This Week at NASA…

was headlined by NASA's announcement of a new, robust multi-year Mars program that will feature a new, Red Planet rover set to launch in 2020.

“While 2020 may seem a long way off, it's really not.

Curiosity was about a decade in the works.

We have a tremendous amount of systems engineering and even spare parts left from the MSL chassis and those are really the enabling things that allow us to do this.”

The new rover will be based on the proven architecture that safely landed Curiosity on the Martian surface this summer.

The 2020 mission will gather new science data about Mars and serve as the next step towards meeting President Obama’s goal of sending humans to Mars in the 2030s.
Also from AGU, news that NASA's Voyager 1 spacecraft has encountered a new region of space at the far reaches of our solar system.

This newly-named “magnetic highway” appears to connect charged particles from the sun’s magnetic field lines with magnetic field lines in interstellar space.

Scientists think this “magnetic highway” is the final region Voyager has to cross before reaching interstellar space, the space between stars.

Other findings reported at AGU included newly-revealed structures and dynamics within Earth's radiation belts by NASA's Van Allen Probes, and predictions by Earth climatologists using NASA satellite records of more intense and longer fire seasons.

The 2012 Fall meeting also included a NASA Social during which about 20 social media users who engage with the agency through Twitter, Facebook, Google+ and other social networks were granted special access to AGU and NASA scientists.
“The data we learn on the one year flight will hopefully set the stage for sending humans beyond low Earth orbit someday.”

Speaking from Houston and Moscow, respectively, NASA Astronaut Scott Kelly and Russian Cosmonaut Mikhail Kornienko discussed with media their upcoming, year-long expedition aboard the International Space Station.

“I’m a believer in the remaining years that we have the space station of expanding the envelope of what we’ve done previously.”

Kelly and Kornienko will launch to the station in early 2015 to begin their one-year tour aboard the orbiting laboratory.

The long duration flight will mark the longest time an American has spent in space on a single mission.

“It’s really a great opportunity for the space station program to get some early insight.”
into twelve month missions and what we need to do to get the most out of the space station both for our future exploration needs as well as for improving human health on Earth.”

Meanwhile the next ISS crew, Expedition 34/35 Soyuz Commander Roman Romanenko, Flight Engineer Tom Marshburn of NASA and Flight Engineer Chris Hadfield of the Canadian Space Agency are at the Baikonur Cosmodrome in Kazakhstan, preparing for their December 19 Soyuz launch to the ISS.

There, they’ll join station Commander Kevin Ford of NASA and Russian Flight Engineers Oleg Novitskiy and Evegeny Tarelkin to bring the station back to its full complement of six crew members.

Astronaut Joe Acaba shared recollections -- and a video -- about his stay aboard the ISS with social media followers at NASA Headquarters in Washington.

“It’s a cool experience and you don’t come back the same.
It's like any life experience it can't help but to change you and change your perspective on the world.”

Acaba, who served as a NASA flight engineer on Expeditions 31 and 32, also made his presentation to employees at the Goddard Space Flight Center.

The other-world photos from the Curiosity rover continue to inform and inspire thousands of people at one of this world’s most famous intersections, New York’s Times Square.

Images taken by Curiosity’s cameras on Mars are routinely displayed on the two, giant Toshiba screens located just below the big New Year’s Eve ball.

“Here you have probably one of the top ten science and engineering feats taking place in space exploration we hoped that it would maybe make people a little curious in exploring the sciences and space exploration again.”

“Millions of people are watching every day Toshiba’s detailed information and NASA’s
You have selected the best site in the world.

Best site!

NASA TV coverage of Curiosity's landing on Mars in August was viewed by thousands in Times Square on Toshiba's big screens.

Hi, I'm Ashwin Vasavada, the deputy project scientist for the Mars Science Laboratory and this is your Curiosity rover update.

It's been a momentous week for Curiosity.

We've wrapped up our scientific study of Rocknest, which also means that we've completed the checkout and first scientific use of all our instruments on the rover and it truly is working great.

We used out ChemCam laser and our APXS chemical sensor to do an initial technical analysis of the soil, determining whether it was safe for scooping and sending to our laboratories.
We use MAHLI, our hand lens imager to take close up views of the soil to look at different particle sizes, shapes and colors and how they change with depth.

We then scooped up the soil and analyzed it if our X-ray diffraction instrument that can identify minerals in the soil based on their unique crystal structure.

But it turned out that a good amount of the material in the soil was not crystalline but that's not a problem for our other laboratory, SAM.

SAM heated up the soil in an oven, measured various gases released as the soil components broke down, such as water, carbon dioxide, oxygen and sulfur.

We haven't yet seen any complex organic molecules but sand isn't the best place to look.

Finally, it's worth remembering that the big questions in science whether Copernicus
finding that the Earth goes around the sun
or Darwin showing that natural selection drives

86
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biological evolution, were answered only after
many measurements were taken compared against

87
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one another and hypotheses were proposed and
tested against data.

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It'll be no different for Curiosity in its
mission to understand the habitability of

89
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ancient Mars at Gale Crater.

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But now we know that we have a fantastic rover,
a great set of tools and a fully functional

91
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scientific payload.

92
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So let’s get on exploring.

93
00:06:54,110 --> 00:06:56,560
This has been your Curiosity Rover Report.

94
00:06:56,560 --> 00:07:00,470
Please check back for more updates.

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More than 600 people attended NASA Technology
Days at Cleveland's Public Auditorium in Ohio.

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Associate Administrator Robert Lightfoot joined
other NASA officials and the city’s mayor

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at the three-day event.
Technology demonstrations, informative speeches and poster sessions celebrated cutting-edge research and technology development available to industry and universities.

Executives from NASA's Chief Technologist and Space Technology Program offices, the Glenn and Langley research centers, and the Goddard Space Flight Center, were available to business and academic leaders interested in establishing innovative partnerships with America's space program.

Researchers at NASA's Kennedy Space Center have built a prototype reactor designed to make something useful from the trash astronauts accumulate in space.

The device incinerates garbage to produce methane, oxygen and water – which can be used for rocket fuel, breathing air and for life support.

"Really what we're trying to do is change the mindset and say waste isn't something you just want to get rid of, we want to think of waste as a resource."
The reactor being developed could fly as soon as 2018 for demonstration on the International Space Station.

Before that though, researchers continue to look for ways to improve it.

“So we will have some challenges making it smaller and lightweight so that it is practical for space applications.”

The research also could pay off here on Earth, where small reactors can be used to generate electricity in remote areas from the trash people produce anyway.

“In third world countries, it’s very important because you can get electricity from a waste product.”

The Jet Propulsion Laboratory hosted its annual Climate Day at the Pasadena Convention Center.

More than one thousand students from 14 schools participated in hands-on activities and science demonstrations, listened to presentations on Earth Science and competed in a game of
“Climate Jeopardy.”

JPL Climate Day helps students separate fact from fiction by sharing the latest scientific findings about global climate and explaining NASA’s role in our understanding of the issues.

Sonic booms created by aircraft flying faster than the speed of sound certainly aren’t known for being faint, but rather for their loud, make-you-jump effect. But sonic booms also have a quieter side.

NASA’s Supersonics Project is embarking on a new effort to characterize that fainter side of sonic booms in the Farfield Investigation of No Boom Threshold project, or FaINT.

Principal investigator Larry Cliatt at NASA’s Dryden Flight Research Center says FaINT is designed to enable engineers to better understand evanescent waves, an acoustic phenomenon that occurs at the very edges of the normal sonic boom envelope.
“They tend to be a lot quieter, probably about five to 10 times quieter than that your normal N-wave sonic boom. And they kind of sound like a distant thunder rumble.”

Linear and spiral microphone arrays laid out on the dry lake bed at Edwards Air Force Base, along with microphones on a blimp-shaped balloon and motor glider flying above the arrays, record the faint sonic booms.

“The purpose of the FaINT project in general is just an additional piece of research that we're working on for having a supersonic commercial transport that can fly over land.”

“NASA's always trying to push research, push boundaries and one of the things we're trying to do is to bring commercial supersonic travel to the world.”

Six years ago, on December 9, 2006, Space Shuttle Discovery launched from the Kennedy Space Center to the International Space Station.
The crew of seven continued construction of the orbiting outpost and helped ready it to support additional science modules.

Discovery also delivered more than two tons of equipment and supplies, and new crew member Suni Williams, who would spend 195 days on Expeditions 14 and 15 to set a record for the longest single space flight by a woman.

And, December 7 marks the 40-year anniversary of the launch from Kennedy of Apollo 17. This eleventh and final manned mission in the Apollo program was the first night launch of a U.S. human spaceflight.

With Command Module Pilot Ron Evans in lunar orbit, Commander Gene Cernan and Lunar Module Pilot, Harrison Schmitt spent just over three days collecting samples and deploying scientific instruments on the moon’s surface.

The 12-day mission ended with their safe return to Earth on December 19.
Apollo 17 also captured one of the world's most celebrated images, the photo of Earth known by all as “The Blue Marble.”

And that's This Week @NASA.

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