



Curiosity Rover Update



1
00:00:07,040 --> 00:00:11,330
This Week at NASA...

2
00:00:11,330 --> 00:00:16,369
Science news from the American Geophysical
Union's 2012 Fall Meeting in San Francisco

3
00:00:16,369 --> 00:00:21,460
was headlined by NASA's announcement of
a new, robust multi-year Mars program that

4
00:00:21,460 --> 00:00:25,250
will feature a new, Red Planet rover set to
launch in 2020.

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00:00:25,250 --> 00:00:28,750
"While 2020 may seem a long way off, it's
really not.

6
00:00:28,750 --> 00:00:30,880
Curiosity was about a decade in the works.

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00:00:30,880 --> 00:00:37,980
We have a tremendous amount of systems engineering
and even spare parts left from the MSL chassis

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00:00:37,980 --> 00:00:41,750
and those are really the enabling things that
allow us to do this."

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00:00:41,750 --> 00:00:46,340
The new rover will be based on the proven
architecture that safely landed Curiosity

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00:00:46,340 --> 00:00:48,480
on the Martian surface this summer.

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00:00:48,480 --> 00:00:54,320
The 2020 mission will gather new science data

about Mars and serve as the next step towards

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00:00:54,320 --> 00:00:59,440

meeting President Obama's goal of sending humans to Mars in the 2030s.

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00:00:59,440 --> 00:01:04,830

Also from AGU, news that NASA's Voyager 1 spacecraft has encountered a new region

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00:01:04,830 --> 00:01:08,380

of space at the far reaches of our solar system.

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00:01:08,380 --> 00:01:13,850

This newly-named "magnetic highway" appears to connect charged particles from the sun's

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00:01:13,850 --> 00:01:19,600

magnetic field lines with magnetic field lines in interstellar space.

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00:01:19,600 --> 00:01:24,610

Scientists think this "magnetic highway" is the final region Voyager has to cross before

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00:01:24,610 --> 00:01:29,210

reaching interstellar space, the space between stars.

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00:01:29,210 --> 00:01:35,869

Other findings reported at AGU included newly-revealed structures and dynamics within Earth's radiation

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00:01:35,869 --> 00:01:42,340

belts by NASA's Van Allen Probes, and predictions by Earth climatologists using NASA satellite

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00:01:42,340 --> 00:01:46,090

records of more intense and longer fire seasons.

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00:01:46,090 --> 00:01:51,350
The 2012 Fall meeting also included a NASA
Social during which about 20 social media

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00:01:51,350 --> 00:01:57,020
users who engage with the agency through Twitter,
Facebook, Google+ and other social networks

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00:01:57,020 --> 00:02:01,700
were granted special access to AGU and NASA
scientists.

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00:02:01,700 --> 00:02:09,729
“The data we learn on the one year flight
will hopefully set the stage for sending humans

26
00:02:09,729 --> 00:02:11,370
beyond low Earth orbit someday.”

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00:02:11,370 --> 00:02:17,700
Speaking from Houston and Moscow, respectively,
NASA Astronaut Scott Kelly and Russian Cosmonaut

28
00:02:17,700 --> 00:02:23,040
Mikhail Kornienko discussed with media their
upcoming, year-long expedition aboard the

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00:02:23,040 --> 00:02:24,280
International Space Station.

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00:02:24,280 --> 00:02:31,120
“I’m a believer in the remaining years
that we have the space station of expanding

31
00:02:31,120 --> 00:02:33,849
the envelope of what we’ve done previously.”

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00:02:33,849 --> 00:02:39,639
Kelly and Kornienko will launch to the station

in early 2015 to begin their one-year tour

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00:02:39,639 --> 00:02:41,290

aboard the orbiting laboratory.

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00:02:41,290 --> 00:02:47,060

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

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00:02:47,060 --> 00:02:48,060

mission.

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00:02:48,060 --> 00:02:51,889

“It’s really a great opportunity for the space station program to get some early insight

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00:02:51,889 --> 00:02:55,959

into twelve month missions and what we need to do to get the most out of the space station

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00:02:55,959 --> 00:03:02,719

both for our future exploration needs as well as for improving human health on Earth.”

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00:03:02,719 --> 00:03:09,569

Meanwhile the next ISS crew, Expedition 34/35 Soyuz Commander Roman Romanenko, Flight Engineer

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00:03:09,569 --> 00:03:15,099

Tom Marshburn of NASA and Flight Engineer Chris Hadfield of the Canadian Space Agency

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00:03:15,099 --> 00:03:20,670

are at the Baikonur Cosmodrome in Kazakhstan, preparing for their December 19 Soyuz launch

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00:03:20,670 --> 00:03:21,809

to the ISS.

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00:03:21,809 --> 00:03:26,969

There, they'll join station Commander Kevin Ford of NASA and Russian Flight Engineers

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00:03:26,969 --> 00:03:32,549

Oleg Novitskiy and Eveygeny Tarelkin to bring the station back to its full complement of

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00:03:32,549 --> 00:03:36,309

six crew members.

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00:03:36,309 --> 00:03:42,790

Astronaut Joe Acaba shared recollections – and a video -- about his stay aboard the ISS with 150

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00:03:42,790 --> 00:03:45,810

social media followers at NASA Headquarters in Washington.

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00:03:45,810 --> 00:03:49,889

"It's a cool experience and you don't come back the same.

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00:03:49,889 --> 00:03:54,999

It's like any life experience it can't help but to change you and change your perspective

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00:03:54,999 --> 00:03:56,029

on the world."

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00:03:56,029 --> 00:04:02,069

Acaba, who served as a NASA flight engineer on Expeditions 31 and 32, also made his presentation

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00:04:02,069 --> 00:04:06,680

to employees at the Goddard Space Flight Center.

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00:04:06,680 --> 00:04:12,290

The other-world photos from the Curiosity rover continue to inform and inspire thousands

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00:04:12,290 --> 00:04:18,359
of people at one of this world's most famous
intersections, New York's Times Square.

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00:04:18,359 --> 00:04:23,750
Images taken by Curiosity's cameras on Mars
are routinely displayed on the two, giant

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00:04:23,750 --> 00:04:27,540
Toshiba screens located just below the big
New Year's Eve ball.

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00:04:27,540 --> 00:04:35,440
"Here you have probably one of the top ten
science and engineering feats taking place

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00:04:35,440 --> 00:04:43,250
in space exploration we hoped that it would
maybe make people a little curious in exploring

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00:04:43,250 --> 00:04:45,500
the sciences and space exploration again."

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00:04:45,500 --> 00:04:53,310
"Millions of people are watching every day
Toshiba's detailed information and NASA's

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00:04:53,310 --> 00:04:54,570
information too.

62
00:04:54,570 --> 00:04:57,680
You have selected the best site in the world.

63
00:04:57,680 --> 00:04:58,680
Best site!"

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00:04:58,680 --> 00:05:03,180
NASA TV coverage of Curiosity's landing

on Mars in August was viewed by thousands

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00:05:03,180 --> 00:05:06,410

in Times Square on Toshiba's big screens.

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00:05:06,410 --> 00:05:12,300

Hi, I'm Ashwin Vasavada, the deputy project scientist for the Mars Science Laboratory

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00:05:12,300 --> 00:05:14,760

and this is your Curiosity rover update.

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00:05:14,760 --> 00:05:17,150

It's been a momentous week for Curiosity.

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00:05:17,150 --> 00:05:21,960

We've wrapped up our scientific study of Rocknest, which also means that we've completed

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00:05:21,960 --> 00:05:26,270

the checkout and first scientific use of all our instruments on the rover and it truly

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00:05:26,270 --> 00:05:27,300

is working great.

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00:05:27,300 --> 00:05:32,710

We used our ChemCam laser and our APXS chemical sensor to do an initial technical analysis

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00:05:32,710 --> 00:05:38,040

of the soil, determining whether it was safe for scooping and sending to our laboratories.

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00:05:38,040 --> 00:05:42,520

We use MAHLI, our hand lens imager to take close up views of the soil to look at different

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00:05:42,520 --> 00:05:47,840

particle sizes, shapes and colors and how they change with depth.

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00:05:47,840 --> 00:05:51,740
We then scooped up the soil and analyzed it if our X-ray diffraction instrument that can

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00:05:51,740 --> 00:05:55,750
identify minerals in the soil based on their unique crystal structure.

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00:05:55,750 --> 00:05:58,990
But it turned out that a good amount of the material in the soil was not crystalline but

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00:05:58,990 --> 00:06:02,590
that's not a problem for our other laboratory, SAM.

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00:06:02,590 --> 00:06:07,050
SAM heated up the soil in an oven, measured various gases released as the soil components

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00:06:07,050 --> 00:06:12,180
broke down, such as water, carbon dioxide, oxygen and sulfur.

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00:06:12,180 --> 00:06:16,250
We haven't yet seen any complex organic molecules but sand isn't the best place

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00:06:16,250 --> 00:06:17,280
to look.

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00:06:17,280 --> 00:06:21,430
Finally, it's worth remembering that the big questions in science whether Copernicus

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00:06:21,430 --> 00:06:25,960
finding that the Earth goes around the sun

or Darwin showing that natural selection drives

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00:06:25,960 --> 00:06:31,080

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

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00:06:31,080 --> 00:06:37,010

one another and hypotheses were proposed and tested against data.

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00:06:37,010 --> 00:06:43,270

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

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00:06:43,270 --> 00:06:45,330

ancient Mars at Gale Crater.

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00:06:45,330 --> 00:06:50,110

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

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00:06:50,110 --> 00:06:51,110

scientific payload.

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00:06:51,110 --> 00:06:54,110

So let's get on exploring.

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00:06:54,110 --> 00:06:56,560

This has been your Curiosity Rover Report.

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00:06:56,560 --> 00:07:00,470

Please check back for more updates.

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00:07:00,470 --> 00:07:06,860

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

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00:07:06,860 --> 00:07:11,900

Associate Administrator Robert Lightfoot joined

other NASA officials and the city's mayor

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00:07:11,900 --> 00:07:14,090

at the three-day event.

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00:07:14,090 --> 00:07:18,990

Technology demonstrations, informative speeches and poster sessions celebrated cutting-edge

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00:07:18,990 --> 00:07:23,639

research and technology development available to industry and universities.

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00:07:23,639 --> 00:07:28,210

Executives from NASA's Chief Technologist and Space Technology Program offices, the

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00:07:28,210 --> 00:07:32,430

Glenn and Langley research centers, and the Goddard Space Flight Center, were available

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00:07:32,430 --> 00:07:37,590

to business and academic leaders interested in establishing innovative partnerships with

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00:07:37,590 --> 00:07:43,530

America's space program.

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00:07:43,530 --> 00:07:47,710

Researchers at NASA's Kennedy Space Center have built a prototype reactor designed to

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00:07:47,710 --> 00:07:52,580

make something useful from the trash astronauts accumulate in space.

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00:07:52,580 --> 00:07:57,860

The device incinerate garbage to produce methane, oxygen and water – which can be used for

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00:07:57,860 --> 00:08:01,110

rocket fuel, breathing air and for life support.

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00:08:01,110 --> 00:08:05,500

“Really what we're trying to do is change the mindset and say waste isn't something

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00:08:05,500 --> 00:08:08,630

you just want to get rid of, we want to think of waste as a resource.

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00:08:08,630 --> 00:08:13,820

The reactor being developed could fly as soon as 2018 for demonstration on the International

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00:08:13,820 --> 00:08:15,700

Space Station.

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00:08:15,700 --> 00:08:19,720

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

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00:08:19,720 --> 00:08:25,630

“So we will have some challenges making it smaller and lightweight so that it is practical

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00:08:25,630 --> 00:08:27,360

for space applications.”

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00:08:27,360 --> 00:08:31,940

The research also could pay off here on Earth, where small reactors can be used to generate

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00:08:31,940 --> 00:08:35,890

electricity in remote areas from the trash people produce anyway.

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00:08:35,890 --> 00:08:41,599

“In third world countries, it's very important

because you can get electricity from a waste

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00:08:41,599 --> 00:08:42,599

product.”

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00:08:42,599 --> 00:08:50,100

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

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00:08:50,100 --> 00:08:55,459

More than one thousand students from 14 schools participated in hands-on activities and science

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00:08:55,459 --> 00:09:00,800

demonstrations, listened to presentations on Earth Science and competed in a game of

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00:09:00,800 --> 00:09:03,480

“Climate Jeopardy.”

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00:09:03,480 --> 00:09:09,329

JPL Climate Day helps students separate fact from fiction by sharing the latest scientific

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00:09:09,329 --> 00:09:13,829

findings about global climate and explaining NASA’s role in our understanding of the

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00:09:13,829 --> 00:09:17,529

issues.

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00:09:17,529 --> 00:09:22,240

Sonic booms created by aircraft flying faster than the speed of sound certainly aren’t

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00:09:22,240 --> 00:09:28,209

known for being faint, but rather for their loud, make-you-jump effect.

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00:09:28,209 --> 00:09:31,870

But sonic booms also have a quieter side.

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00:09:31,870 --> 00:09:37,100

NASA's Supersonics Project is embarking on a new effort to characterize that fainter

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00:09:37,100 --> 00:09:43,610

side of sonic booms in the Farfield Investigation of No Boom Threshold project, or FaINT.

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00:09:43,610 --> 00:09:48,240

Principal investigator Larry Cliatt at NASA's Dryden Flight Research Center says FaINT is

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00:09:48,240 --> 00:09:53,829

designed to enable engineers to better understand evanescent waves, an acoustic phenomenon that

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00:09:53,829 --> 00:09:57,060

occurs at the very edges of the normal sonic boom envelope.

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00:09:57,060 --> 00:10:03,529

"They tend to be a lot quieter, probably about five to 10 times quieter than that your

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00:10:03,529 --> 00:10:04,689

normal N-wave sonic boom.

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00:10:04,689 --> 00:10:07,730

And they kind of sound like a distant thunder rumble."

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00:10:07,730 --> 00:10:13,189

Linear and spiral microphone arrays laid out on the dry lake bed at Edwards Air Force Base,

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00:10:13,189 --> 00:10:18,730

along with microphones on a blimp-shaped balloon

and motor glider flying above the arrays,

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00:10:18,730 --> 00:10:20,139

record the faint sonic booms.

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00:10:20,139 --> 00:10:24,639

“The purpose of the FaINT project in general is just an additional piece of research that

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00:10:24,639 --> 00:10:30,160

we’re working on for having a supersonic commercial transport that can fly over land.”

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00:10:30,160 --> 00:10:34,439

“NASA’s always trying to push research, push boundaries and one of the things we’re

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00:10:34,439 --> 00:10:41,199

trying to do is to bring commercial supersonic travel to the world.”

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00:10:41,199 --> 00:10:46,399

Six years ago, on December 9, 2006, Space Shuttle Discovery launched from the Kennedy

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00:10:46,399 --> 00:10:51,319

Space Center to the International Space Station on STS-116.

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00:10:51,319 --> 00:10:55,559

The crew of seven continued construction of the orbiting outpost and helped ready it to

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00:10:55,559 --> 00:10:58,029

support additional science modules.

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00:10:58,029 --> 00:11:02,820

Discovery also delivered more than two tons of equipment and supplies, and new crew member

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00:11:02,820 --> 00:11:09,319

Suni Williams, who would spend 195 days on Expeditions 14 and 15 to set a record for

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00:11:09,319 --> 00:11:13,820

the longest single space flight by a woman.

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00:11:13,820 --> 00:11:21,579

And, December 7 marks the 40-year anniversary of the launch from Kennedy of Apollo 17.

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00:11:21,579 --> 00:11:25,959

This eleventh and final manned mission in the Apollo program was the first night launch

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00:11:25,959 --> 00:11:28,320

of a U.S. human spaceflight.

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00:11:28,320 --> 00:11:33,480

With Command Module Pilot Ron Evans in lunar orbit, Commander Gene Cernan and Lunar Module

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00:11:33,480 --> 00:11:39,040

Pilot, Harrison Schmitt spent just over three days collecting samples and deploying scientific

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00:11:39,040 --> 00:11:41,330

instruments on the moon's surface.

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00:11:41,330 --> 00:11:46,629

The 12-day mission ended with their safe return to Earth on December 19.

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00:11:46,629 --> 00:11:52,319

Apollo 17 also captured one of the world's most celebrated images, the photo of Earth

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00:11:52,319 --> 00:11:55,730

known by all as "The Blue Marble."

160

00:11:55,730 --> 00:11:57,939

And that's This Week @NASA.

161

00:11:57,939 --> 00:12:02,560

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