Remarks by the Honorable Sean O'Keefe
NASA Administrator
The Forum on Earth Observations
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Thank you Chip (Charles "Chip" Groat, Director, U.S. Geological Survey) for that kind introduction.

I wish to extend my appreciation to our good friends at NOAA and the Institute for Global Environmental Strategies for organizing this important forum.

The presence of so many leaders from the agriculture, transportation, energy, resource management, public health, and technology sectors certainly demonstrates the increasing significance to society of Earth observations.

In keeping with the conference theme, I'd like to discuss how the capabilities developed by NASA for our Earth Observation System and related applications efforts are contributing to the public good.

We're convinced it's only by getting a better understanding of the complex dynamics of Earth's climatic system that we will be able to truly study and understand our neighboring planets as we extend our exploration reach throughout the solar system in the decades ahead. Indeed, Earth Observations are a vital component of our space exploration agenda.

In this regard, please allow me to begin by talking about a recent newsworthy application of our ability to monitor Earth's unique environment from space.

I know that people throughout the world and especially those in our southeastern states have marveled at and appreciated our ability to observe from space the formation of nature's most destructive storms.

While most of our storm images have come from unmanned satellites, it is worth noting the work of our Expedition 9 crewmembers onboard the International Space Station--Mike Fincke and Gennady Padalka--in capturing stunning images of Hurricane Frances when it grew to the size of Texas.

We always say that our astronauts have the unique opportunity to see things that have never been seen before, and being able to see a storm of this size and magnitude in its entirety is certainly a good example.

These, and other observations of Hurricanes Charley, Frances, Ivan and Jean provided by NASA's TRMM (Trim), and QuikScat satellite added to NOAA's hurricane forecasting center capability to give public health and safety officials advance warning of the storms' formation and with hurricane track models good estimates of their projected paths. This information allowed officials to mitigate the harmful effects of these storms to property, and most importantly, save lives. Continued advancements in improving hurricane forecasting is being enabled by the data provided by NASA's Terra and Aqua satellites.

Because of our investment in these Earth observation capabilities, we're now able to narrow the predicted course of a hurricane's path from 300 miles to less than 100 miles, with advanced warning of up to five days before the storms actually make landfall.

Last Saturday, I visited the Kennedy Space Center and observed during a helicopter tour damage that occurred to our buildings and facilities when Charley and Frances made landfall. From this perspective the impact of nature's fury to the Kennedy Space Center was stark and dramatic. We were very fortunate indeed that our workforce down there did have the necessary warning of the approaching storm.

Although the rebuilding task ahead of us at the Kennedy Space Center is very large indeed, I'm confident that our entire team in Florida will take on this challenge with the skill and commitment they bring to all of NASA's mission activities.

To be certain, using Earth observations to better predict weather and climate change underscores NASA's serious intention to work with partner organizations and nations to establish a sustainable capability to observe and understand the Earth as a

whole planet from a variety of vantage points, including from space, in order to improve the quality of life for us all.

This, of course, is the intent of the Global Earth Observation System of Systems, or GEOSS, whose development was unanimously agreed to last year at the first Earth Observation Summit here in Washington, and reconfirmed at a second summit in Tokyo in April.

Thus far, 48 countries and 29 international organizations are committed to the development of comprehensive, coordinated, and sustained Earth observation systems in order to understand the major global environmental and economic challenges of the 21st century.

Two weeks ago, the U.S. government issued two weeks ago a draft 10-year Strategic Plan for the U.S. Integrated Earth Observation System, focusing on

nine societal benefit areas in which work is already underway and progress can be realized more quickly.

I'm quite proud that NASA has a vital role in this activity. Our new Science Mission Directorate, led by Al Diaz, the former Director of the Goddard Space Center, and our chief Exploration Scientist, Dr. Ghassem Asrar, are leading the NASA effort.

We created the Science Mission Directorate, which joins our former Earth Science and Space Science Enterprises, as part of an Agency-wide transformation that we hope will "wire NASA for success" to achieve the goals of the nation's vision for space exploration. The vision calls for America, working in concert with other nations, industry and academia, and using a combination of astronaut pioneers and robotic explorers to better understand our home planet and extend our exploration reach.

We know that a greater understanding of the Earth will enable us to better focus our scientific efforts as we explore other planets.

By combining Earth and Space science in this one Mission Directorate, we intend to link the exploration of planetary bodies, chart the best route of discovery throughout the solar system, and reap the benefits of Earth and space exploration for society.

A combined Earth and space science Mission Directorate will be better able to establish an understanding of the Earth, other planets and their evolution, bring the lessons of our study of Earth to the exploration of the solar system, and assure the discoveries made here will enhance our work there.

In terms of Earth observations, NASA's Science Mission Directorate is in the midst of launching a fleet of more than 20 Earth observing research satellites that will help us better understand the

complex interactions among the land surface, atmosphere, oceans and ice caps, and the Earth's interior.

The latest addition to our constellation of Earth Observing satellites is Aura, a mission dedicated to studying the health of the Earth's atmosphere.

Aura will help us answer three key scientific questions: First, is the Earth's protective ozone layer recovering? Second, what are the processes controlling air quality? And finally, how is the Earth's climate changing.

Significantly, Aura joins Terra a land monitoring satellite and Aqua, whose purpose is to observe Earth's water cycle, in completing the first series of NASA's Earth Observing System satellites.

Before the end of the decade, and with the support of several partner nations, we look forward to the launch of several important missions that will significantly help move the idea of a Global

Observation System of Systems from a concept to reality.

Among these missions are:

- CloudSat, an experimental satellite designed to measure the vertical structure of clouds from space, and CALIPSO, a laser that will fly in tandem with Cloudsat's radar to produce high-resolution three-dimensional profiles of aerosols and clouds.
- The National Polar Orbiting Preparatory or NPP mission, a bridge mission to the next generation weather satellite we are jointly developing with NOAA and the Defense Department.
- The Orbiting Carbon Observatory, which will for the first time measure diverse sources and sinks of carbon from space.

- Aquarius, which will measure the role of ocean salinity in Earth's climate.
- Hydros, a mission to measure soil moisture that will close key gaps in our understanding of the water cycle and fresh water availability.
- And the Global Precipitation Mission, which will improve our ability to make global rainfall observations.

When first conceived, these missions were targeted toward the overarching goal of learning how to study the Earth as a system so that we may better understand the dynamics of weather global climate change.

While getting to this point was no easy task for NASA, we have made remarkable progress by developing a flexible and evolvable program implementation strategy to take advantage of new

scientific knowledge and technological developments.

Our resilient Earth observations program is helping scientists to improve models of Earth's weather and climate, but we are also able to use our satellites and instruments to view local changes in their global context, thereby contributing to the broader public good for all humankind.

Please allow me to provide a few examples. All of us just heard from a panel of distinguished scientists about the use of Earth observations to improve public health. We know that many chronic and infectious diseases are related to environmental conditions. Recent outbreaks of West Nile Virus and other vector-borne diseases, for example, have illustrated the importance of having accurate and timely information about such variables as rainfall

and temperature to identify the habitats for these vector borne diseases and to respond to epidemics.

To address this concern we are putting our NASA satellites to work to provide useful information into decision support systems used for public health.

We are also providing observations and predictions to help partners such as The Center for Disease Control and Prevention correlate the incidence frequencies of chronic and infectious diseases to weather, climate, and other key environmental factors. Once verified, validated and benchmarked, these relationships can be assimilated into surveillance systems such as the Environmental Public Health Tracking Network to track and predict disease. Other partners, such as the National Institutes of Health and the EPA are part of this effort.

In the future, NASA is planning to deploy satellites that will expand our ability to track environmental information related to public health issues, most notably with the Global Precipitation Mission due to be launched by the end of the decade and with future-generation weather satellites.

Similarly, we are engaging our Earth observation assets to help those of you involved in using unique observational capabilities to improve the production of food and fiber, forest fire management, water resources management, and the work of emergency personnel dealing with such natural hazards as volcanoes, land-slides and earthquakes.

Of course in this post 9/11 world, some of the most serious hazards we face are man-made. And I can assure you that NASA is deeply committed to applying our cutting-edge technologies to our nation's

critical Homeland Security and national defense needs.

I'd like to tell you a story about the events of 9/11 three years ago that I don't think most people are aware of. Soon after the horrible terrorist attacks on the World Trade Center buildings, the folks at FEMA asked NASA to provide technical assistance to rescue and recovery teams working at the site with the use of technology we use in remote sensing.

NASA sent to New York City a sensor that helped FEMA and Environmental Protection Agency officials monitor the concentration of airborne hazardous particles in the vicinity of the World Trade Center site and the condition of hazardous hot spots in the rubble.

NASA used data from this sensor and the unique hyperspectral capability of the Earth Observing 1 satellite, the technology demonstration to Landsat 7,

to observe over 300 different types of particulate matter over the World Trade Centers site. This information enabled the EPA and other first responders to better understand that very difficult situation in near real time.

Currently, we are collaborating with the Department of Homeland Security and other federal agencies to support various risk, vulnerability, and mitigation assessments.

We are also utilizing satellites such as Aqua, the Gravity Recovery and Climate Experiment, or GRACE, to monitor water resources from space in order to improve decision making for natural resource management and emergency response, thus enabling a better response to future homeland security threats.

From a national defense standpoint, we've used the Shuttle Radar Topography experiment to map more than three-quarters of the Earth's surface with very precise radar. These data are used routinely in defense operations around the globe.

Also, our troops currently stationed in the Middle East are making good use of MODIS data from the Terra and Aqua satellites to get a better picture of dust storms in the region.

Indeed, we are so excited about using the view from space to serve society, because as we keep building on our Earth observing capabilities, more and more useful applications become apparent. And we very much want to work with your community to leverage these capabilities to the utmost.

A few blocks from here, on the grounds of the National Academy of Sciences, there's a statute that

honors Dr. Albert Einstein. Speaking at Cal Tech, he once observed: "Concern for man himself and his fate must always form the chief interest of all technical endeavors…in order that the creations of our minds shall be a blessing and not a curse to mankind."

I'm grateful that this community has gathered here today, very much in a concerted effort to ensure that we use advanced technologies to be a blessing for humankind. I appreciate your dedication to this effort, and I thank you very much for the opportunity to participate in this forum. Thank you very much.