

# REMARKS FOR ACTING ADMINISTRATOR LIGHTFOOT

*As Prepared*

## GODDARD MEMORIAL SYMPOSIUM

March 8, 2017

Thank you, Chris [Scolese]. It's great to be here in my capacity as acting administrator. Thank you to the AAS for inviting me.

You know, I've been to this great event quite a few times throughout my career – although it's hard to believe this is the 55<sup>th</sup> Goddard Memorial Symposium. I've seen our work evolve in many ways over the years, but the passion with which we carry out that work remains constant.

It's a time of transition. There's no avoiding that elephant in the room, but I want to just start out by saying how grateful and awed I am by everything that is going on right now at NASA and in our field, and I want to just say, keep going! The best is yet to come.

And your theme, Future Space: Trends, Technologies and Missions is right on target. Our field shapes the future, and what we do and how we carry out our work is vitally important.

We've certainly been busy at NASA. Commercial cargo flights for the year are well underway, with SpaceX already launched last month, and Orbital ATK in the queue for March 19. I asked Bill Gerstenmaier, our associate administrator for Human Exploration and Operations, to look at the feasibility of putting crew on Exploration Mission-1, the first integrated flight of the Space Launch System rocket and the Orion spacecraft. You know, little things.

That last SpaceX launch brought to the station the Stratospheric Aerosol and Gas Experiment III (SAGE III), which will give us a new way to monitor Earth's protective ozone layer and document its ongoing recovery, and the Lightning Imaging Sensor (LIS), which will observe lightning over much of the planet -- data that

will help improve our understanding of its connections to weather and related phenomena. We're enhancing the station's use as a platform for Earth science.

In just a couple of weeks, Orbital ATK is going to send another Cygnus to the station on an Atlas V from Cape Canaveral. Some of the cool things aboard that Cygnus will include 38 CubeSats that will be deployed from the space station; an advanced plant habitat for studying plant physiology and growing fresh food in space (and you thought we were kidding when we said the technologies in *The Martian* movie were real); and an antibody investigation to increase the effectiveness of chemotherapy drugs and reduce side effects.

Media gets a chance to see the fully loaded Cygnus tomorrow in the Payload Hazardous Servicing Facility at the Kennedy Space Center, just one of many ways we're connecting people directly with space.

Many of you know that we've added Sierra Nevada Corporation to the mix for the next phase of the commercial resupply program, and The Boeing Company and SpaceX also are under contract to transport crew to the station soon and are making a lot of progress in that complex work.

It's been a game changer to achieve all this progress in commercial space in such a short period of time, and we really think that the growth of this segment is only going to continue as more players take part and more people, from industry, to other governments, academia, students and educators and others all see the benefits of access to low Earth orbit. So that's a trend, for certain.

On the deep space front, we're making a lot of progress on the Space Launch System rocket and Orion spacecraft that will next take astronauts to deep space. We've had engine tests and

booster firings, and Orion has already flown to space once. The SLS and Orion systems have definitely moved far beyond concept and are well into production.

Today, there's an Orion parachute test at the U.S. Army's Yuma Proving Ground in Arizona. Orion is scheduled for its second airdrop test, in a series of eight, to qualify the parachute system for crewed flights. Media will have the opportunity to interview Orion engineers, see the test Orion up close and view the test from the drop zone.

As I mentioned, I asked our Human Exploration and Operations Mission Directorate to look at the possibility of flying humans aboard the first integrated flight of SLS and Orion, and we're at the earliest stages of examining that now. The first flight right now is going to be uncrewed, but if we can safely get a crew aboard, we'd welcome that advance.

Obviously you've heard about some of our commercial partners' interest in going to deep space as well. Our international partners are certainly on board to move farther as well, and so I think that is another trend – the consensus that we need to look toward those horizon goals, and the amount of work we've already expended on them. That just wasn't there a few years ago – not to the level it is now, where deep space missions, whether that's to the moon or Mars or beyond, is on everyone's agenda.

In Science, I hope you all are ready for even more amazing things in the near future. Not only will Juno, currently operating around Jupiter, continue to send back unprecedented data and images of our big neighbor, but we're working hard on the Mars 2020 rover – which will instruments from several nations to unlock more mysteries of Mars' past as revealed in the geological record, further our search for life in the universe and advance our knowledge of how future human explorers could use natural

resources available on the surface of the Red Planet. We've just selected the final three candidates for the rover's landing site.

But before Mars 2020, there's also InSight, which is a Mars lander, also with international cooperation, that will study the deep interior of Mars. In April we begin the final leg of Cassini's mission around Saturn, and that amazing mission is going to go out in a blaze of glory. That spacecraft has had an incredible lifespan – launched in 1997 and orbiting Saturn since 2004. For its final bow-out, we're going to fly through the planet's rings, get closer to the planet than ever before and then see how much data we can get as we head for the surface.

Next year the James Webb Space Telescope – taking shape not far from here at the Goddard Space Flight Center -- will launch as the successor to Hubble, and keep our tradition of Great Observatories going strong. We've been talking about JWST for a

long time and now it's right around the corner. At this event next year, the launch will just be a matter of a few months away.

A couple of weeks ago, we blew everyone away when we announced that our Spitzer Space Telescope has revealed the first known system of seven Earth-size planets in the habitable zone around a single star, and data from the Kepler mission continues to increase our knowledge about planets – some possibly having the potential to harbor life – outside our solar system.

We're also planning a mission to Jupiter's moon Europa, a watery moon that just might hold clues to life elsewhere in our solar system...so I think there's another trend. Thinking big about what we want to do in science and really going for it. For instance, it's really changed our thinking when we realize that there are planets that could be Earth-like outside our solar system – and we have evidence of this, it's not science fiction. The TRAPPIST-1

announcement about the exoplanets was one of our biggest in years, which shows the public is with us in this interest.

Technology drives exploration, and among many areas where we're pushing for breakthroughs, a few weeks ago we announced that we will be partnering with eight U.S. companies to advance small spacecraft and launch vehicle technologies that are on the verge of maturation and are likely to benefit both NASA and the commercial space market. It marks the second round of public-private opportunities that enable industry to develop promising commercial space technologies that also may benefit future NASA missions. We're also making advances in solar electric propulsion. We're advancing towards commercial supersonic flight again. Green fuels and electric planes are moving forward...

And that's just a fraction of what we're working on.

I think we can all agree that patience pays off in our field.

Patience and tenacity.

Just showing up every day and doing our jobs --- it all adds up.

Across years. Across administrations. Just a little over 55 years ago, John Glenn had become the first American to orbit the Earth.

Now, the New Horizons spacecraft is heading for a new destination in the Kuiper Belt. Our astronauts are training for the first commercial test flight. Later this year we're going to announce the new class of astronaut candidates, and that highly selected group -- from 18,300 applications -- is going to help us reach deep space again with humans.

As I mentioned, we have upcoming a slew of science missions, to Mars, to Europa. Our existing missions like Juno are just starting to send us their results. WFIRST has begun as the successor to the Webb Telescope before we even launch JWST.

I guess what I'm trying to say is that we need the long view while we carry out the day to day.

I can't say today just where all the chips will lie in the next budget. Those talks are ongoing right now, and we expect a budget outline next week, followed by a more detailed plan from the Administration in early May – although no date has been set.

The Administration is preparing a Fiscal Year 2018 budget that would increase base military spending by \$54 billion, to be offset by \$54 billion in funds reallocated from the overall pool of resources available for domestic discretionary programs.

While the final numbers for NASA and its programs are going through this give and take process, we remain confident that the President supports NASA. He mentioned in his speech to both houses of Congress last week that, "American footprints on

distant worlds are not too big a dream.” NASA has been working on such a goal for some time now, and I want our entire workforce to continue that great work.

And I want to reiterate that point for you. For us, the choices we face are not an “OR,” but an “AND.” We’re not going to choose between the commercial innovation we’ve seen in the past few years and the work that only government has so far been able to do. We want a diverse array of partners, from nations who are new to this arena, to new industry partners, to citizen scientists and makers around the world.

We are confident that our history of bi-partisan support and the strong foundation we’ve built for undertaking deep space and other missions will serve us well going forward.

The bottom line is that our strategy and plans revolve around our enduring purpose to discover, explore, develop, and enable.

Over our entire history, we've essentially been working on these broad thrusts, which will continue:

- Fostering new discoveries and expanding human knowledge
- Global engagement and diplomacy
- Interactions with the nations' security and industrial base posture
- Economic development and growth
- Addressing societal challenges
- Leadership and inspiration

In our thinking, these are not politically driven priorities, they're overarching activities that bring a lot of good to the nation.

The International Space Station, for example, has been an amazing example of how diverse nations can work together peacefully for a greater good.

Our technologies developed for exploration improve life on Earth. If you look at the Spinoff 2017 publication that came out late last year, you'll see how we've impacted everything from brain surgery to detecting CO2 emissions.

We've rewritten astrophysics textbooks with Hubble and other missions, just to name one area where we've had a huge impact.

And what we do is inspiring the next generation to join our journey of discovery. I'm meeting with a group of those students this morning, and I know they're going to inspire me!

There are students around the world who are preparing right now to be the next exploration leaders, and the astronaut who will

wear the first boots on Mars is sitting in a classroom somewhere right now. They might even be at a gathering like this.

I'm an optimist, and I think our best days are yet to come.

We look forward to working with you to make that a reality. The priorities I've just laid out are going to continue to unfold in our work, and I know that with your help, our nation will continue leading the world in space.

Thank you.