REMARKS FOR ADMINISTRATOR CHARLES BOLDEN

CLEVELAND CITY CLUB

July 9, 2010

Thank you for inviting me to join you today for the Cleveland City Club. It's a pleasure to be in Ohio again. And thanks to Senator Sherrod Brown, for helping to facilitate this dialogue. I was pleased to welcome Senator Brown to Glenn again this morning. Over the years he has been a staunch advocate for the work done at the Center. We look forward to sharing with him and members of the Ohio Delegation our plans for carrying out the President's vision for NASA's future and the new assignments that have been identified for Glenn. I'd also like to take this opportunity to announce to this audience that I have selected Ramon "Ray" Lugo for appointment as the permanent Glenn Research Director effective the 18th of this month. Ray has a long and storied history with NASA beginning at the Kennedy Space Center as a co-op in 1975. Since November 2007, Ray served as the Deputy Director of Glenn and he has been serving as Acting Director since March of this year. Ray is a tremendous leader and I welcome him to his new position as Director of the Glenn Research Center.

And, it's good to be back in the heartland. The summer heat and election year politics are making Washington a bit crazier than usual.

But I do sincerely believe that the path the President wants to set us on beginning October 1 is going to be good for the nation, for jobs and the economy, and for a future full of discoveries and amazing accomplishments for NASA.

As many of you may know, President Obama unveiled his National Space Policy last week. NASA is part of the President's larger strategy, which involves many other agencies, to revive our investment in research and development…and make the U.S. once again a technical innovator that inspires younger generations to pursue technical careers because they want to make a difference and contribute to national goals.

This will mean focusing on technologies that the aerospace field has wanted for years, but that weren't able to invest in because we were always too busy launching the next rockets instead of having the chance to step back and look at things from a larger perspective.

That's one of the things the President has given us. Perspective. While NASA does amazing things every day, we need to think about the future and how we can increase our capabilities. How we can let the commercial sector take over areas of our work where they are able and allow NASA to focus on developing the technologies that people have been talking about for some time, the things we'll really need for the space missions of the future.

New propulsion systems, for instance, to get us to our destinations faster and mitigate some of the human health issues in deep space such as the radiation hazard. Precision landing so we can realistically look at safely landing humans or robots on asteroids or other planetary bodies. Inflatable habitats and closed loop life support and the ability to use the resources at our destinations to make long term habitation feasible. These are just a handful of the things the President, and NASA, is talking about when we use terms like Flagship Technology Demonstrations, Game Changing Technology, and Cross Cutting Technology.

We want our research and development to focus on technologies that will lead the way for a wide range of missions, be broadly applicable and really change the way we think about our space missions and what is possible.

The President has laid out a very forward-looking budget for us and, subject to congressional approval of that proposal, the Glenn Research Center stands to benefit quite a bit.

Glenn has a rich history of exemplary leadership and performance in support of the agency's mission. Glenn is a unique NASA center with demonstrated capability in the development of spaceflight hardware, aerospace power, propulsion, advanced communications, human systems research, International Space Station research, and aeronautics research and development. These core strengths and capabilities position Glenn well for future NASA missions and also make it a significant contributor to the

overall national priority the President has set for research and development. Glenn has always been an R&D leader, and we're going to make great use of that history and bench strength.

Under the President's proposal, the center will get program management of one of our key areas, the Exploration Technology Development and Demonstration Program.

This important program area will manage $223 million in FY 2011 and $1.8 billion over five years to mature key exploration technologies through laboratory, ground and flight tests.

Initial projects are likely to focus on high power electric propulsion, autonomous precision landing, in-situ resource utilization, human-robotic systems -- including operating robots from orbit -- and fission surface power systems.

Each of these areas will be essential if we are truly to break the bonds of low Earth orbit and carry out the kinds of missions of which we have dreamed of for years. The breakthroughs we make in these areas will not be just for one particular mission but will be used and adapted across a wide spectrum of activities.

If the new budget is approved, we'll also create a Space Technology Research Grants Program Office at Glenn to manage $70 million in FY 2011 and $350 million over five

years to support foundational research and graduate studies in key aeronautics-related disciplines.

The program is designed to meet the future space science and exploration needs of NASA as well as those of other government agencies and the commercial space sector through technological innovation.

This portfolio focuses on foundational research in advanced space systems and technology that we will carry out in collaboration with academia, a broad range of NASA field Centers, our international partners, and with the option of including small business and industry partners.

The FY 2011 budget also increases research activities in green aviation and *Next Generation Air Transportation System*, or *NextGen*, capabilities. This focus builds on Glenn's longstanding experience in this area.

Overall, our plan is for Aeronautics to get an increase of $300 million, or about 15%, over the next four years. There's not a lot of controversy about this, and ultimately the American flyer, all of us, will benefit from safer, cleaner and more efficient air travel.

Aero work at Glenn is also planned to include integration of unmanned aircraft systems into the national airspace. Research plans are also currently being developed that include design and feasibility studies, high-fidelity simulations, flight demonstrations,

design competitions and prize challenges that seek technological solutions to current and future challenges in green aviation, air traffic management, and aviation safety.

The FAA has the lead in *NextGen*, but NASA has a key role in technology development and demonstration, as it has for decades.

Similar to what we want to do with space exploration, we will develop capabilities we don't have today, but that everyone agrees we need.

We are working with many partners both here and internationally on these aeronautics challenges. Our partners include academia, industry and government. We're exploring early-stage ideas, developing new operations and safety technologies, and demonstrating the potential of promising new vehicles.

There are technical challenges and there are challenges that come from a whole new way of doing business such as acquisition strategy and procurement practices. We'll be looking at them all. Critical areas such as aircraft icing, complex human-automation interactions, and data mining tools that can help airlines to better understand and assess fleet performance and safety are just a few of the items on our plate.

What we're looking at is a whole new day for air travel. New types of vehicles and new ways for how they move in our system and how we relate to them.

It's very exciting, and something the average citizen can relate to. So Glenn's historic connection to Aeronautics will almost certainly continue, and be strengthened.

In addition to these proposed assignments it should be noted that, building on its expertise in power systems, we recently assigned Glenn the lead role for the Radioisotope Power Systems Program. Under this program, Glenn will lead the development of power systems that will get our future science missions to the outer planets. In addition, there is the potential for Glenn to support NASA’s science missions by providing technology for advanced in-space propulsion and advanced communications systems.

As I'm sure you know, the President's new direction has generated quite a bit of discussion since it was unveiled Feb. 1. There is still a long way to go.

But, on June 29, the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies reported out their FY 2011 bill.

Overall, the news was good. The Subcommittee endorsed full funding at the NASA request of $19 billion for FY11.

The committee did "fence" all Exploration funds, with the exception of $306 million for Commercial Cargo, “subject to enactment of legislation authorizing human spaceflight activities in FY 2011.”

Exploration is obviously where the greatest discussion is still going to take place. But the increase for our Earth science missions, for aeronautics, for other science missions and for education – there is wide consensus on all of these priorities.

NASA is not in a position to speculate on Glenn's final FY11 budget at this time, but we will share details as they become available. The proposed center work assignments I have mentioned will significantly raise the profile of Glenn within the agency, particularly in Spaceflight and Exploration.

The work we're planning to bring to Glenn reflects a high level of confidence in the center's ability to perform those challenging new activities and collaborate with other NASA Centers.

And I'd bet that area students will benefit from the grants to academia and 500 fellowships we'll be awarding to students across the country.

Also, the President's announced at his speech this spring at the Kennedy Space Center his proposed redesign of the Orion crew capsule. Glenn expects to have a role in this work, and the Plum Brook site should retain its critical Space Environmental Test responsibilities. In addition, we are optimistic that commercial companies will also have an interest in testing at Plum Brook Station.

Right now, while the Congress does its work, we continue with the "program of record," Constellation. Nearly all of the FY10 funds are obligated, and we'll make as many milestones as we can. We also are laying the groundwork so that we are prepared for the future.

As most of you probably know, we've issued quite a few Requests for Information, or RFIs, recently. The deadlines have passed, we've received good input, and we are evaluating the responses now.

The FY 2011 NASA budget request includes a heavy lift and propulsion technology research and development line that is funded at $3.1 billion over five years. The driving effort addressed in the new FY11 plan is to develop an affordable engine and enabling technologies needed for a future heavy lift launch vehicle.

The RFI for heavy lift was the first of our recent series. Based on those responses, we were able to issue a Broad Agency Announcement about Heavy Lift that went out June 29 with a deadline of July 26.

Individual awards will not exceed $750K and we anticipate making them around September 1. NASA’s total budget for this BAA will not exceed $8 million in FY10.

A decision on building a heavy-lift vehicle will not be made until 2015, allowing five years to demonstrate new technologies that can be infused into the heavy lift launch

vehicle and engine designs to reduce the cost and risk of large-scale human exploration of space before beginning to build a vehicle.

This is very exciting because we'll be looking at real progress toward the capability of exploring multiple potential destinations, including the Moon, asteroids, Lagrange points, and Mars and its environs in a cost effective and safe manner.

Another RFI, for the Exploration Technology Development and Demonstration program that will be housed at Glenn, addressed that program's primary goal of developing technologies that expand our capabilities in a sustainable way. The RFI, again, focused on:

- In-Situ Resource Utilization
- High-Power Electric Propulsion
- Autonomous Precision Landing
- Telerobotics, and
- Fission Power Systems Technology

The Exploration Robotic Precursor Missions RFI sought ideas for larger missions around $800 million or below for prioritized assessment of human destinations, as well as Exploration Scouts, the less expensive, quicker missions to help us test technologies.

An RFI about Flagship Technology sought ideas relevant to an initial set of projects to develop and demonstrate the technologies needed to reduce the cost and expand the capability of future space exploration activities. Here we're looking at:

- In-orbit propellant transfer and storage
- Lightweight/inflatable modules
- Automated/autonomous rendezvous and docking
- Aero-assist/entry, descent and landing
- Closed loop life support, and
- Advanced in-space propulsion (ion/plasma, etc.)

A secondary goal of this and all the RFIs is to create opportunities for engineers and scientists from NASA, private industry, and academia to gain experience in designing, building, and operating new space technologies and spacecraft.

The RFI for commercial capabilities sought information to help NASA plan the overall strategy for the development and demonstration of a commercial crew transportation capability and to receive comments on NASA human-rating technical requirements that have been drafted as a part of this initiative.

And yes, we were gratified by the successful launch June 4 of the Falcon 9 and look forward to continued close work with SpaceX as it meets its milestones toward commercial cargo and ultimately, crew capability.

You can see we've been busy. We know what we want to do and where we want to go once Congress approves our budget.

The investment in new technologies that the President's budget represents will be good for the nation. It's going to lead to new jobs, new capabilities, new discoveries, and new international and industry partnerships. There's a depth and richness to it that I can only hint at in a short talk like this, but we are very excited about the future at NASA and the way we are positioning our space program to continue to grow in a sustainable and exciting way for generations to come.

You can be sure that Glenn will be one of the cornerstones of this program. Now I'm happy to take your questions.