

Maryland Space Business Roundtable
November 10, 2015
NASA Deputy Administrator Dr. Newman

Thank you all very much. What a great group this is.

I have to say this feels like a bit of a homecoming for me. First of all, I like to consider myself an “honorary Marylander.” Hopefully, you’ll allow me to lay claim to the Old Line State. You see, I dock my boat near Annapolis. So I’ve come to understand what Captain John Smith was talking about when he wrote about the land around the Chesapeake that *“heaven and earth never agreed better to frame a place”* for people to live.

Secondly, I always feel right at home with fellow “space nerds.”

PERSONAL BACKGROUND

For those of you I’m yet to meet, a little about me: I started at NASA as Deputy Administrator in May. As many of you know, we’re an agency of about 18,000 full time employees and 40,000 contractors. In my role as Deputy, I work with Administrator Bolden on our day-to-day management and operations. And I oversee planning and policy direction.

I put a special emphasis on education, exploration, and technology. All these areas are passions of mine.

Prior to formally joining the team at NASA, I served as the Apollo Program Professor of Astronautics at MIT – where I worked with many NASA employees and contractors, as well as folks in some of your companies and organizations.

For about twelve years I directed our Technology and Policy program at MIT. I know the intersection of these two disciplines is a space – no pun in tended – that many of you work in as well.

As both an engineer and an educator, I have a deep appreciation of the work that you do as a Roundtable to promote STEM education – or as I like to call it “STEAMD.” I add the “A” for the Arts and the “D” for design because I believe that as a nation, we need to be encouraging more of our young folks to embrace these disciplines as well.

MARYLAND & SPACE

Maryland, of course, is sometimes nicknamed “America in Miniature.” As NASA Deputy Administrator, I’ve come to realize that it’s also “America’s space community in miniature.”

Sixteen of the top 25 companies in America's space industry manufacturing and service sector are located in Maryland;

And nine of the 14 Fortune 500 companies in the aerospace and defense sectors have a presence in Maryland;

I know I don't have to remind any of you of what the Goddard Space Flight Center means to our space program and to our country.

Robert Goddard once said that *"It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."*

What a perfect way this is to describe the work that our friends are doing at Goddard. It's work that continues to teach us more about our universe and our place in it. And through Earth Science – it is also teaching us more about our own planet.

These assets alone make Maryland an incredible place for space – but of course there's more:

The Johns Hopkins Applied Physics Lab, for example, had an amazing summer as New Horizons sent home all those magnificent pictures of Pluto.

And Hopkins is one of several Maryland colleges and universities where students and faculty alike are doing some really impressive work when it comes to aeronautics. Morgan State. Bowie State. The University of Maryland College Park. UMBC. UMES.

Of course, one of Maryland's greatest space assets is your Congressional delegation. With this in mind, let me share with you a quote from a living Maryland legend. Someone we will all miss very, very dearly. Senator Barbara Mikulski:

"Each one of us can make a difference. Together we make change."

I want to spend the rest of my remarks on this theme. Each of us can make a difference. Together we make change.

JOURNEY TO MARS

NASA is on a Journey to Mars and this Journey runs through Greenbelt and all of Maryland.

Each of us, as individuals, have a role to play in making this Journey possible. And at NASA we recognize that it's by working together across sectors (and

across countries) that we will reach our goal of sending astronauts to the Red Planet in the 2030s.

Therefore we at NASA are actively seeking out partners. Industry partners. Academic partners. Citizen scientists. The public at large.

Today, there is a new consensus emerging in the scientific and policy communities around NASA's strategy, plan and timetable for moving our Journey to Mars forward.

I want to encourage you to read about our plan online at NASA.gov. I think you'll find that our plan is clear. It's affordable. And make no mistake – it's attainable.

Our strategy is designed around three stages, and in each stage there are significant business opportunities.

The first stage is what we call an "earth reliant stage." The second is a "proving ground stage." The third is an "earth independent stage."

By applause, how many of you are aficionados of space history? I am too. You might recall that getting to the moon was also a three-stage process. You see, after President Kennedy challenged NASA to go to the moon, NASA didn't just put Neil Armstrong, Buzz Alderin, and Michael Collins into a rocket on the next day and say "safe travels."

First, NASA had to test the systems just to get humans to space for short periods of time. Then we had to get humans to space for longer periods.

Second, we had to do more complex things like rendezvous in space. During this stage, our astronauts conducted the very first "EVAs" or spacewalks.

Finally we advanced to Apollo. During this stage, we started working with the power of the Saturn V rockets. And we sent people on missions to orbit.

After these three stages, we were ready to send our astronauts to the moon.

STAGE 1: EARTH RELIANT

Right now, we're in the initial "Earth Reliant" stage – and frankly, we're remarkably far along.

In fact, we are closer to sending astronauts to Mars than ever before in human history.

Every day, we're learning more and more about how to live in space and the impacts it has on human beings. We're buying down the risks to human health. At the same time, we're making great technical progress.

Thanks to pop culture phenomena like the movie *The Martian*, there's a growing excitement among the general public that's also propelling our Journey forward.

I want to share with you just a few measures of the progress we're making in this Earth-Reliant phase:

The Orion spacecraft has now flown farther into space than any spacecraft built for human passengers has flown in more than four decades.

The Space Launch System (SLS) rocket that will someday propel American astronauts to deep space has moved from concept to development. Furthermore, it's hitting critical milestones in its construction and assembly.

President Obama has extended the life of the International Space Station for ten years to at least 2024. You may have seen that last week marked the 15th anniversary of a continuous human presence about the Station.

Speaking of the Space Station: American astronaut Scott Kelly is half way through his Year In Space. We'll be able to study the effects of such a long duration mission and to benchmark them with his twin brother Mark, who is here at home on Earth.

Meanwhile, you may have seen the exciting discovery from MAVEN that we announced last week, which taught us about the fate of the Martian atmosphere. Of course, this comes on the heels of the confirmation that flowing water exists on the surface of Mars.

It seems like every day we get a little bit closer to our ultimate goal of sending astronauts to Mars. And we're making this progress in lockstep with commercial partners, academic partners, and international partners.

These partnership are not only supporting scientific exploration, they're also supporting job creation and economic growth. I believe the technical, policy term for this is "*two-fer*." Actually, when you consider the long tradition of space technologies being spun-off for Earthly benefits – it's actually a "*three-fer*."

By the way, while we can take credit for memory foam, artificial limbs, and cardiac imaging systems – sadly, we can't claim Velcro or Tang as our own.

With that said, our researchers have identified more than 1,800 technologies that have been spun-off from NASA activities that are putting Americans to work and improving our health, safety, and quality of life.

Take for example the work of TSi, a Maryland company based in Beltsville. They've partnered with researchers at Goddard on to GPS-powered emergency systems that have helped in the rescue of 30,000 people!

As we speak today, NASA is partnering on American businesses on everything from 3D Printing to high performance computing to small satellite technologies like "cubesats."

It goes without saying that the further along we get on our Journey to Mars, the more opportunities there will be for companies and organizations like yours to partner with us.

We have a number of initiatives that make funding available to companies that are willing to match them with their own resources as they advance the technologies that will help us get closer to our goals.

Meanwhile, as NASA focuses on developing vehicles and technologies for deep space travel, President Obama's plan from Day 1 has been to fuel the creation of a commercial market in low Earth orbit.

Some of you may be among the 350 companies working across 35 states on commercial crew.

On the cargo side, American companies – including a member of this Roundtable (Orbital ATK) are already transporting cargo to the International Space Station.

STAGE 2: PROVING GROUND

On to the Proving Ground ... the second phase of our Journey to Mars.

In the decade of the 2020s, we'll test solar electric propulsion, habitats and other technologies for the first time in their intended environment.

We'll be a few days or weeks away from Earth. My fellow sailors will understand what it means when you're a few days or weeks away from land.

There will be tremendous commercial opportunities associated with these efforts in cis-lunar space.

Last year around this time, we issued what's called a "broad agency announcement" which is basically an open casting call for proposals from the business community. We asked for concept studies and development projects in advanced propulsion, small satellites, and habitation.

This past spring we announced seven recipients of what we call “NextSTEP” awards for companies working on habitation systems. The idea is that these habitats or “hab’s” would initially be able to sustain a crew of four for a few months in cis-lunar space and eventually could evolve into a habitat for astronauts to live and work in on a long duration mission like Mars.

We also anticipate that this work will fuel additional commercial space activity in low earth orbit ... paying it forward as well as paying it back.

CONCLUSION (STAGE 3: EARTH INDEPENDENT)

Before we open for Q&A I just wanted to touch very briefly on our horizon goal. The “Earth Independent” stage. That’s when we’ll be ready to go to the Mars neighborhood.

In deep space, when we’re potentially months away from earth, our astronauts will either have to make the resources need, or NASA will have had to send them in advance.

What does this mean? It means that life support systems will need to be self-sustaining.

It means that better communications systems will need to cut down the delay in communications.

It means astronauts are going to be on their own should there be a problem with the spacecraft, a medical emergency, or really just in meeting their own daily needs for food, water, air and exercise.

The solutions to these challenges will not invent themselves. Nor will they fund themselves.

While NASA’s employees and contractors will develop many of them, we will need the help from our partners.

It all comes back to those words from Senator Mikulski I quoted upfront: *“Each one of us can make a difference. Together we make change.”*

President Obama has put us on an extraordinary course. It’s my hope that future leaders will keep our progress going. And that we’ll all work together on making this Journey possible.

“Together we make change.”

Thank you all very much.