1
00:00:07,130 --> 00:00:10,060
This Week at NASA…

2
00:00:10,060 --> 00:00:17,000
NASA’s new advanced communications satellite,
TDRS-K, is set to be launched from the Kennedy

3
00:00:17,000 --> 00:00:19,150
Space Center on Wednesday.

4
00:00:19,150 --> 00:00:24,450
From its geosynchronous orbit, TDRS-K will
have a wide enough view of our planet to pick

5
00:00:24,450 --> 00:00:29,950
up and relay signals from NASA's fleet of
Earth-orbiting spacecraft, including the International

6
00:00:29,950 --> 00:00:33,360
Space Station and the Hubble Space Telescope.

7
00:00:33,360 --> 00:00:38,070
TDRS-K is the first of a new generation of
comm satellites meant to meet the increased

8
00:00:38,070 --> 00:00:41,720
demands of NASA's growing fleet of research
satellites.

9
00:00:41,720 --> 00:00:47,590
TDRS-K will be the 11th satellite in the TDRS
series launched by NASA since it began building

10
00:00:47,590 --> 00:00:58,630
the space-borne network in 1983. Two additional
TDRS spacecraft will follow in 2014 and 2015.

11
00:00:58,630 --> 00:01:03,260
The Robotic Refueling Mission wrapped up four

of its six-day testing of robotic technology

12
00:01:03,260 --> 00:01:06,150
on the International Space Station.
\h

13
00:01:06,150 --> 00:01:10,960
Engineers at Goddard Space Flight Center and
operators at the Johnson Space Center successfully

14
00:01:10,960 --> 00:01:17,130
maneuvered Dextre, the ISS's robotic arm,\hto
its target – a fuel valve\hon a specially-designed

15
00:01:17,130 --> 00:01:23,420
practice box. \hNASA-developed tools precisely
cut three separate wires, and removed and

16
00:01:23,420 --> 00:01:29,880
safely stowed two unique caps in preparation\hfor
the main event – the transfer of simulated

17
00:01:29,880 --> 00:01:35,489
fuel. \hThis would be a first-of-its-kind
robotic fluid transfer on orbit.

18
00:01:35,489 --> 00:01:38,890
\h
With RRM, NASA is proving technology that

19
00:01:38,890 --> 00:01:44,659
will help us understand how we can one day
use robots to refuel satellites in space – especially

20
00:01:44,659 --> 00:01:50,139
those that were never designed to be serviced.
Additional tests of this technology will continue

21
00:01:50,139 --> 00:01:56,450
throughout the year.

22
00:01:56,450 --> 00:02:01,899
NASA engineers working on the nation’s new
Space Launch System have resurrected the world's

23
00:02:01,899 --> 00:02:08,899
most powerful rocket engine ever flown -- the
mighty F-1 - and test fired its gas generator

24
00:02:08,899 --> 00:02:11,990
on the Marshall Space Flight Center’s Test
Stand.

25
00:02:11,990 --> 00:02:16,690
What they learn will help engineers develop
NASA’s new heavy-lift rocket due to launch

26
00:02:16,690 --> 00:02:19,480
Orion and its astronauts into space.

27
00:02:19,480 --> 00:02:23,920
“If we understand how the gas generator
works that was designed in the fifties and

28
00:02:23,920 --> 00:02:30,970
sixties, how did it operate, what are the
characteristics of that engine, then we have

29
00:02:30,970 --> 00:02:36,030
reduced the risks of understanding how can
we then bring it into an advanced booster

30
00:02:36,030 --> 00:02:37,030
engine.”

31
00:02:37,030 --> 00:02:43,130
The F-1 powered the Saturn V rocket that sent
Apollo astronauts to the moon. This 20-second

32

00:02:43,130 --> 00:02:53,070
test.is one in a series pushing the F-1 gas
generator to limits beyond Apollo-era tests.

33
00:02:53,070 --> 00:02:58,770
President Obama’s proposal for a new National
Network for Manufacturing Innovation brought

34
00:02:58,770 --> 00:03:05,960
some 350 representatives from industry, academia,
and economic development agencies to a NASA

35
00:03:05,960 --> 00:03:08,870
co-sponsored workshop in Huntsville.

36
00:03:08,870 --> 00:03:13,480
The “Blueprint for Action” public workshop
was a forum at which the network’s proposed

37
00:03:13,480 --> 00:03:18,520
design could be reviewed and refined. The
Marshall Space Flight Center will be home

38
00:03:18,520 --> 00:03:23,140
to one of the network’s regional components,
the Institutes for Manufacturing Innovation.

39
00:03:23,140 --> 00:03:25,850
John Vickers, Marshall’s Materials & Processes
Laboratory: “Manufacturing innovation and

40
00:03:25,850 --> 00:03:30,820
advanced manufacturing technology are critical
to NASA. It's critical to all of our missions.

41
00:03:30,820 --> 00:03:35,690
It's critical to our science missions. It's
critical to our human spaceflight missions,

42
00:03:35,690 --> 00:03:41,960

aeronautics missions and our Space Technology Mission Directorate -- technology that we

43
00:03:41,960 --> 00:03:42,960
produce.”)

44
00:03:42,960 --> 00:03:47,880
Marshall center director Patrick Scheuermann served as NASA’s representative to the workshop’s

45
00:03:47,880 --> 00:03:53,370
Interagency Working Group. NASA’s Space Technology Mission Directorate leads the agency’s

46
00:03:53,370 --> 00:04:00,480
participation in the nationwide Advanced Manufacturing network.

47
00:04:00,480 --> 00:04:07,060
A NASA sub-orbital telescope has given scientists the first clear evidence of energy transfer

48
00:04:07,060 --> 00:04:13,460
from the sun’s magnetic field to the solar atmosphere or corona. This process, called

49
00:04:13,460 --> 00:04:19,970
“solar braiding,” has been theorized yet unobserved by researchers until the High Resolution

50
00:04:19,970 --> 00:04:26,870
Coronal Imager, Hi-C, obtained highest resolution images from a large active region in the sun's

51
00:04:26,870 --> 00:04:31,850
corona.
Launched from the White Sands Missile Range

52
00:04:31,850 --> 00:04:40,690
in New Mexico last July, the 464-pound, 10-foot-long

Hi-C telescope took 165 images during its

53
00:04:40,690 --> 00:04:45,820
roughly 10-minute flight. Initial image sequences
were seen to demonstrate the evolution of

54
00:04:45,820 --> 00:04:51,630
the magnetic field and its repeated release
of energy through activity seen on the sun

55
00:04:51,630 --> 00:04:58,480
at temperatures ranging from two million to
four million degrees.

56
00:04:58,480 --> 00:05:03,411
While the Mars rover, Curiosity, may be grabbing
its share of headlines these days, another

57
00:05:03,411 --> 00:05:09,070
Red Planet rover is quietly embarking on its
tenth year of exploration.

58
00:05:09,070 --> 00:05:14,600
Opportunity is smaller and doesn't carry the
same high-tech tools as Curiosity, but since

59
00:05:14,600 --> 00:05:21,560
landing on Mars on January 25, 2004, it’s
made many notable discoveries -- including

60
00:05:21,560 --> 00:05:25,530
the Red Planet’s warmer and wetter past.

61
00:05:25,530 --> 00:05:30,760
Opportunity and its twin, Spirit, were only
supposed to explore for three months, but

62
00:05:30,760 --> 00:05:36,760
both outlasted their original mission. Spirit
lost communication with Earth in 2010 shortly

63
00:05:36,760 --> 00:05:42,650
after getting stuck in Martian sand. But Opportunity
remains healthy and is studying interesting

64
00:05:42,650 --> 00:05:47,560
rocks in a massive crater.

65
00:05:47,560 --> 00:05:53,560
Another NASA spacecraft, this one orbiting
Mars, is providing new evidence of a wet underground

66
00:05:53,560 --> 00:06:00,490
environment that adds to an increasingly complex
picture of the planet's early evolution.

67
00:06:00,490 --> 00:06:05,930
Researchers analyzing spectrometer data captured
by the Mars Reconnaissance Orbiter (MRO) of

68
00:06:05,930 --> 00:06:11,199
the floor of McLaughlin Crater think the 1-point-4
mile deep crater once allowed underground

69
00:06:11,199 --> 00:06:16,550
water, which otherwise would have stayed hidden,
to flow into the crater's interior.

70
00:06:16,550 --> 00:06:21,840
Layered, flat rocks found at the bottom of
the crater contain carbonate and clay minerals

71
00:06:21,840 --> 00:06:28,080
that form in the presence of water. McLaughlin
also lacks large inflow channels, and small

72
00:06:28,080 --> 00:06:32,490
channels originating within the crater wall
end near a level that could have marked the

73
00:06:32,490 --> 00:06:34,810
surface of a lake.

74
00:06:34,810 --> 00:06:40,919
Launched in 2005, MRO and its six instruments
have provided more high-resolution data about

75
00:06:40,919 --> 00:06:47,639
the Red Planet than all other Mars orbiters
combined.

76
00:06:47,639 --> 00:06:51,520
NASA scientists routinely use lasers to track
the position of the Lunar Reconnaissance Orbiter's

77
00:06:51,520 --> 00:06:57,479
laser altimeter as it orbits the moon. Recently,
however, they also tried something a little...different.

78
00:06:57,479 --> 00:07:00,620
In addition to tracking the instrument, they
used the laser to send a picture of the famous

79
00:07:00,620 --> 00:07:05,370
Mona Lisa in the first demonstration of laser
communication with a satellite at the moon.

80
00:07:05,370 --> 00:07:09,790
To do this, the LRO team used the existing
laser tracking signal--sent by the Next Generation

81
00:07:09,790 --> 00:07:13,610
Satellite Laser Ranging Station at NASA's
Goddard Space Flight Center.

82
00:07:13,610 --> 00:07:17,360
The image was divided into pixels, which were
then sent to the spacecraft one at a time

83

00:07:17,360 --> 00:07:21,710
by re-timing the regular tracking pulses.
By delaying the tracking pulses by specific

84
00:07:21,710 --> 00:07:25,610
amounts, LRO scientists could use the difference
between the expected arrival time and the

85
00:07:25,610 --> 00:07:30,000
actual arrival time to indicate the brightness
of an individual pixel. Once the image was

86
00:07:30,000 --> 00:07:33,470
sent, scientists corrected for transmission
errors caused by the Earth's atmosphere using

87
00:07:33,470 --> 00:07:38,320
common techniques used in CDs and DVDs. They
also studied signal fluctuations due to Earth's

88
00:07:38,320 --> 00:07:42,699
atmosphere. The final image was verified when
it was returned to Earth using LRO's radio

89
00:07:42,699 --> 00:07:44,430
telemetry system.

90
00:07:44,430 --> 00:07:48,460
This test--and the data obtained from it--sets
the stage for future high data-rate laser

91
00:07:48,460 --> 00:07:52,540
communication demonstrations that will be
a central feature of NASA's next moon mission,

92
00:07:52,540 --> 00:07:54,980
the Lunar Atmosphere and Dust Environment
Explorer.

93
00:07:54,980 --> 00:07:58,979

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

94
00:07:58,979 --> 00:08:02,810
may also be used to communicate with them,
sending not only data, but perhaps images

95
00:08:02,810 --> 00:08:07,100
that one day will be as famous as... the Mona
Lisa.

96
00:08:07,100 --> 00:08:13,730
“I do want to welcome all of you here for
what I do hope will be a very inspiring program.”

97
00:08:13,730 --> 00:08:20,259
NASA Administrator Charles Bolden kicked off
a special commemoration of the life and vision

98
00:08:20,259 --> 00:08:21,710
of Dr. Martin Luther King, Jr. at Headquarters.

99
00:08:21,710 --> 00:08:36,519
The MLK “Day of Remembrance” program featured
musical selections, poetry and speakers celebrating

100
00:08:36,519 --> 00:08:40,510
the continuing impact of Dr. King’s work
and philosophy.

101
00:08:40,510 --> 00:08:48,890
“Tell them about the dream Dr. King, tell
them about the dream!!

102
00:08:48,890 --> 00:08:59,500
The NASA Headquarters Chapter of Blacks in
Government, BIG, sponsored the event.

103
00:08:59,500 --> 00:09:07,250
Forty-two years ago, on January 31, 1971,

the Apollo 14 mission began with the launch

104
00:09:07,250 --> 00:09:13,700
of a Saturn V rocket from the Kennedy Space
Center. Astronauts Alan Shepard, Stuart Roosa,

105
00:09:13,700 --> 00:09:17,779
and Edgar Mitchell manned NASA's third mission
to land on the moon.

106
00:09:17,779 --> 00:09:24,050
"It looks you are about on the bottom step
and on the surface, not bad for an old man."

107
00:09:24,050 --> 00:09:29,660
Shepard and Mitchell conducted two lunar EVAs
and collected more material and scientific

108
00:09:29,660 --> 00:09:37,550
data than Apollo 11 and 12 combined. And famously,
Commander Shepard swung the first golf club

109
00:09:37,550 --> 00:09:41,910
in space, sending two balls across the lunar
frontier.

110
00:09:41,910 --> 00:09:44,420
"Miles, miles and miles."

111
00:09:44,420 --> 00:09:53,300
Apollo 14 touched down safely in the Pacific
Ocean on February 9, 1971.

112
00:09:53,300 --> 00:09:58,070
This commemorative plaque was issued to the
United States and the governments of fourteen

113
00:09:58,070 --> 00:10:03,210
other countries to mark the signing of the
Space Station Intergovernmental Agreement

114
00:10:03,210 --> 00:10:11,310
15 years ago on January 29, 1998. The IGA
is an element of the legal structure used

115
00:10:11,310 --> 00:10:16,660
to regulate the International Space Station
and is an agreement between NASA, The Canadian

116
00:10:16,660 --> 00:10:23,360
Space Agency, The Japan Aerospace Exploration
Agency, The Russian Federal Space Agency and

117
00:10:23,360 --> 00:10:28,310
eleven member states of the European Space
Agency.

118
00:10:28,310 --> 00:10:38,950
Alright, here's your clue: She won more
than $69,000 this month on the nationally-syndicated

119
00:10:38,950 --> 00:10:45,230
TV game show, Jeopardy! The answer, posed
in the form of a question: Who is Kristin

120
00:10:45,230 --> 00:10:50,090
Morgan? The engineer-turned-strategic analyst
at the Marshall Space Flight Center leveraged

121
00:10:50,090 --> 00:10:54,940
her strong engineering and science background
-- and several early college semesters as

122
00:10:54,940 --> 00:11:00,010
an art history major – to cash in on the
show she's watched regularly since childhood.

123
00:11:00,010 --> 00:11:01,800
"Who is Richard the Third?"

124
00:11:01,800 --> 00:11:06,709
Morgan thanked her colleagues in Marshall's
Office of Strategic Analysis & Communications

125
00:11:06,709 --> 00:11:09,810
who pitched in after-hours to help prepare
her.

126
00:11:09,810 --> 00:11:14,820
“She has a very impressive five day total
of Sixty-Nine thousand, ninety-eight dollars!”

127
00:11:14,820 --> 00:11:15,820
$69,089.

128
00:11:15,820 --> 00:11:20,890
Morgan was top money-winner on five Jeopardy!
episodes, qualifying her for the show’s

129
00:11:20,890 --> 00:11:24,040
next Tournament of Champions!

130
00:11:24,040 --> 00:11:26,070
And that’s This Week @NASA.

131
00:11:26,070 --> 00:11:30,390
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