Remarks by the Honorable Sean O'Keefe
NASA Administrator
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Thank you Tammy (Tammy Lytle, President, National Press Club) for that very thoughtful and gracious introduction.

On behalf of the dedicated men and women of NASA I am honored to speak before this distinguished gathering and to CSPAN viewers and National Public Radio listeners throughout the country about our continuing efforts to pioneer the space frontier and about the tangible benefits the public's investment in our Nation's space efforts is helping to bring about.

Of course we come together this spring afternoon to discuss NASA's space research and exploration agenda with the tragic loss of the courageous crew of the Space Shuttle Columbia still very much on our minds.

It was nearly 11 weeks ago that our entire country and the world came to renew our appreciation for the dedication and heroism of seven courageous astronauts, the members of the STS-107 crew.

On their 16-day mission of exploration and discovery, our Columbia astronauts demonstrated once again through their joyful

and determined pursuit of knowledge on behalf of all humanity that great lives are defined by great purposes. And we miss them more than words can say.

In their mission dedicated to scientific research, the commander Rick Husband, the pilot William McCool, and the mission specialists Mike Anderson, Dave Brown, Kalpana Chawla, Laurel Clark, and Ilan Ramon worked tirelessly on a wide range of experiments with objectives as diverse as fighting cancer, improving crop yields, developing fire-suppression techniques, building earthquake resistant buildings and understanding the effects of dust storms on the weather.

We will never forget their contributions, and we will honor their legacy by learning from this setback and moving forward with safe flight operations that will advance the noble goals motivating our science research and exploration agenda. That is indeed the admonition that each of the families of these seven courageous people have implored us to dedicate ourselves to.

At the Memorial Service in Houston following the Columbia tragedy, just days later, the President observed, most eloquently, “America's space program will go on. This cause of exploration and discovery is not an option we choose, it is a desire written in the human heart. We are that part of creation which seeks to understand all creation. We find the best among us, send them

forth into unmapped darkness and pray they will return. They go in peace for all mankind and all mankind is in their debt."

Our first task as we do indeed move forward is to help the independent Columbia Accident Investigation Board determine the cause or causes of the accident and all necessary remedies. In this work, we are making significant progress both in terms of data analysis and in terms of the recovery of Columbia.

In the countryside of eastern Texas and western Louisiana, for example, recovery teams have found more than one-third of the orbiter, including several key parts from the left wing, and the critical Orbiter Experimental Recorder: the data recorder that gives us so much information, that verifies and validates so much of what we learned from Mission Control on that fateful day.

Just an hour ago I returned with Bill Readdy, my colleague at NASA, from my third visit to eastern Texas to review the recovery plan and to personally thank all the folks who have been helping to make this remarkable effort, which will contribute to the investigation effort and the critical means to help protect public safety. And we announced yesterday that we are beginning to wind down that activity, that we have covered the area that is intended.

Over the last couple of months, over 14,000 people from the Environmental Protection, the Federal Emergency Management

Agency, the FBI, Defense Department, the U.S. Forest Service, the Texas and Louisiana National Guards and from many state and local law enforcement and emergency service units have worked long hours under difficult circumstances—unbelievable weather conditions—to get the job done.

We owe a tremendous debt of gratitude to the citizens of Lufkin, Texas, which is where the main operations have been conducted, and the surrounding communities of Hemphill, Nagadoches, Palestine and Corsicana which are all an area from Dallas-Fort Worth southeast to the Louisiana-Texas border, and surrounding communities who have welcomed the NASA family and the recovery team members with open arms.

In each of these communities there are base camps in the four primary areas, of more than 1500 folks who are part of the debris recovery effort and are set up to cover every acre of a 240 mile long debris field which is about 10 miles wide. And having searched over 550,000 acres in that span of time, in search patterns that resemble the kind of effort you'd see in a Hollywood setup of a prison manhunt where everyone walks 10 feet apart from each other across this entire area of acreage. Now to put that in context that is equivalent to covering every acre in the state of Rhode Island and they did than in a span of time less than 90 days. And each and every one of these crews come back each evening, to a

tent city essentially, of roughly 1500 to 2000 people in each of the camps: to Hemphill, Nagadoches, Palestine and Corsicana and review the bidding of the day and turn in the materials they retrieved.

Now as arduous as this has been there have also been a couple points of humor. Again, a place like Palestine (Pal-es-teen), Texas has one the more unique pronunciations of what everyone else around the world would call Pal-es-tine. Except on the occasion in which in Nagadoch….Nagadoches actually in Texas that they discovered one morning just recently that the folks in the Palestine camp had decided to commandeer one of their buses and so announced as how, "The Palestinians have taken the bus." Anywhere else but east Texas this may have made a major headline in some of the national newspapers. But it nonetheless it had an important context to the 1500 people in each of those base camps.

Sadly, the effort has also reminded us how difficult, how challenging these circumstances can be and how tragic. Two of the recovery team volunteers, helicopter pilot Buzz Mier of Arizona and Texas Forest Service Ranger Charles Krenek lost their lives in an accident in a helicopter just three weeks ago, reminding us how difficult and hazardous this task is.

This loss reminds all of us that in addition to our brave troops who have performed so magnificently in Operation Iraqi Freedom, we owe so much to the public servants right here in the United States who selflessly serve all of us in America each and every day.

And throughout this difficult period, we have also taken solace in the tremendous outpouring of support from Americans who have given us the strength we need to persevere.

We've heard from thousands of folks who want us to continue progressing with spaceflight activities, and to do so with the utmost regard for safety and incorporating the lessons learned we derive from the Columbia tragedy. And that's exactly what we will do.

From the very first day, our commitment to the families of those seven courageous crew members is that we are going to find out what caused this tragedy, we'll fix it, and we will return to safe flight as expeditiously as possible.

It is also important to note that we are moving forward in our efforts to open new pathways of exploration and discovery.

For example, at this very moment as we gather here in this great setting here in Washington, D.C., know that 250 miles straight overhead U.S. astronauts Ken Bowersox and Don Pettit, our science officer onboard the International Space Station and

Cosmonaut Nikolai Budarin—our Expedition Six crew members on International Space Station—are safely conducting scientific research and upkeep activities on that important scientific laboratory.

Later this month, our Russian partners will launch a Soyuz crew exchange flight with astronaut Ed Lu and cosmonaut Yuri Malenchenko who are slated to replace the Expedition crew that is presently there. We look forward to welcoming home Ken, Don and Nikolai when they return to Earth following their roughly five month stay on orbit in about three weeks.

The significant research that is being conducted on the Space Station has largely gone unnoticed in the wake of the Columbia tragedy, but the American public deserves to know more about the kinds of work that this remarkable facility and the people who crew it are enabling.

Thus far, more than sixty experiments spanning across such scientific disciplines as human physiology, genetics, plant biology, earth observations, physics, and cell biology have been conducted on the Space Station.

And from these experiments, scientists are learning better methods of drug testing, and about dynamic models of human diseases, the physics of fundamental processes in manufacturing,

antibiotic synthesis, and changes in Earth climate, vegetation, and crops.

Our Space Station crew members 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.

Even with the limited crew of two we are planning for the near term until we return to flight safely, this research will continue.

All these activities will, of course, help us make significant progress toward NASA's mission goals of understanding and protecting the home planet, exploring the Universe and searching for life, and inspiring that next generation of explorers.

To help advance these ambitious goals, we have now set upon a prudent and preliminary course to begin planning for when the Shuttle will return to flight safely. We have begun the effort in order to be ready to implement the findings immediately of the Columbia Accident Investigation Board, and its chair Admiral Hal Gehman fully understands the logic for our approach of getting on with it and moving right now to implement the findings they release. Just today, their first string of findings will be coming out.

Dr. Michael Greenfield, our Associate Deputy Administrator for Technical Programs, who you met earlier and former astronaut

Bill Readdy, our Associate Administrator for Space Flight, who you have also met, will be the two primary co-chairs of our Return to Flight Team and efforts to get back to doing this safely. Astronaut Jim Halsell, who's a veteran of five Shuttle missions, will oversee the day-to-day work required for our Return-to-Flight.

Our return-to-flight team will be composed of a number of key officials and safety professionals from within NASA and the industry, and I'm confident they will provide a sound foundation for this vital activity.

To plan for the flying—to fly the Shuttles safely and effectively throughout at least the middle of the next decade we need to continue to think in term of what improvements are necessary until we can find other means of sending humans to space (for) exploration.

Our Integrated Space Transportation Plan, which was introduced by the President last November, was supported by Congress in last year's appropriations measure and is now in the current proposal the President has advanced for the budget to address our Nation's near and mid-term requirements in human space flight by making investments to extend the service life required and the operational life of the Shuttle for continued safe operations in addition to the continuing efforts on new programs.

In parallel we will forge ahead with the development of a new Orbital Space Plane to provide a crew transfer capability as early as possible to assure access to and from the International Space Station and with next-generation launch vehicle technology in such areas as propulsion, structures, and operations will set the stage for the ultimate replacement downstream of the Space Shuttles.

Just as the Integrated Space Transportation Plan provides a logical means for us to address near-term spaceflight needs, our overall Strategic Plan for NASA, on behalf of the American people, logically extend our research and exploration horizons.

Now building on the foundation of our ongoing capabilities and future technology breakthroughs, the Strategic Plan sets out how we intend to achieve our mission goals and create a true highway to space in the years ahead. And for your convenience copies of that plan which are easily readable, written in language that most of us understand, English, and are not the size of the normal strategic plan doorstops, are available for you today as you leave the room. Or for those who may be listening, available there is a website, nasa.gov that includes the Strategic Plan as well. It is a very short, readable document.

The plan envisions an expanding human and robotic presence throughout the solar system as we move forward with a

combination of stepping stone missions and the building blocks of transformational technologies and capabilities.

It is designed to enable us to reach any number of destinations in the solar system, do important science at those destinations, and also tangibly advance economic and technological progress in the process of doing so.

One of the exciting potentials we're looking at is the use of gravitationally balanced points in the Sun-Earth system, to better enable the 21st century exploration of potentially the Moon, asteroids, Mars and the moons of Jupiter, and the construction and servicing of next generation space telescopes.

And to be sure, this is not going to happen right away, but eventually we hope to utilize these libration points for more ambitious science and exploration missions that will allow us to take a stepping-stone approach ever outward, with sophisticated robots enhancing what our human explorers set out to do.

As and we set out to answer the critical science questions that drive these kinds of inquiries, we're not talking about some visionary dream that is something we might achieve: It is grounded in reality. Specifically, we are pursuing a number of critical tasks and building block technologies to ensure that several bold scientific goals are achieved in the decades ahead.

For example, in the immediate near-term we are using the International Space Station and ground research to look at how we can address the long-term health issues of crews exposed to radiation.

This research will examine potential alternatives to active or passive shielding for future missions, and whether or not artificial gravity is needed for deep space exploration missions.

Just to put this in context for you, the daily radiation exposure that every astronaut aboard the International Space Station--250 miles straight up, as they orbit the earth every 90 minutes—(they) receive the dosage equivalent of eight chest x-rays a day. Beyond 600 miles, on the Van Allen Belt and beyond, and certainly around the planet Mars or any other destination you could imagine the radiation effects are at least three times greater than that. As a consequence, individuals would not survive the experience. We have to conquer this particular challenge of that exposure issue.

Someday, we also hope to use the Space Station as a technology proving ground where astronauts can learn how with the help of robots to construct and maintain large scientific platforms like telescopes that could give us clear views of Earth-like planets orbiting nearby suns.

Our Human Research Initiative, that is a very active part of today's program is also designed to deal with the human effects of long-term spaceflight duration. The U.S. astronaut record just set last June of longest duration spaceflight by Dan Bursch and Carl Walz is 196 days. That's about the amount of time roughly that it would take to get to Mars using today's conventional means to that, not back, and certainly not any time there during the course of time examining. In the course of the roughly five to six month Expedition crew time that is spent aboard the International Space Station it is fairly typical that most crews experience about a 30 percent degradation in muscle mass and about a 10 percent degradation on bone mass.

That's regenerative fortunately, but it takes several months to do so. We have got to find out a way to arrest that particular pattern. In doing so that then makes open the opportunity for long-duration space flight that could make these exploration objectives possible. And along the way it would also help the rest of us who are going to be bound to this Earth instead of those remarkable souls who are there (in space) on those occasions if we can find out how to arrest that pattern of rapid degenerative effort of muscle mass and bone mass. It has great applications for how we can apply that (knowledge) right here on this planet. Imagine the consequence of dealing of the issue of just bone mass loss alone. It

happens to all of us as a matter of age, gradually. If we could eliminate the prospect of any of us confronting in our future osteoporosis or hip replacements or any of those other factors because of what we learn as a result of this imperative of those folks engaged in that activity, that would be a marvelous consequence and it one that we are dedicated to working our way through.

Another of our objectives for future space exploration activities is to develop new propulsion systems that will significantly enhance the ability of our robotic spacecraft to perform scientific investigations of planets, not to mention significantly cut down the amount of time it takes to get there.

By using conventional propulsion, just to give you context for this, it takes 15 years for a spacecraft to get to the edge of our own solar system, just to our own solar system. Once they approach their destinations, they can only do rewarding science for a few weeks or a month at best because of a fly by. One shot. That's it. So fifteen years from now the camera better work or the mission isn't worth having pursued. More importantly, you're very hopeful that the scientists who dreamed up the scientific packages 15 years later still care about the results once they get them. That's too long.

So using nuclear and other advance propulsion systems, we believe we can do much better.

Through Project Prometheus nuclear propulsion is going to enable exploration missions that are inconceivable with current conventional chemical propulsions.

Missions can, for the first time, be redirected to take advantage of circumstances as they unfold, just as Lewis and Clark redirected their voyage nearly 200 years ago when it became clear there was no single water passage to the Pacific Ocean.

We've got to have the ability to be adaptive to this and to get there in a more rapid pace to inform the scientific agenda.

Our first demonstration of this technology will a mission that will allow us to send a spacecraft on a complex, multiple orbit examination of Jupiter's icy moons. Multiple paths. No one fly-by.

We further believe that the pursuit of nuclear and other advanced propulsion technologies will open the door to other power generation and propulsion technologies that may make it feasible to an even quicker pathway to that future.

When our future spacecraft go to the planets, they may also be using another transformative technology we're working on in the realm of laser communications.

Following in the same progression that led from the Telegraph to the Telephone, our Optical Communications efforts will use laser light instead of radio waves to revolutionize the way we gather and report back information to scientists here on Earth.

Now again, this is not just a dream, this is a reality we're about to do. This technology will demonstrated this decade on a Mars orbiting mission, in six years. When successful we will be able to map the entire surface of Mars in four months. Today, using conventional radio frequency communications, the Mars Reconnaissance Orbiter will take roughly two years to map 20 percent of the red planet's surface. So its got a tremendous return.

It is technological capabilities like this that will open up fantastic avenues of scientific inquiry. And that's what NASA's work is all about. To make breakthrough technologies as opposed to incremental or marginal improvements each way.

Now while the demonstration of these technological marvels loom on the near-term horizon, it is also with great excitement that we look forward to some very important space science missions in the weeks ahead.

In a matter or days we will be launching the Space InfraRed Telescope, the fourth and final of NASA's first generation of great observatories, along with Hubble.

SIRTF will help us peer into star and planet-forming regions found in the cold dusty expanse of space, and to image the most distant galaxies in the universe. This sun-orbiting telescope is expected to see planetary systems being formed by "hundreds if not thousands," notes Michael Bicay, a project astronomer at the California Institute of Technology.

In June our sights will be on another great feat of exploration, the launch of the twin Mars rovers, vehicles that will write another page in the storied history of planetary exploration.

Our objective is a bold one: to land the twin rovers on Mars early next year in January to look for geological evidence that the red planet was once a warmer, wetter place, a venue potentially which was hospitable to life.

The two provisional landing sites are selected. Both show powerful evidence of past liquid water, but in very different ways. One has a large hole in the ground with a dry riverbed running right through it, suggesting the presence of an ancient lake. And the other has the chemical signature of past liquid water.

There is much to explore and we intend to explore it. But by doing so in using this stepping stone approach of technology enablers in order to make this set of advances possible, and doing it expeditiously.

As a final point I'd like to make today, and I thank you for your patience, NASA has always openly shared our triumphs and tragedies with the American people and the people of the world through the efforts of the hard working press corps represented so ably here today. This has and will always be the case. It is certainly the manner in which we have sought to respond and continue to work through the Columbia tragedy.

But it is not unprecedented what we've done the last eleven weeks. Forty-two years ago this spring, when we were preparing to launch Alan Shepard on our first Mercury mission, there was a brief debate within NASA and the Kennedy Administration at that time as to whether live television broadcasts of the launch should be allowed, or whether we should follow the lead of the Soviet Union by controlling press access to the launch sites and wait until a successful launch had occurred prior to releasing government approved film images of the event.

James Webb, my predecessor, who was the second NASA Administrator at that time, argued, and President Kennedy agreed, that we should take the route of openness, even though he knew NASA would be taking a huge institutional risk had Shepard's flight failed.

Following Shepard's successful Freedom Seven mission, President Kennedy said, "This flight was made out in the open

with all the possibilities of failure. Because great risks were taken, it seems to me that we have some right to claim that this open society of ours, which risked much, gained much."

It is in this spirit of our space program continuing to operate that we will be as open as that, and we will continue to be as forthcoming. We do so chastened by our setbacks, but resolute that we will learn from them and will gain the knowledge and wisdom we need to continue advancing our mission goals and providing tangible benefits to millions of Americans and people throughout the world.

That's our intention in this 45th year of exploring the cosmos, and in this Centennial of Flight year.

The Vice President at a memorial service here in Washington at the National Cathedral several days after the Columbia accident observed, "We're a nation of pioneers and immigrants, of bold explorers and discoverers, and we have invited kindred souls from many nations to join us in the greatest of all voyages. In doing so we honor the heritage of our country and help to shape the future of all mankind."

We should all take note, I think, that in the grand scheme of things, one hundred years in this Centennial of Flight Year is a very short period of time. In that blink of an eye we've gone from

Kitty Hawk to Tranquility Base and now look forward to our rovers traversing the surface of Mars.

So despite the challenges we face, the future we envision is a future of boundless possibility. I thank all of you for what you are doing to report on this historic endeavor, and for the honor of speaking to you this afternoon. Thank you all very much.