



1  
00:00:07,060 --> 00:00:11,130  
This Week at NASA...

2  
00:00:11,130 --> 00:00:16,270  
Astronaut Scott Kelly has been selected by  
NASA to begin a one-year mission aboard the

3  
00:00:16,270 --> 00:00:19,900  
International Space Station in 2015.

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00:00:19,900 --> 00:00:24,449  
Joining Kelly on the ISS will be Russian cosmonaut,  
Mikhail Kornienko.

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00:00:24,449 --> 00:00:29,109  
The pair will launch aboard a Russian Soyuz  
spacecraft from the Baikonur Cosmodrome in

6  
00:00:29,109 --> 00:00:32,009  
Kazakhstan in spring 2015.

7  
00:00:32,009 --> 00:00:37,530  
Their 12-month stay aboard the world's only  
laboratory in microgravity will provide new

8  
00:00:37,530 --> 00:00:43,860  
data about how the human body reacts and adapts  
to the harsh environment of space.

9  
00:00:43,860 --> 00:00:48,960  
That information will help scientists assess  
crew performance and health, and develop better

10  
00:00:48,960 --> 00:00:54,400  
ways to reduce the risks of long-duration  
spaceflight, as NASA plans to send the next

11  
00:00:54,400 --> 00:01:03,100  
generation of explorers on missions around

the moon, to an asteroid and ultimately, Mars.

12  
00:01:03,100 --> 00:01:09,510  
The next crew headed for the ISS on Expedition 34/35, continues to train in Star City, Russia

13  
00:01:09,510 --> 00:01:11,070  
for their missions..

14  
00:01:11,070 --> 00:01:17,259  
NASA's Tom Marshburn, the Canadian Space Agency's Chris Hadfield and Russian cosmonaut

15  
00:01:17,259 --> 00:01:22,619  
Roman Romanenko are scheduled to launch to the station on December 19, where they'll

16  
00:01:22,619 --> 00:01:26,060  
become the second half of the Expedition 34 crew.

17  
00:01:26,060 --> 00:01:32,650  
They'll be joined on Expedition 35 next March by NASA's Chris Cassidy, and cosmonauts

18  
00:01:32,650 --> 00:01:38,560  
Pavel Vinogradov and Alexander Misurkin.

19  
00:01:38,560 --> 00:01:43,219  
Scientists with NASA's MESSENGER mission say new observations made by the spacecraft

20  
00:01:43,219 --> 00:01:48,719  
confirm a long-held theory: that the polar regions of Mercury harbor an abundance of

21  
00:01:48,719 --> 00:01:51,459  
water ice and other frozen volatiles.

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00:01:51,459 --> 00:01:58,810

“Messenger has revealed a very important chapter in the story of how water ice and

23

00:01:58,810 --> 00:02:03,509

other volatile materials have been delivered to the inner planets ... it's extraordinary

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00:02:03,509 --> 00:02:09,090

that this chapter is so well preserved on the planet closest to the Sun.”

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00:02:09,090 --> 00:02:14,790

Given its proximity to the Sun, Mercury would seem to be an unlikely place to find water

26

00:02:14,790 --> 00:02:15,790

ice.

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00:02:15,790 --> 00:02:21,180

But since the tilt of the planet's rotational axis is almost zero, scientists suggested

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00:02:21,180 --> 00:02:27,310

decades ago that there might be water ice and other frozen volatiles trapped at Mercury's

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00:02:27,310 --> 00:02:29,670

poles, which NEVER see sunlight.

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00:02:29,670 --> 00:02:34,920

MESSENGER, which stands for MErcury Surface, Space ENvironment, GEochemistry and Ranging,

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00:02:34,920 --> 00:02:42,780

is the first spacecraft to orbit the solar system's innermost planet.

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00:02:42,780 --> 00:02:47,739

NASA Administrator Charlie Bolden toured the

United Launch Alliance's space rocket production

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00:02:47,739 --> 00:02:49,510

facility in Decatur, Ala.

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00:02:49,510 --> 00:02:55,040

The facility is home to two families of rockets,  
Atlas and Delta.

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00:02:55,040 --> 00:03:01,090

Together, Atlas and Delta rockets have had  
more than 850 successful launches.

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00:03:01,090 --> 00:03:07,000

Their major fabrication, assembly and integration  
are completed at the Decatur facility.

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00:03:07,000 --> 00:03:10,580

ULA is a joint venture of Lockheed Martin  
and The Boeing Company.\h

38

00:03:10,580 --> 00:03:21,370

A J-2X power pack assembly burns brightly  
during the latest hot-fire test conducted

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00:03:21,370 --> 00:03:23,870

at the Stennis Space Center.

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00:03:23,870 --> 00:03:31,659

Lasting 278 seconds, the test used newly-installed  
gauges to measure how much strain the turboprop

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00:03:31,659 --> 00:03:36,930

placed on the engine's turbine structure  
as it spun at various high speeds.

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00:03:36,930 --> 00:03:42,209

The test was the latest in a series used by  
engineers to evaluate the J-2X, which will

43  
00:03:42,209 --> 00:03:46,910  
help power the upper stage of NASA's new  
Space Launch System.

44  
00:03:46,910 --> 00:03:53,099  
And, they're getting ready for the SLS at  
the Kennedy Space Center.

45  
00:03:53,099 --> 00:04:00,080  
This time-lapse video shows Crawler-Transporter  
2, fresh from the first phase of a major overhaul,

46  
00:04:00,080 --> 00:04:04,459  
taking a test drive from Pad 39A to the Vehicle  
Assembly Building.

47  
00:04:04,459 --> 00:04:09,829  
Kennedy's two crawler- transporters have  
moved mobile launchers and their mounted vehicles

48  
00:04:09,829 --> 00:04:14,870  
from the VAB to KSC's ocean-side launch  
pads since the Apollo era.

49  
00:04:14,870 --> 00:04:20,920  
But, with the Space Launch System in development,  
engineers began modifying crawler-transporter

50  
00:04:20,920 --> 00:04:26,771  
2 last December to ensure it can handle the  
agency's heaviest rocket ever—and help

51  
00:04:26,771 --> 00:04:31,740  
move America's human spaceflight program  
onward and upward for years to come.

52  
00:04:31,740 --> 00:04:32,740  
Chief Technologist Mason Peck was a keynote  
speaker at the NASA Innovative Advanced Concepts

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00:04:32,740 --> 00:04:33,740

Program's 2012 Fall Symposium.

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00:04:33,740 --> 00:04:34,740

Held near the Langley Research Center, the NIAC event included panel discussions on topics

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00:04:34,740 --> 00:04:35,740

ranging from propulsion and power and space debris removal to near-Earth object mitigation

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00:04:35,740 --> 00:04:36,740

and robotics and space probes.

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00:04:36,740 --> 00:04:37,740

"It's important for us at NASA; it's important for us as a nation.

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00:04:37,740 --> 00:04:38,740

It's not only about investing in technology for the sake of science and the sake of human

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00:04:38,740 --> 00:04:39,740

space.

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00:04:39,740 --> 00:04:40,740

It's also done because it advances our economy.

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00:04:40,740 --> 00:04:41,740

It means we can design new computers, new smartphones, new applications, new medical

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00:04:41,740 --> 00:04:42,740

applications - new things that will change our lives here.

63

00:04:42,740 --> 00:04:43,740

NIAC determines whether an idea or concept is worth developing as one of the many, new

64  
00:04:43,740 --> 00:04:44,740  
advanced technologies critical to NASA missions  
in the next 10 to 100 years.

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00:04:44,740 --> 00:04:45,740  
Hi my name is Torsten Zorn I'm tactical  
downlink lead on the Mars Science Laboratory

66  
00:04:45,740 --> 00:04:46,740  
and I'm coming to you with your Curiosity  
rover report.

67  
00:04:46,740 --> 00:04:48,090  
Since November 10th we've been tracking  
a very large dust storm on Mars with Mars

68  
00:04:48,090 --> 00:04:51,160  
Reconnaissance Orbiter, Curiosity and Opportunity.

69  
00:04:51,160 --> 00:04:55,600  
Luckily this dust storm has abated and even  
if it didn't it would have been fine for

70  
00:04:55,600 --> 00:04:59,960  
Curiosity as well within its design limitations.

71  
00:04:59,960 --> 00:05:05,400  
Recently Curiosity was able to take a beautiful  
hi-res image of herself using the MAHLI Hand

72  
00:05:05,400 --> 00:05:06,550  
Held Imager.

73  
00:05:06,550 --> 00:05:11,610  
By putting together a sequence of very complex  
arm motions we were able to take dozens of

74  
00:05:11,610 --> 00:05:16,080

images and splice them together creating a beautiful self-portrait.

75  
00:05:16,080 --> 00:05:20,310  
After several weeks of being stationary at the Rocknest site we began driving again on

76  
00:05:20,310 --> 00:05:21,889  
Sol 100.

77  
00:05:21,889 --> 00:05:26,319  
This marked a significant milestone on the mission as we reached about a half a kilometer

78  
00:05:26,319 --> 00:05:29,759  
of total driving distance on the surface of Mars.

79  
00:05:29,759 --> 00:05:34,820  
Currently the left front wheel is sitting on a rock that we've dubbed Bell Island.

80  
00:05:34,820 --> 00:05:39,979  
We plan to back up off that rock to bring the rock into the arm's workspace and we're

81  
00:05:39,979 --> 00:05:44,800  
going to do some contact science on it with APXS and MAHLI.

82  
00:05:44,800 --> 00:05:48,680  
After completing our science campaign at our current location we're going to be moving

83  
00:05:48,680 --> 00:05:51,470  
to the East to a place called Point Lake.

84  
00:05:51,470 --> 00:05:55,940  
From here we're going to be looking for a target to perform our first ever drill on

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00:05:55,940 --> 00:05:57,450

Mars.

86

00:05:57,450 --> 00:05:59,789

This has been your Curiosity rover report.

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00:05:59,789 --> 00:06:47,080

Check back for further updates.

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00:06:47,080 --> 00:06:52,520

Though the effect of Hurricane Sandy is undeniable,  
the impact of the storm to Wallops Flight

89

00:06:52,520 --> 00:06:58,199

Facility was minimized thanks to an improved  
beach and sea wall project that proved critical

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00:06:58,199 --> 00:06:59,960

to the protection of Wallops launch assets.

91

00:06:59,960 --> 00:07:04,069

"You would have had sand inundation into  
their liquid fueling facility area, which

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00:07:04,069 --> 00:07:07,680

is all stone now and quite a big mess to pick  
up.

93

00:07:07,680 --> 00:07:12,669

It could have been pretty catastrophic for  
that operation, Antares operation possibly."

94

00:07:12,669 --> 00:07:19,039

But the protection of the beach and berm improvement,  
known as the Wallops Island Storm Damage Reduction

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00:07:19,039 --> 00:07:20,789

project, came at a cost.

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00:07:20,789 --> 00:07:25,800

It's estimated that some 500 to 700 feet of berm was wiped out by the super storm.

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00:07:25,800 --> 00:07:29,840

But Wallops engineers have a plan in place to deal with this temporary situation.

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00:07:29,840 --> 00:07:34,300

"It's like a brake pad, every time that brake pad starts wearing down.

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00:07:34,300 --> 00:07:38,370

When it gets to the point when we need re nourishment, we're going to basically twice

100

00:07:38,370 --> 00:07:41,740

a year, we're going to look at this beach, survey it and find out where the beach is

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00:07:41,740 --> 00:07:47,460

and what it's doing, and we expect on a three to seven year cycle we'll have to

102

00:07:47,460 --> 00:07:48,639

re nourish this beach.\h

103

00:07:48,639 --> 00:07:50,919

"

Each re-nourishment project is expected to

104

00:07:50,919 --> 00:07:54,300

include about 800,000 cubic yards of sand.

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00:07:54,300 --> 00:07:58,960

In the meantime, NASA officials are working to address the immediate needs of the beach

106

00:07:58,960 --> 00:08:08,310

following Hurricane Sandy.

107

00:08:08,310 --> 00:08:13,000

I'm Kody Ensley and I do software engineering on Robonaut at Johnson Space Center.

108

00:08:13,000 --> 00:08:19,090

Basically the robot, Robonaut 2 behind me, has onboard software; the processors actually

109

00:08:19,090 --> 00:08:20,479

live in his stomach.

110

00:08:20,479 --> 00:08:24,730

What I'm doing is helping to architect the software that will allow the robot to be able

111

00:08:24,730 --> 00:08:26,490

to move around inside the Space Station autonomously.

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00:08:26,490 --> 00:08:31,300

I was born and raised on the Flathead Indian Reservation in Pablo, Montana and when I was

113

00:08:31,300 --> 00:08:36,890

a kid growing up, my parents invested a lot of money into Lego's and I think that's probably

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00:08:36,890 --> 00:08:38,729

the reason that I ended up here today.

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00:08:38,729 --> 00:08:44,390

I was not one of those kids at the age of 6 who knew they would end up with NASA.

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00:08:44,390 --> 00:08:50,890

One of NASA's own, Scott Askew, was involved in a program called the NAEP which is basically

117

00:08:50,890 --> 00:08:54,610

where NASA lends out professors to travel to universities.

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00:08:54,610 --> 00:08:59,290

I heard about something called the Undergraduate Student Research Project and I applied for

119

00:08:59,290 --> 00:09:00,940

the USRP program.

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00:09:00,940 --> 00:09:04,579

After successive internships and then finally a coop, I was hired here at Johnson Space

121

00:09:04,579 --> 00:09:05,579

Center.

122

00:09:05,579 --> 00:09:10,300

Being able to do outreach and show that there are opportunities like internships, Co-ops,

123

00:09:10,300 --> 00:09:14,839

where not only you can leave to get training, but can bring that back to the Reservation

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00:09:14,839 --> 00:09:16,910

and you can help pass that along to other people there.

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00:09:16,910 --> 00:09:19,660

It has probably been my proudest personal accomplishment.

126

00:09:19,660 --> 00:09:23,089

We don't want robots to replace people; we don't think they can, but we definitely think

127

00:09:23,089 --> 00:09:29,240

that we can assist people in getting to the next frontier faster.

128

00:09:29,240 --> 00:09:37,360

Nineteen years ago, on December 2, 1993 the first Hubble Space Telescope servicing mission,

129

00:09:37,360 --> 00:09:42,640

STS-61 got underway with the launch of space shuttle Endeavour and her seven-member crew

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00:09:42,640 --> 00:09:44,320

from the Kennedy Space Center.

131

00:09:44,320 --> 00:09:50,120

A corrective optics package designed to fix a flaw in the telescope's primary mirror

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00:09:50,120 --> 00:09:56,120

was successfully installed, sharpening Hubble's vision from blurry to pristine.

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00:09:56,120 --> 00:10:01,170

Hubble also received instrument upgrades and new solar arrays during the course of five

134

00:10:01,170 --> 00:10:04,589

spacewalks.

135

00:10:04,589 --> 00:10:11,820

And five years later, on December 4, 1998, Endeavour began another mission, this time

136

00:10:11,820 --> 00:10:16,529

as the first shuttle assembly flight to the International Space Station.

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00:10:16,529 --> 00:10:22,430

STS-88 delivered to the station the first American module, "Unity," which was mated

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00:10:22,430 --> 00:10:28,320

to "Zarya," the Russian Functional Cargo  
Block module launched to orbit one month earlier.

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00:10:28,320 --> 00:10:34,580

The crew completed three spacewalks to connect  
power and data cables between the modules.

140

00:10:34,580 --> 00:10:36,610

And that's This Week @NASA.