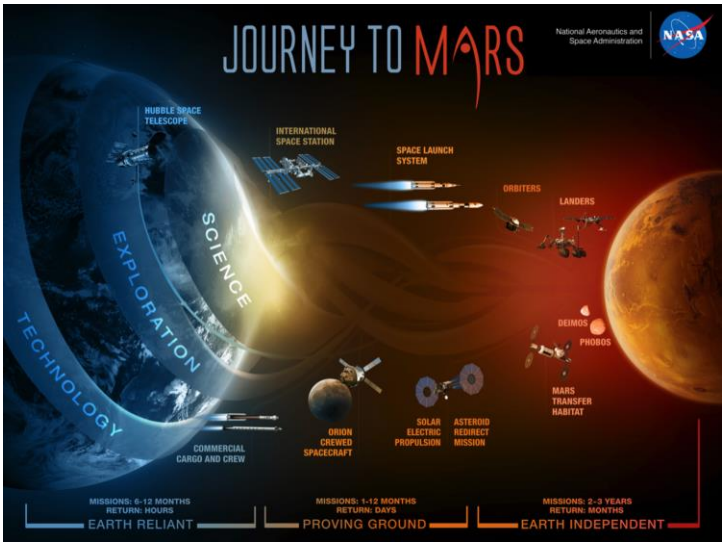
NASA DEPUTY ADMINISTRATOR DR. DAVA NEWMAN
UN COPUOS
Vienna, Austria
June 14, 2016

It's an honor and a pleasure to be here to address the United Nations Committee on the Peaceful Uses of Outer Space. You have done so much to support and expand the benefits of space exploration for people around the world.

From our perspective at NASA, one of the most gratifying developments over the past few years has been the increasing number of nations who have joined the global exploration endeavor. Nations large and small, both with and without formal space agencies, have reached the conclusion that everyone who has a passion for space and exploration can

participate, finding a role where their expertise is needed. In short, every single nation can play a part in what we believe is the next great human exploration endeavor, the human Journey to Mars: a scientific journey of discovery, and the next phase of humanity's development as a spacefaring people – to become interplanetary.

Our diversity is our strength. What was initially a space race is now an era of global cooperation. Mars exploration is a great example of international collaboration. NASA's Curiosity rover includes participation by 13 countries including instrument contributions from 5. Travel to other planets, whether with robots or humans, and developing the technologies to peer beyond our solar system are big, inspiring missions that take years of planning and focusing our collective vision over decades - many are too large for any single nation or space agency.



NASA began our Mars exploration more than four decades ago when our robotic explorers were the first to study the Red Planet, beginning with Mariner Four's flyby in

July 1965. We're about to celebrate the Viking Landers' 40th anniversary. The intrepid Opportunity rover is still going, having exceeded its mission plan by more than 12 years.

Today, we have five orbiters and rovers on Mars, providing daily scientific discoveries on Mars, both past and present (and the past is 3.5 Billion years ago when Mars likely harbored life and was much warmer and wetter than today). Our past 5 decades of discovery pave the way for our future astronaut missions to Mars. All of our incredible scientific assets involve significant cooperation with international partners.

And today, we are focused, we are inspired, and we're making the necessary investments – we are closer than ever before in the history of human civilization to sending human beings to Mars in the 2030s. We're undertaking this journey to Mars in three phases, Earth reliant on ISS, the Mars proving ground in Earth–Moon, or deep space, orbit and Mars ready.

Phase I: The International Space Station, or ISS, is not only an integral part of our work, it is also perhaps the greatest example showing how many diverse nations, working together for the peaceful exploration of space, can create something of lasting value that is bigger than the sum of any single contribution.

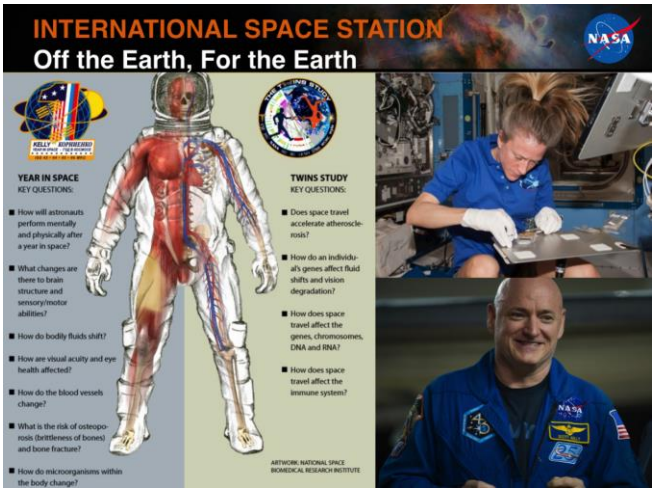
We are embarking on 16 years of permanent human habitation, over which, the ISS has demonstrated its remarkable importance to the ISS Partner nations. Despite tight budgets and competing domestic priorities, the United States, Russia, Japan and Canada have all made the decision to commit to supporting ISS operations through at least 2024; and the European Space Agency, ESA, is anticipated to take a similar decision later this year. The ISS is the centerpiece of international human space exploration and the first step in the global human exploration roadmap.

The ISS enables us to work off the Earth, but for the Earth. We are learning how to live and work in space for the long term and demonstrating technologies we'll need to travel back to deep space and to Mars. It's benefits return to us many fold, from water

processing technology that helps people in remote areas, to Earth science and climate observations, to mobile healthcare devices and wearable technologies to many other spinoff technologies, more than 1600 per year, now improving life across the globe, or what I like to call Spaceship Earth.

Critical transportation of cargo and crew to the ISS is currently provided by Russia, Japan and the United States. NASA opened a new chapter in exploration with the advent of public–private commercial space -- where industry partners carry cargo and, soon, astronauts to low Earth orbit, allowing NASA to begin to focus on the more challenging exploration missions to deep space.

We now have two U.S. providers actively carrying cargo to the International Space Station, and a third company has just been added, and we have two U.S. companies already contracted to begin carrying our astronauts to space with final testing in 2017 and astronauts in 2018. Our first commercial crew astronauts have been selected and are already training.



Every partner nation has made unique and invaluable contributions to the station, and the international crews are critical to carrying out research from across the world. In any given six-month period there are about 250 experiments going on aboard the station, and, to date, over 95 nations have taken advantage of the research and education opportunities it provides. With the advent of commercial crew to ISS, we will be able to add an additional crewmember, for a total of 7. We just completed the record-breaking One Year in Space and Twins Study with astronaut Scott Kelly and his identical twin, Mark, on Earth as the control to further investigate human physiology in space, and to perform our first genetics experiments. Today's students also are able to send their own research to the space station, such as a DNA sequencer from a high school student, which is inspiring this generation to dream and turn their dreams in to reality, making giant leaps in exploration.

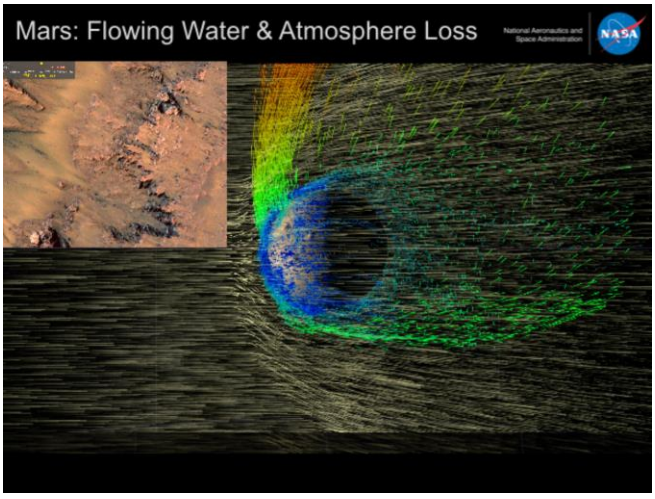
Which brings me back to the Journey to Mars. We have a clear vision for getting there. We need scientists, engineers, managers, spacecraft designers, astronauts, artists, physicians, and entrepreneurs – in short, a diverse mix of people with many different skills to engage hearts and minds and also develop the technology.

Phase II: Beyond LEO and the ISS, we build our capabilities and expand their application as we go is the proving ground of deep space. There we will test cutting edge new technologies like solar electric propulsion.

I've had the opportunity to visit the facilities where the Space Launch System (SLS) rocket is being manufactured, and I also had occasion to see a successful test of the engine (RS-25). This is the system that will someday launch American astronauts to deep space and to Mars, and it's more powerful than the Saturn 5 that took us to the moon.

We're also making incredible progress on the Orion crew vehicle, and the two segments of the crew module have been welded together and delivered to our Kennedy Space Center for the upcoming Exploration Mission – 1 (EM-1) that takes us to lunar orbit in 2018, and just a few years later the first astronauts aboard the Orion capsule will rocket in to deep space on the SLS. We're investing in over 1,000 companies. The European Support Module (ESM) is a critical element with Orion for EM–1.

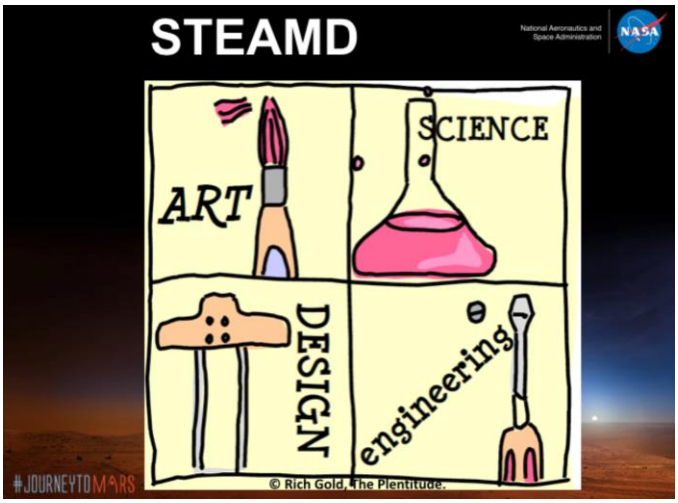
All of this is happening as we have worked to achieve widespread agreement across the globe that humanity is ready for larger missions, undertaken together. The Global Exploration Roadmap, released by the space agencies in the International Space Exploration Coordination Group, or ISECG, reflects a common long-range human exploration strategy that begins with the ISS and expands human presence into the solar system, leading to human missions on the surface of Mars. Our journey to Mars is our way of taking concrete steps to implement that shared vision and has attracted interest from many nations, and as I mentioned, we will need the expertise of many partners to solve the myriad of challenges – from spacesuit mobility to radiation shielding to in-space propulsion to closed loop life support systems, just to name a few.



Science and Mars robotic pre-cursor missions continue to play a critical role in the Journey to Mars. Our orbiters and rovers, along with those of other nations including most recently India, next Europe, and soon, the United Arab Emirates, continue to uncover surprising scientific findings about Mars, such as the recent discovery of seasonal water flowing on Mars using data from NASA's Mars Reconnaissance Orbiter. And we now

have evidence that the solar wind and radiation is a major cause for the erosion of the atmosphere of Mars as the ions are being ablated away as I speak. Without a global magnetic field protecting it from the Sun, Mars is left with only 1% Co2 atmosphere.

We will be working with many partners to gather data with robotic explorers such as InSight and the Mars2020 rover, which will serve as precursors to humans arriving at the Red Planet, even as they help us learn more about Earth and the formation of the solar system. Indeed, science missions are one of the most fruitful areas of international cooperation.



As Administrator Bolden and I travel the world, we are constantly struck by the enthusiasm of young people today for space exploration – whether they're in the science, technology, engineering and mathematics fields, or the Arts and Design, which are also critical to our work. I'm STEAMD that we're not making progress more quickly, and I always include the artists who are the visionaries and story tellers and the designers. We have a new generation of 3D makers who I include. Every girl and boy out there are invited to join us.

Phase III: Boots on Mars in the 2030s! One of the most exciting things about our journey is that it knows no borders, and the brightest minds of every nation are coming forward to participate. Whether these leaders are in school now, are already beginning or completing

their careers, or are citizen scientists and inventors, the world – the future – needs this global effort to raise the bar of human potential. Our work must engage both hearts and minds – both people of my generation, and the Mars Generation who will complete the journey and carry it even farther.

There's an urgent need for all nations to participate in this enormous undertaking, so it is my great pleasure to see so many of our partner nations represented here as well as many of you who will be our partners of the future. Reaching Mars is the greatest undertaking humanity has ever envisioned, and I want to stress again that we need you all.

The journey to Mars is taking shape in real time, right now, in orbit above us, and across the world as thousands of people work on the technologies and systems – and partnerships – to get us to Mars.

Even as we push for Mars, I always return to our home planet of Spaceship Earth because the Journey to Mars is essentially about life here on Earth. We explore to answer the enduring questions: Are we alone? Is there life on other planets? And was there life on Mars? All of our exploring of the solar system is to understand our place and to improve life here on Earth. This vision of Earth, from our DSCOVR mission at L1 (Lagrangian point 1 half way between Earth and the Sun), is a wonderful gravity neutral point 1 million miles (1.6 M km) away reminds us how precious our Spaceship Earth is to all of us, and that every thing we know, every one we know, and our entire knowledge of human life and existence is encompassed in this Pale Blue Dot, which from Mars looks like a tiny pin head.

I want to close with a quote from the great aviator, Amelia Earhart. She said, “The most difficult thing is the decision to act, the rest is merely tenacity. The fears are paper tigers. You can do anything you decide to do. You can act to change and control your life; and the procedure, the process is its own reward.”

Today we have a chance to act. Mars is in our grasp. It is already an exhilarating journey, and we want every one of you to be there with us. We want to take the world, all of humanity, with us together. Thank you, Mr. Chairman.