



1
00:00:07,470 --> 00:00:08,590
This Week at NASA

2
00:00:08,590 --> 00:00:24,009
Three, two, one, zero and liftoff of the Atlas
five rocket with TDRS-K broadening, enhancing

3
00:00:24,009 --> 00:00:28,310
and improving the capability of space-based
tracking.

4
00:00:28,310 --> 00:00:34,720
The rocket carrying NASA's new advanced communications
satellite, TDRS-K, successfully lifted off

5
00:00:34,720 --> 00:00:37,800
Wednesday from the Cape Canaveral Air Force
Station in Florida.

6
00:00:37,800 --> 00:00:40,190
Roll program has begun rates look good.

7
00:00:40,190 --> 00:00:45,480
From its geosynchronous orbit, TDRS-K will
have a wide enough view of our planet to pick

8
00:00:45,480 --> 00:00:51,000
up and relay signals from NASA's fleet of
Earth-orbiting spacecraft, including the International

9
00:00:51,000 --> 00:00:53,230
Space Station and the Hubble Space Telescope.

10
00:00:53,230 --> 00:00:54,410
Booster has throttled back right on schedule.

11
00:00:54,410 --> 00:00:59,110
TDRS-K is the first of a new generation of
comm satellites meant to meet the increased

12
00:00:59,110 --> 00:01:04,030
demands of NASA's growing fleet of research satellites.

13
00:01:04,030 --> 00:01:11,180
TDRS-K is the 11th satellite in the TDRS series launched by NASA since it began building the

14
00:01:11,180 --> 00:01:14,159
space-borne network in 1983.

15
00:01:14,159 --> 00:01:22,110
Two additional TDRS spacecraft will follow in 2014 and 2015.

16
00:01:22,110 --> 00:01:26,740
The Robotic Refueling Mission wrapped up four of its six-days of testing of robotic technology

17
00:01:26,740 --> 00:01:29,640
on the International Space Station.

18
00:01:29,640 --> 00:01:34,440
Engineers at Goddard Space Flight Center and operators at the Johnson Space Center successfully

19
00:01:34,440 --> 00:01:40,610
maneuvered Dextre, the stations robotic arm, to its target – a fuel valve on a specially-designed

20
00:01:40,610 --> 00:01:42,770
practice box.

21
00:01:42,770 --> 00:01:47,810
NASA-developed tools precisely cut three separate wires, and removed and safely stowed

22
00:01:47,810 --> 00:01:54,390

two unique caps in preparation for the main event – the transfer of simulated fuel.

23

00:01:54,390 --> 00:01:58,950

This would be a first-of-its-kind robotic fluid transfer on orbit.

24

00:01:58,950 --> 00:02:04,500

With RRM, NASA is proving technology that will help us understand how we can one day

25

00:02:04,500 --> 00:02:11,760

use robots to refuel satellites in space – especially those that were never designed to be serviced.

26

00:02:11,760 --> 00:02:19,920

Additional tests of this technology will continue throughout the year.

27

00:02:19,920 --> 00:02:25,370

NASA engineers working on the nation's new Space Launch System have resurrected the world's

28

00:02:25,370 --> 00:02:32,370

most powerful rocket engine ever flown -- the mighty F-1 - and test fired its gas generator

29

00:02:32,370 --> 00:02:35,459

on the Marshall Space Flight Center's Test Stand.

30

00:02:35,459 --> 00:02:40,160

What they learn will help engineers develop NASA's new heavy-lift rocket due to launch

31

00:02:40,160 --> 00:02:42,950

Orion and its astronauts into space.

32

00:02:42,950 --> 00:02:48,270

If we understand how the gas generator works

that was designed in the 50s and the 60s;

33

00:02:48,270 --> 00:02:50,040

how did it operate?

34

00:02:50,040 --> 00:02:54,099

What are the characteristics of that engine?

35

00:02:54,099 --> 00:02:58,849

Then we have reduced the risks of understanding
how can we then bring it into an advanced

36

00:02:58,849 --> 00:03:00,040

booster engine.

37

00:03:00,040 --> 00:03:05,510

The F-1 powered the Saturn V rocket that sent
Apollo astronauts to the moon.

38

00:03:05,510 --> 00:03:14,160

This 20-second test is one in a series pushing
the F-1 gas generator to limits beyond Apollo-era

39

00:03:14,160 --> 00:03:16,550

tests.

40

00:03:16,550 --> 00:03:22,250

President Obama proposal for a new National
Network for Manufacturing Innovation brought

41

00:03:22,250 --> 00:03:29,430

some 350 representatives from industry, academia,
and economic development agencies to a NASA

42

00:03:29,430 --> 00:03:32,350

co-sponsored workshop in Huntsville.

43

00:03:32,350 --> 00:03:36,960

The "Blueprint for Action public workshop

was a forum at which the network's proposed

44

00:03:36,960 --> 00:03:40,190

design could be reviewed and refined.

45

00:03:40,190 --> 00:03:44,390

The Marshall Space Flight Center will be home to one of the network's regional components,

46

00:03:44,390 --> 00:03:48,030

the Institutes for Manufacturing Innovation.

47

00:03:48,030 --> 00:03:52,580

Manufacturing innovation and advanced manufacturing technology is critical to NASA.

48

00:03:52,580 --> 00:03:54,310

It's critical to all of our missions.

49

00:03:54,310 --> 00:03:56,330

It's critical to our science missions.

50

00:03:56,330 --> 00:04:02,440

It's critical to our human spaceflight missions, aeronautics missions and our Space Technology

51

00:04:02,440 --> 00:04:06,680

Mission Directorate -- technology that we produce.

52

00:04:06,680 --> 00:04:11,360

Marshall center director Patrick Scheuermann served as NASA's representative to the workshop's

53

00:04:11,360 --> 00:04:13,120

Interagency Working Group.

54

00:04:13,120 --> 00:04:19,000

NASA's Space Technology Mission Directorate

leads the agency's participation in the nationwide

55

00:04:19,000 --> 00:04:23,960

Advanced Manufacturing network.

56

00:04:23,960 --> 00:04:30,530

A NASA sub-orbital telescope has given scientists the first clear evidence of energy transfer

57

00:04:30,530 --> 00:04:35,840

from the sun's magnetic field to the solar atmosphere or corona.

58

00:04:35,840 --> 00:04:42,380

This process, called solar braiding, has been theorized yet unobserved by researchers until

59

00:04:42,380 --> 00:04:48,110

the High Resolution Coronal Imager, Hi-C, obtained highest resolution images from a

60

00:04:48,110 --> 00:04:53,880

large active region in the sun's corona.

61

00:04:53,880 --> 00:05:00,380

Launched from the White Sands Missile Range in New Mexico last July, the 464-pound, 10-foot-long

62

00:05:00,380 --> 00:05:06,040

Hi-C telescope took 165 images during its roughly 10-minute flight.

63

00:05:06,040 --> 00:05:11,220

Initial image sequences were seen to demonstrate the evolution of the magnetic field and its

64

00:05:11,220 --> 00:05:16,470

repeated release of energy through activity seen on the sun at temperatures ranging from

65

00:05:16,470 --> 00:05:21,960

two million to four million degrees.

66

00:05:21,960 --> 00:05:26,890

While the Mars rover, Curiosity, may be grabbing its share of headlines these days, another

67

00:05:26,890 --> 00:05:32,550

Red Planet rover is quietly embarking on its tenth year of exploration.

68

00:05:32,550 --> 00:05:38,080

Opportunity is smaller and doesn't carry the same high-tech tools as Curiosity, but since

69

00:05:38,080 --> 00:05:45,130

landing on Mars on January 25, 2004, its made many notable discoveries -- including the

70

00:05:45,130 --> 00:05:49,009

Red Planets warmer and wetter past.

71

00:05:49,009 --> 00:05:54,240

Opportunity and its twin, Spirit, were only supposed to explore for three months, but

72

00:05:54,240 --> 00:05:57,150

both outlasted their original mission.

73

00:05:57,150 --> 00:06:02,330

Spirit lost communication with Earth in 2010 shortly after getting stuck in Martian sand.

74

00:06:02,330 --> 00:06:11,039

But Opportunity remains healthy and is studying interesting rocks in a massive crater.

75

00:06:11,039 --> 00:06:17,050

Another NASA spacecraft, this one orbiting

Mars, is providing new evidence of a wet underground

76

00:06:17,050 --> 00:06:23,979

environment that adds to an increasingly complex picture of the planet's early evolution.

77

00:06:23,979 --> 00:06:29,389

Researchers analyzing spectrometer data captured by the Mars Reconnaissance Orbiter (MRO) of

78

00:06:29,389 --> 00:06:34,669

the floor of McLaughlin Crater think the 1-point-4 mile deep crater once allowed underground

79

00:06:34,669 --> 00:06:40,030

water, which otherwise would have stayed hidden, to flow into the crater's interior.

80

00:06:40,030 --> 00:06:45,320

Layered, flat rocks found at the bottom of the crater contain carbonate and clay minerals

81

00:06:45,320 --> 00:06:47,699

that form in the presence of water.

82

00:06:47,699 --> 00:06:52,930

McLaughlin also lacks large inflow channels, and small channels originating within the

83

00:06:52,930 --> 00:06:58,289

crater wall end near a level that could have marked the surface of a lake.

84

00:06:58,289 --> 00:07:04,389

Launched in 2005, MRO and its six instruments have provided more high-resolution data about

85

00:07:04,389 --> 00:07:11,120

the Red Planet than all other Mars orbiters combined.

86
00:07:11,120 --> 00:07:15,010
NASA scientists routinely use lasers to track
the position of the Lunar Reconnaissance Orbiter's

87
00:07:15,010 --> 00:07:17,530
laser altimeter as it orbits the moon.

88
00:07:17,530 --> 00:07:20,949
Recently, however, they also tried something
a little...different.

89
00:07:20,949 --> 00:07:24,110
In addition to tracking the instrument, they
used the laser to send a picture of the famous

90
00:07:24,110 --> 00:07:28,860
Mona Lisa in the first demonstration of laser
communication with a satellite at the moon.

91
00:07:28,860 --> 00:07:33,270
To do this, the LRO team used the existing
laser tracking signal--sent by the Next Generation

92
00:07:33,270 --> 00:07:37,090
Satellite Laser Ranging Station at NASA's
Goddard Space Flight Center.

93
00:07:37,090 --> 00:07:40,840
The image was divided into pixels, which were
then sent to the spacecraft one at a time

94
00:07:40,840 --> 00:07:43,389
by re-timing the regular tracking pulses.

95
00:07:43,389 --> 00:07:47,289
By delaying the tracking pulses by specific
amounts, LRO scientists could use the difference

96

00:07:47,289 --> 00:07:50,789

between the expected arrival time and the actual arrival time to indicate the brightness

97

00:07:50,789 --> 00:07:52,720

of an individual pixel.

98

00:07:52,720 --> 00:07:56,190

Once the image was sent, scientists corrected for transmission errors caused by the Earth's

99

00:07:56,190 --> 00:07:59,699

atmosphere using common techniques used in CDs and DVDs.

100

00:07:59,699 --> 00:08:02,919

They also studied signal fluctuations due to Earth's atmosphere.

101

00:08:02,919 --> 00:08:07,900

The final image was verified when it was returned to Earth using LRO's radio telemetry system.

102

00:08:07,900 --> 00:08:11,940

This test--and the data obtained from it--sets the stage for future high data-rate laser

103

00:08:11,940 --> 00:08:16,020

communication demonstrations that will be a central feature of NASA's next moon mission,

104

00:08:16,020 --> 00:08:18,460

the Lunar Atmosphere and Dust Environment Explorer.

105

00:08:18,460 --> 00:08:22,449

So, while lasers are currently being used to track NASA satellites, in the future they

106

00:08:22,449 --> 00:08:26,289

may also be used to communicate with them,
sending not only data, but perhaps images

107

00:08:26,289 --> 00:08:30,590

that one day will be as famous as... the Mona
Lisa.

108

00:08:30,590 --> 00:08:37,099

I do want to welcome all of you here for what
I hope will be an inspiring program

109

00:08:37,099 --> 00:08:42,300

NASA Administrator Charles Bolden kicked off
a special commemoration at Headquarters of

110

00:08:42,300 --> 00:08:49,550

the life and vision of Dr. Martin Luther King,
Jr.

111

00:08:49,550 --> 00:08:59,990

The MLK Day of Remembrance" program featured
musical selections, poetry and speakers celebrating

112

00:08:59,990 --> 00:09:03,879

the continuing impact of Dr. King's work
and philosophy.

113

00:09:03,879 --> 00:09:11,420

People all over the country, including Dr.
King were very important in the Civil Rights

114

00:09:11,420 --> 00:09:12,420

Movement.

115

00:09:12,420 --> 00:09:18,420

The NASA Headquarters Chapter of Blacks in
Government, BIG, sponsored the event.

116

00:09:18,420 --> 00:09:22,990

Liftoff, we have liftoff of Apollo 14

117

00:09:22,990 --> 00:09:30,739

Forty-two years ago, on January 31, 1971,
the Apollo 14 mission began with the launch

118

00:09:30,739 --> 00:09:34,660

of a Saturn V rocket from the Kennedy Space
Center.

119

00:09:34,660 --> 00:09:39,749

Astronauts Alan Shepard, Stuart Roosa, and
Edgar Mitchell manned NASA's third mission

120

00:09:39,749 --> 00:09:47,529

to land on the moon.

121

00:09:47,529 --> 00:09:53,230

Shepard and Mitchell conducted two lunar EVAs
and collected more material and scientific

122

00:09:53,230 --> 00:09:57,179

data than Apollo 11 and 12 combined.

123

00:09:57,179 --> 00:10:03,439

And famously, Commander Shepard swung the
first golf club in space, sending two balls

124

00:10:03,439 --> 00:10:05,389

across the lunar frontier.

125

00:10:05,389 --> 00:10:07,910

Miles, miles and miles.

126

00:10:07,910 --> 00:10:16,799

Apollo 14 touched down safely in the Pacific
Ocean on February 9, 1971.

127

00:10:16,799 --> 00:10:21,559

This commemorative plaque was issued to the

United States and the governments of fourteen

128

00:10:21,559 --> 00:10:26,700

other countries to mark the signing of the
Space Station Intergovernmental Agreement

129

00:10:26,700 --> 00:10:31,680

15 years ago on January 29, 1998.

130

00:10:31,680 --> 00:10:37,249

The IGA is an element of the legal structure
used to regulate the International Space Station

131

00:10:37,249 --> 00:10:43,850

and is an agreement between NASA, The Canadian
Space Agency, The Japan Aerospace Exploration

132

00:10:43,850 --> 00:10:49,399

Agency, The Russian Federal Space Agency and
eleven member states of the European Space

133

00:10:49,399 --> 00:10:52,869

Agency.

134

00:10:52,869 --> 00:11:02,429

Alright, heres your clue: She won more than
\$69,000 this month on the nationally-syndicated

135

00:11:02,429 --> 00:11:04,369

TV game show, Jeopardy!

136

00:11:04,369 --> 00:11:09,730

The answer, posed in the form of a question:
Who is Kristin Morgan?

137

00:11:09,730 --> 00:11:13,679

The engineer-turned-strategic analyst at the
Marshall Space Flight Center leveraged her

138

00:11:13,679 --> 00:11:18,410

strong engineering and science background
-- and several early college semesters as

139

00:11:18,410 --> 00:11:25,279

an art history major – to cash in on the
show shes watched regularly since childhood.

140

00:11:25,279 --> 00:11:30,189

Morgan thanked her colleagues in Marshall's
Office of Strategic Analysis & Communications

141

00:11:30,189 --> 00:11:38,690

who pitched in after-hours to help prepare
her.

142

00:11:38,690 --> 00:11:44,679

Morgan was top money-winner on five Jeopardy!
episodes, qualifying her for the shows next

143

00:11:44,679 --> 00:11:47,519

Tournament of Champions!

144

00:11:47,519 --> 00:11:49,549

And thats This Week @NASA.

145

00:11:49,549 --> 00:11:53,869

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