few short years ago that President Obama stood here in the Armstrong Operations and Checkout building and committed us to a Journey to Mars, beginning with an unprecedented mission to send astronauts to an asteroid as part of a stepping stone approach to reach the Red Planet.

Thanks to the hard work of our NASA team – and the work of our contractor, academic and entrepreneurial partners all across America -- we've made a lot of progress on that journey.

This includes progress in integrating all of our work in a structured roadmap that is leading us to breakthroughs in new advanced technologies, driving us to new destinations and generating the inspiration on which future generations will thrive.

Just behind me are some tangible examples of our progress. The *Orion* spacecraft, which recently performed a near flawless flight test on its first journey to space, is being taken apart right now so it can reveal its secrets about that amazing flight. What we learn will prepare us for its next launch aboard our Space Launch System rocket (SLS) and its future with astronauts aboard exploring farther into our solar system than ever before.

Thanks to grit, determination and American ingenuity, we've returned cargo resupply missions to the United States, insourcing these jobs and creating a whole new private market in low Earth orbit.

Now U.S. companies, large and small, are developing the new systems in which our astronauts soon will travel from right here on the Space Coast in Florida to low Earth orbit. This initiative, where we hand off low Earth orbit transportation to the private sector, is critical to our journey to Mars.

The Boeing *CST-100* mockup behind me that features the company's first-generation weld structure is a prime example of how the American aerospace industry is rising to the challenge of increasing crew safety while bringing down the cost of space travel.

This *CST-100* weldless structure is an example of the innovative engineering that makes the spacecraft reusable up to ten times.

This pressure dome has no welds, which allows for a short turnaround time between flights, increases simplicity of production and drives down costs.

SpaceX also is working on a *Crew Dragon* to complement the successful cargo capsule that has now been regularly delivering cargo and science experiments to the International Space Station (ISS) for more than two years. The *Dragon* cargo module behind me flew SpaceX's first mission to the ISS, becoming the first spacecraft produced by a private entity to be launched into space, rendezvous with and be berthed to an orbiting outpost and deorbit and land in tact back here on Earth.

A version of the *Crew Dragon* is being prepped for shipment and is set to arrive just down the road at Cape Canaveral Air Force Station in the next couple weeks for an upcoming pad abort test flight. Both SpaceX and Boeing have set up operations here on the Space Coast, bringing jobs, energy and excitement about the future with them.

To further advance these plans and keep on moving forward on our journey to Mars, President Obama is proposing an FY2016 budget of \$18.5 billion dollars for NASA, building on the significant investments the Administration has made in America's space program over the past six years. That's a half billion-dollar increase over last year's enacted budget, and it is a clear vote of confidence in you – the employees of NASA – and the ambitious exploration program you are executing.

Your work is part of a vital strategy to equip our nation with the new advanced manufacturing and space technologies for the future and inspire a new generation of explorers to make the next giant leaps in human experience. NASA is firmly on a Journey to Mars. Make no mistake, this journey will help guide and define our generation.

This year we celebrate 50 years since Edward White left his Gemini capsule to become America's first spacewalker. It was only a few years later that we landed humans on the moon, and not too long after that the United States became the first, and still only nation, to successfully land a spacecraft on Mars.

Our incredible 30-year Space Shuttle Era followed from the early '80's through July 2011, during which the science community saw the deployment of three of the four Great Observatories deployed from the shuttle during the decade of the '90's – the *Hubble Space Telescope* (Apr '90), the *Compton Gamma Ray Observatory* (Apr '91) and the *Chandra X-Ray Observatory* (Jul '99) – contributing to a golden age of planetary and astrophysics exploration and discovery. It was through the Space Shuttle Program that NASA opened space flight to many who had previously had no chance of flying – bringing diversity in our crews to include women, minorities and astronauts from many of our partner nations – perhaps its greatest legacy.

Using shuttle as our transportation for our astronaut construction crews, we then spearheaded assembly of the International Space Station (ISS) in which humans have now lived continuously for more than 14 years. Over the past six years, we've taken the most concrete steps *ever* to advance a human mission to Mars.

This journey to Mars, indeed our entire path to the future, starts now, right here on Earth. Our commercial crew work, for example, is headquartered here at Kennedy, but encompasses efforts in 37 states from Nevada to Montana to Kansas, Wisconsin, New Jersey and North Carolina. Whether you're working in a family-run composite fabrics mill in Pennsylvania or developing the next generation of Mars rovers in California; from the Ohio Space Corridor to the Mid-Atlantic Regional Spaceport in Virginia, you're part of our Journey.

Right now in Mississippi at our Stennis Space Center, we just tested the RS-25 engines from the space shuttle, four of which will power our new Space Launch System to carry *Orion* on future missions to deep space. In just a few weeks, the solid rocket booster for that rocket will be fired up in Utah.

Students from the Governor's School for Science and Technology in Hampton, Virginia, winners of the Lockheed Martin – NASA Exploration Design Challenge, flew radiation shielding experiments on *Orion* and continue to use our commercial partners to send experiments to the Station, nurturing not only new discoveries, but the hands-on experience of a new generation hungry to make space their own.

This summer, NASA plans to once again test our Low Density Supersonic Decelerator off the coast of Hawaii to continue proving in flight the new technologies critical for landing larger payloads on the surface of the Red Planet.

We know that technology drives exploration and our journey to Mars. We also will continue to develop advanced solar electric propulsion systems needed for the Asteroid Redirect Mission (ARM) and other deep space missions and to make advances in the atomic clocks and green propellants that will guide and power our future missions.

Landing on an asteroid traveling through space or retrieving a piece of it requires advanced autonomous robotics and guidance and control technologies. These NASA-developed technologies will be applicable to commercial satellite servicing, future exploration, resource extraction, mining, in situ resource utilization and planetary sample return. The asteroid mission also will demonstrate advanced high-power Solar Electric Propulsion (SEP), critical for future NASA and commercial uses. The mission will test asteroid deflection techniques and may provide information to inform future work to help us protect our home planet.

We have identified several asteroids that could be good candidates and will make a decision soon on a capture option.

As we advance our journey to Mars, we're also focusing here on Earth on making aviation greener, quieter and more efficient.

Every U.S. aircraft and U.S. air traffic control tower has NASA-developed-technology on board. NASA scientists and engineers are working on new composite materials that will make future air and spacecraft lighter and more durable. NASA is with you when you fly and we're committed to transforming aviation by dramatically reducing its environmental impact, maintaining safety in more crowded skies and paving the way toward revolutionary aircraft shapes and propulsion systems.

As we all know, the most important planet we study is the one on which we live - Earth. The reality is our planet is changing – and the data continues to prove this, but we're on it.

NASA is a leader in Earth and climate science and our constantly expanding view of our planet from space is helping us understand Earth and its changes.

When natural disasters impact us, the Space Station and NASA satellites are there to help make time-critical observations and aid in recovery. In the last twelve months, we've launched five Earth science missions – five! The last in these “Year of Earth” missions, Soil Moisture Active Passive, or *SMAP*, was launched just this past Saturday. These missions are studying such diverse things as ocean winds, components of our atmosphere such as clouds and aerosols and precipitation on a global level.

SMAP will give us for the first time EVER a picture of soil moisture on a global scale. The mission will help improve climate and weather forecasts and allow scientists to monitor droughts and better predict flooding caused by severe rainfall or snowmelt.

SMAP data will allow nations to better forecast crop yields and bolster early-warning systems.

The Airborne Snow Observatory uses instruments aboard aircraft to tell, again -- for the first time EVER -- how much water is stored in the mountain snowpack and how that changes from week to week. This is critical to helping evaluate and plan strategies to combat the intense drought plaguing California and many southwestern states and help protect their businesses and communities. In Colorado, the observatory is flying in the Uncompahgre Basin and the headwaters of the Rio Grande, which also stretch to Texas. NASA is leading the way in understanding local, regional and global water cycles – information critical to understanding our environment and supporting our economy and national security.

The technologies we develop to explore space have practical applications right here on Earth. One example is the shock absorbers used during space shuttle launches that are now being used to brace buildings during earthquakes, preventing damage and saving lives; or a NASA-simplified bacteria test being used to monitor water quality in rural communities around the world and cabin pressure monitors that alert pilots when oxygen levels are approaching dangerously low levels in their aircraft.

As we strive to achieve the dream of sending humans to Mars, it's important to remember we're already there.

For 40 years, increasingly advanced robotic explorers have studied the Red Planet. This has dramatically increased our scientific knowledge and helped pave the way for astronauts to travel there.

Our latest Mars spacecraft, *MAVEN*, arrived last September to study the upper atmosphere and joined a fleet of orbiters and rovers on the surface. Next year, we will send the *InSight* lander to study the planet's core. In 2020 a new rover building on the incredible success of *Curiosity* will help us prepare for human arrival at Mars and, for the first time ever, will cache a sample for later return to Earth.

Mars is a key destination, but it's only one point on our journey of discovery. It's a journey across and out of our solar system to the farthest reaches of the universe and the frontier of the human capacity to explore.

I was privileged 25 years ago this April to pilot the Space Shuttle Discovery's STS-31 mission, during which we deployed the Hubble Space Telescope. *Hubble* is still doing amazing science, and the last textbook that will have to be rewritten because of its discoveries hasn't even been drafted yet.

In just three years, we'll launch the James Webb Space Telescope, *Hubble's* successor, and continue to reveal the unknown with the largest observatory ever put in space. That amazing telescope is taking shape right now in suburban Maryland, where the mirrors have arrived and the "heart" of the telescope that holds its instruments successfully completed a nearly four-month test in a cryogenic thermal vacuum chamber.

After nearly nine years and three billion miles of travel, the *New Horizons* spacecraft was awoken last month in preparation for its arrival in the Pluto system in July. Right now *Dawn* is approaching the dwarf planet Ceres. *Juno* is speeding toward Jupiter where it will not only send back unprecedented data from a first ever polar orbit of our giant neighbor, it will demonstrate how solar power can work at great distances from the sun.

Looking to the future, we're planning a mission to explore Jupiter's fascinating moon Europa, selecting instruments this spring and moving toward the next phase of our work.

The Kepler mission continues to discover new planets outside our solar system. It has confirmed more than 1000 planets, some of which could be rocky like Earth. The Solar Dynamics Observatory just took its 100 MILLIONTH image of the sun and in dozens of other Astrophysics and Heliophysics missions, the data streaming back to us is bathing us in information through which scientists will sort, decipher and make discoveries for years to come.

Our journey of discovery has only just begun. Together, humans and robots will pioneer Mars and the solar system. In fact, they already work closely together aboard the Space Station. As the President said in his State of the Union speech two weeks ago, “[we’re] ...pushing out into the solar system not just to visit, but to stay.”

Next month we launch astronaut Scott Kelly and his Russian counterpart, Mikhail Kornienko, on a one-year mission aboard the Station to learn more about how to live and work in space for the long term. We'll compare his vital signs to those of his twin brother, Mark, here on Earth in a first ever experiment using identical twins to learn more about the effects of living in space.

So as I stand before you today, in front of these very tangible examples of our progress and our future, I can unequivocally say that **the State of NASA is strong.**

Our newest rocket, the Space Launch System, has moved from formulation to development, something no other exploration class vehicle has achieved since the agency built the Space Shuttle.

AND RIGHT HERE AT KENNEDY SPACE CENTER, the ground systems team has also moved from formulation to development, making steady progress toward modernizing and advancing our ground systems to be ready to launch the SLS.

We have two commercial providers bringing cargo and research to the Space Station, something that would have been science fiction just a few years ago is now fact. This success and the rapid progress our commercial crew providers are making validate our faith and investment in commercial space.

Science maintains its intense grip on the world's imagination in the handful of examples I mentioned and there are dozens more. None of this happens by accident. We outlined a vision, got bi-partisan support for it and then let the most talented workforce on or off the planet go execute the plan.

Some have said that NASA is adrift. If you look at everything I talked about today – at the spacecraft of the future behind me and the concrete plans in development for human and robotic exploration in cis-lunar space and beyond.

If you visit our various NASA and commercial manufacturing facilities where work is ongoing for our future such as Michoud, here at KSC, in Utah, Texas or California. If you travel the world, as I regularly do, and see the enthusiasm I see for NASA everywhere I go, or interact with, as I do regularly, the tens of thousands of students around the world from elementary through graduate school who are excited about the dream of one day traveling into space and visiting Mars, I think you'll come to a different conclusion. That the idea we're adrift is an empty hook trying to catch yesterday's fish.

I couldn't be more excited about our future! We're making steady progress and continuing to reach for new heights.

We're making our mark on history, and along the way we're inspiring a whole new generation of scientists, engineers and astronauts. That's why we're dedicated to STEM education and broadening the pipeline to develop the leaders of the future.

That's why we've been inviting citizen scientists, makers and innovators from across America to share their best ideas through prizes and challenges.

I want every American to feel the pride that all of us who work at NASA have for our space program. What we have accomplished in the past six years, and what we will do in the years ahead, is the surest way I know to achieve that.

NASA is an incredible investment for our nation because what we do not only uncovers new knowledge; it helps raise the bar of human achievement.

People everywhere are attracted to what we do, because exploration embodies our values as a nation - resilience, hope, overcoming the challenges faced. As the Best Place to Work in Government, we share a willingness to learn from our mistakes so that we can transform the impossible into the possible.

Because of the dedication and determination of each and every one of you in our NASA Family, America's space program is not just alive, it is thriving! Together with our commercial and international partners, academia and entrepreneurs, we're launching the future. With the continued support of the Administration, the Congress and the American people, we'll all get there together.

Thank you.