

# ***Exciting Developments in Space Exploration and the Future of International Cooperation***

**Remarks by NASA Administrator Charles F. Bolden  
American University in Cairo**

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"As salaam alaykum" – and good evening. I am honored to be in your beautiful city of Cairo. I especially want to thank the faculty, staff and students of American University in Cairo for hosting our NASA contingent here tonight. Though not my first visit to your extraordinary country, it is my first visit here and to the region as NASA Administrator and, more importantly, the first time that a NASA Administrator has visited here in pursuit of cooperation in space.

When my president, Barack Obama, came here to Cairo one year ago, he came to speak of a new beginning between the United States and Muslims around the world. As he stated in his remarks at Cairo University, the new beginning would be one "...based on mutual interest and mutual respect, and one based upon the truth that America and Islam are not exclusive and need not be in competition. Instead, they overlap, and share common principles – principles of justice and progress; tolerance and the dignity of all human beings."

We at NASA are fond of referring to the International Space Station, now marking its tenth year of permanent human presence in orbit around Earth, as one of the greatest engineering feats in human history.

It is humbling, however, to be here in the shadow of the Cairo Citadel and the Great Pyramid at Giza and speak of the engineering wonders of the world. These monuments are a great testament to the vitality of the Egyptian culture and the strong skills of its people, and a unique vantage point for considering the potential for U.S. – Egyptian cooperation in the frontiers of space.

Just as these national monuments and the International Space Station - which was designed, built and today operated by many nations – just as they both demonstrate the potential for extraordinary human achievement, so sometime can the accomplishments of a single individual.

Such an individual is a gentleman whose story began as a boy born in the Nile Delta town of Zagazig and educated in the sciences at Ain Shams University. This boy - an icon here in Egypt - named Farouk El-Baz, went on to make very significant contributions to his native country and to the United States in space research.

As the United States pursued the dream of landing the first human being on the moon, Dr. El-Baz, now director of the Center for Remote Sensing at Boston University, was a supervisor of lunar science planning for a company supporting NASA's efforts. He spoke of his work with the Apollo team recently in the opening address for the Cairo Science Festival.

American actor and producer Tom Hanks later recalled Dr. El-Baz's importance to the moon missions in TV segment called "The Brain of Farouk El-Baz," viewed by millions of Americans. He is also known for the fictional shuttle craft that carried his name on the popular TV/movie franchise known as Star Trek.

Of a more enduring nature, however, are Dr. El-Baz's contributions to bi-national advances in the use of space-based instruments to study arid environments. Dr. El-Baz supplemented his extensive field work in desert research with space-based photography and imagery. He now promotes the use of space technology in the fields of archaeology, geography and geology.

Another boy who grew up on the banks of the Nile – a boy named Ahmed - has nearly as exciting a story that many of you also know well. Educated in the sciences at Alexandria University, Dr. Ahmed Zewail also pursued an advanced degree in the United States and ultimately earned the highest science honor in the world, the Nobel Prize, for his groundbreaking work in chemistry.

Dr. Zewail is now America's first science envoy to the Middle East and playing a critical role in the enhancement of productive science and technology cooperation between our nations and others in the region.

I tell you the story of these two legendary individuals who have such strong ties to both Egypt and the United States to illustrate that the basis for meaningful cooperation between our two countries, in science, and, in particular, in space activities, already exists. Faculty, staff and students at

this fine academic institution and other institutions in Egypt, are poised to continue that cooperation through new and innovative collaboration.

We have great mutual interest in the important applications of space to solving problems here on earth, in the environment, in biomedicine, in weather forecasting, in the management of natural disasters. Our scientists cross borders to study and to work fruitfully to solve challenges common to all sides of our planet.

I know this from personal experience, too. I am not only the first NASA Administrator to visit this remarkable country, but also one of only two NASA Administrators -- and the first in nearly two decades -- to have served the space program as a space shuttle astronaut. It is another truly unique vantage point – to lead the agency having the perspective of an indelible image of our planet, Earth, as I viewed it from space.

Because of that exceptional experience, I brought with me to the Administrator's office two deeply held beliefs.

First, having personally witnessed the extraordinary beauty of Earth from space, I can attest to how interconnected we are as a species, whether we make our home in Cairo, Washington, China, or Antarctica.

As we look at the Earth view on the screen behind me, we see that it is a single planet, with land masses that jut up into what is actually a single ocean covering Earth. We share one ecosystem and a thin, fragile atmosphere that protects us from the Sun. Our carbon footprints resonate across the globe. And, looking away from Earth, we see how tiny we are

against a vast universe that offers endless opportunities for exploration and scientific discovery to benefit all mankind.

This global perspective is consistent with my second belief -- that international cooperation is an intrinsic and essential aspect of the exploration of space. On my third mission to space, as Commander of Space Shuttle Atlantis, an international crew carried the *Atmospheric Laboratory for Applications and Science* (known as *ATLAS-1*) to low-Earth orbit. *ATLAS-1* was a spacecraft comprised of instruments provided by seven different countries to study the atmosphere, solar radiation, and space plasma physics.

The International Space Station, to which I referred earlier, is not only an engineering accomplishment of great complexity but also the premier example of what can be achieved through international cooperation in space.

Citizens of nations as diverse as Russia and Japan live aboard this orbiting laboratory built through the efforts of 15 countries. The scientific research and technology development activities conducted aboard the International Space Station, which range from vaccine development to the study of desert land deterioration, will have enormous impacts on life on Earth. In addition, the space station is increasingly used as a global educational platform to teach the next generation of scientists and engineers.

Finally, and perhaps most significantly, some believe that the most enduring contribution of the Space Station is the partnership itself – an

international partnership that has united over a dozen nations in the peaceful exploration of space for the benefit of humankind.

The family of nations who benefit from space technology, scientific research, and earth science applications grows with every passing year. NASA has nearly 500 active international agreements with 118 different countries. As such, nearly all of our major programs benefit from some level of international cooperation.

While the majority of NASA's cooperation is accomplished with space faring nations, other nations are increasingly relying on the unique capabilities of space for day-to-day activities such as urban planning, resource management, communications, weather forecasting, navigation, and disaster response.

As a consequence, NASA's international partnerships have continued to grow in diversity and importance, as the Agency has engaged both developed and developing nations in a wide range of mutually beneficial activities.

At the same time, it remains the case that nearly half of our active agreements involve cooperation with the same small group of about eight countries.

Soon after President Barack Obama stood in Cairo, just over one year ago, and spoke of Partnership between the United States and Muslims around the world, he asked NASA to change that ratio by reaching out to "non-traditional" partners and strengthening our cooperation in the Middle

East, North Africa, Southeast Asia and in particular in Muslim-majority nations.

NASA has embraced this charge. International cooperation contributes significantly to NASA's mission just as it does to the national goals and objectives of our partners. Existing cooperation with non-traditional partners is reflected in many of our agreements that involve low-cost, high impact activities in science and education.

For example, NASA already has 39 active agreements in 30 dominantly Muslim countries. Many of those agreements are for participation in an outstanding program known as *GLOBE*, or *Global Learning and Observations to Benefit the Environment*, an internet-based global community of students, teachers, and scientists. Students actively take measurements that are then shared with others around the world, using the Internet to record the data. Importantly, these high-quality, student-made measurements are being used by professional scientists and researchers around the world to help validate satellite data and to improve weather and climate forecasts.

Through *GLOBE*'s classroom activities, fieldwork and international collaboration, students develop a better understanding of Earth's environment on a local, regional, and global basis.

So far, *GLOBE* reaches one million students in 20,000 schools worldwide, and we are continually reaching out to additional partner nations.

Shifting now from education to operational programs, NASA's Earth science activities are inherently global as we strive to understand Earth as a system, from a variety of U.S. and international platforms. For example, NASA monitors adverse weather events globally, such as major dust storms in Northern Egypt, through satellites such as Aqua and Terra. NASA has seven current and near-future missions that measure water – every one of those missions involves very significant international partnerships, and together they benefit people around the world by providing crucial data to help improve agricultural planning, water resource management, disaster preparedness and environmental protection.

Many of our Earth science satellites are calibrated through ground-based research programs involving dozens of countries. One of these programs, the *Aerosol Robotic Network*, or *AERONET*, is an optical, ground-based aerosol-monitoring network and data archive system in which over 40 countries and regions participate.

Other small, low-cost activities in partnership with other U.S. Government agencies and international organizations can also have significant benefits to NASA and our partners.

For example, working closely with the U.S. Agency for International Development and international organizations, NASA has initiated a number of very successful pilot projects, particularly in the area of remote sensing applications. An important example of this type of cooperation is NASA's involvement in the establishment of the *SERVIR* operations facilities in Central America and East Africa for remote sensing applications.

*SERVIR* is a regional visualization and monitoring system that brings together NASA-provided satellite and other geospatial data measurements, along with computer models and forecasts, for improved scientific knowledge and decision-making. Among other things, *SERVIR* is used to monitor and forecast ecological changes and severe events such as forest fires, red tides, and tropical storms. Discussions are already underway for potential expansion of the *SERVIR* approach to other regions of the world.

Let's turn to the possibility of expanded cooperation. There are a variety of options for mutually beneficial space cooperation with Egypt beyond *GLOBE*, *AERONET* and *SERVIR* that I mentioned earlier, such as in education. Egyptian students at high schools and universities can collaborate with their American peers through NASA's Digital Learning Network, a system that allows NASA scientists and engineers to interact with schools across the globe. Students can work alongside experts, being mentored on career choices and comparing notes on their latest science, technology and engineering experiments. NASA will be working with our U.S. Ambassador in Egypt, the Honorable Margaret Scobey, and her staff to identify other areas for future collaboration.

In the space sciences, NASA has had preliminary discussions with Egyptian scientists on expanding the analysis of data from NASA's high-energy astrophysics missions through the establishment of duplicate software libraries here in Egypt. NASA looks forward to the potential for new discovery through the participation of Egyptian scientists in scientific analysis using this data archive.

We also look forward to the potential for expanding cooperation on programs such as the International Space Weather Initiative, research on water resource management, and even the use of space-borne remote sensors to study archaeology. The International Space Weather Initiative, which has been endorsed by the United Nations, opens new opportunities for collaboration with governments, universities and national laboratories interested in building a knowledge base in space physics.

The initiative allows for the broad dissemination of information in six languages to 192 member countries of the United Nations.

Beyond education, Earth science and the other opportunities under consideration, there are no boundaries to where our cooperation can take us in the long run. Our long-term space exploration objectives include leaving low-Earth orbit for as yet unknown destinations, most certainly to include Mars. It is inconceivable that any one nation will be able to achieve such space exploration goals alone.

To summarize, NASA is not only a space exploration agency, but also an Earth improvement agency. What NASA does every day – in space and on the ground – is an effort to improve the lives of people on Earth and our understanding of the world and ourselves.

As our challenges are interconnected, so are our solutions. The more we engage with our global partners on these endeavors, to address significant questions about the Earth and space, to study and understand

the challenges to our own planet and develop solutions, the greater the benefit to us all.

International cooperation has always been a basic principle of NASA's mission. With the renewed energy from President Obama's Cairo initiative, we continue to expand our efforts to work together with other nations in pursuit of common objectives.

As I know from my time in orbit on the U.S. Space Shuttle, astronauts see a single, magnificent planet when we look down from space.

Crew members aboard the International Space Station see their homelands pass by for just a few seconds at a time - one orbit every 90 minutes – and take advantage of any spare moments looking out the new panoramic cupola at the vista before them. From that vantage point, the differences that divide us seem much less significant than those that unify us.

Together, we must continue to share discovery and knowledge, bring the benefits of space technology to citizens at home, and encourage the use of space as a tool for sustainable development here on the Earth. NASA can, and has, set the standard for peaceful cooperation in science and technology among diverse nations.

By furthering our mutual objectives through enhanced cooperation in space, we can demonstrate in this new era of international partnerships how important global challenges and goals for the planet can be addressed by peoples of all nations working together. As President Obama closed his message On a New Beginning here in Cairo one year ago this month –

“The people of the world can live together in peace. We know that is God’s vision. Now that must be our work here on Earth.”

Thank you and peace be with you all!