1
00:00:17,890 --> 00:00:15,430
as 2013 wound to a close

2
00:00:20,109 --> 00:00:17,900
NASA's exploration systems development

3
00:00:22,839 --> 00:00:20,119
division powered through an array of

4
00:00:25,179 --> 00:00:22,849
tests and milestones vehicle

5
00:00:28,359 --> 00:00:25,189
manufacturing facility construction and

6
00:00:31,350 --> 00:00:28,369
systems testing for NASA's all-new Space

7
00:00:34,540 --> 00:00:31,360
Launch System are progressing rapidly

8
00:00:36,430 --> 00:00:34,550
meanwhile Orion and the ground systems

9
00:00:38,680 --> 00:00:36,440
development and operations programs

10
00:00:46,329 --> 00:00:38,690
prepare for the upcoming launch of

11
00:00:49,180 --> 00:00:46,339
exploration flight test-1 the Orion

12
00:00:51,459 --> 00:00:49,190
stage adaptor diaphragm is a lightweight

13
00:00:53,770 --> 00:00:51,469

composite structure that protects the

14
00:00:56,979 --> 00:00:53,780
Orion crew capsule from hazardous gases

15
00:00:59,169 --> 00:00:56,989
produced by the upper stage engines the

16
00:01:01,899 --> 00:00:59,179
diaphragm was recently pressure tested

17
00:01:04,660 --> 00:01:01,909
by joining it to the adaptor and sealing

18
00:01:07,030 --> 00:01:04,670
with a vacuum this pressure test

19
00:01:09,040 --> 00:01:07,040
simulated atmospheric conditions the

20
00:01:12,040 --> 00:01:09,050
hardware may experience during flight

21
00:01:15,100 --> 00:01:12,050
and is another essential milestone to

22
00:01:17,410 --> 00:01:15,110
ensure crew safety the Space Launch

23
00:01:19,630 --> 00:01:17,420
systems adaptive augmenting control

24
00:01:22,660 --> 00:01:19,640
system was tested at the Armstrong

25
00:01:25,359 --> 00:01:22,670
Flight Research Center in November to

26
00:01:27,999 --> 00:01:25,369
test the system SLS is automated

27
00:01:30,819 --> 00:01:28,009
avionics computer was installed on one

28
00:01:33,999 --> 00:01:30,829
of NASA's versatile fa-18 jets for

29
00:01:36,490 --> 00:01:34,009
analysis and validation the adaptive

30
00:01:39,010 --> 00:01:36,500
augmenting controller is an autonomous

31
00:01:41,520 --> 00:01:39,020
course correction program designed to

32
00:01:44,859 --> 00:01:41,530
instantly detect and adjust to

33
00:01:47,410 --> 00:01:44,869
unpredicted changes in flight by

34
00:01:50,440 --> 00:01:47,420
exercising the system in an f-18

35
00:01:53,319 --> 00:01:50,450
research jet engineers were able to run

36
00:01:56,410 --> 00:01:53,329
dozens of scenarios on each 90-minute

37
00:01:58,870 --> 00:01:56,420
flight successful deployment of this

38
00:02:01,420 --> 00:01:58,880

innovative control system will increase

39
00:02:03,789 --> 00:02:01,430
performance and robustness of the rocket

40
00:02:06,140 --> 00:02:03,799
as it is steered along the path to deep

41
00:02:11,220 --> 00:02:09,120
atma shoe assembly facility the first

42
00:02:14,220 --> 00:02:11,230
propellant tank dome was completed on

43
00:02:16,800 --> 00:02:14,230
the circumferential dome weld tool the

44
00:02:19,830 --> 00:02:16,810
massive propellant tanks used on the SLS

45
00:02:22,530 --> 00:02:19,840
core stage are unlike any that have ever

46
00:02:25,890 --> 00:02:22,540
been made before and require new tools

47
00:02:28,320 --> 00:02:25,900
and processes for construction the

48
00:02:29,910 --> 00:02:28,330
nearby vertical assembly center will

49
00:02:32,460 --> 00:02:29,920
house one of the world's largest

50
00:02:34,470 --> 00:02:32,470
friction-stir weld errs which will be

51
00:02:40,260 --> 00:02:34,480
used to assemble the liquid hydrogen and

52
00:02:42,660 --> 00:02:40,270
oxygen tanks last November 90 toward 900

53
00:02:44,280 --> 00:02:42,670
cubic yards of concrete foundation in

54
00:02:46,380 --> 00:02:44,290
preparation for the new vertical

55
00:02:49,440 --> 00:02:46,390
assembly centers tower structure and

56
00:02:52,320 --> 00:02:49,450
welding elements this amount of concrete

57
00:02:55,080 --> 00:02:52,330
is similar to a foundation for a major

58
00:03:03,340 --> 00:02:55,090
modern hotel and will accommodate one of

59
00:03:09,140 --> 00:03:06,140
with the launch of exploration flight

60
00:03:11,240 --> 00:03:09,150
test-1 less than a year away the Orion

61
00:03:14,000 --> 00:03:11,250
program is conducting more frequent

62
00:03:16,280 --> 00:03:14,010
critical testing in October at the

63
00:03:18,410 --> 00:03:16,290

Kennedy Space Center in Florida the

64
00:03:20,630 --> 00:03:18,420
avionics system was installed in the

65
00:03:23,480 --> 00:03:20,640
crew module and powered up for the first

66
00:03:26,000 --> 00:03:23,490
time the spacecraft came to life and

67
00:03:30,590 --> 00:03:26,010
performed as expected in a series of

68
00:03:32,200 --> 00:03:30,600
system tests in December NASA's super

69
00:03:34,820 --> 00:03:32,210
guppy arrived from New Hampshire

70
00:03:38,060 --> 00:03:34,830
carrying Orion's most critical safety

71
00:03:40,520 --> 00:03:38,070
component the ablative heat shield the

72
00:03:43,130 --> 00:03:40,530
world's largest and most complex heat

73
00:03:44,570 --> 00:03:43,140
shield will protect future crews as the

74
00:03:47,300 --> 00:03:44,580
capsule plummets through the Earth's

75
00:03:49,400 --> 00:03:47,310
atmosphere traveling more than 20,000

76
00:03:52,280 --> 00:03:49,410
miles per hour the heat shield will

77
00:03:54,490 --> 00:03:52,290
experience temperatures nearing 4,000

78
00:03:57,230 --> 00:03:54,500
degrees Fahrenheit

79
00:03:59,600 --> 00:03:57,240
Orion's service module was lifted for a

80
00:04:02,050 --> 00:03:59,610
test fit to the spacecraft adapter it

81
00:04:04,850 --> 00:04:02,060
will use on exploration flight test-1

82
00:04:07,160 --> 00:04:04,860
with the help of an air bearing pallet

83
00:04:11,240 --> 00:04:07,170
the adapter was positioned beneath the

84
00:04:13,280 --> 00:04:11,250
service module for alignment a modified

85
00:04:15,770 --> 00:04:13,290
version of Orion's launch abort system

86
00:04:18,950 --> 00:04:15,780
was completed for the spacecraft's first

87
00:04:22,370 --> 00:04:18,960
mission the launch abort system consists

88
00:04:25,370 --> 00:04:22,380

of three motors the main abort motor the

89
00:04:28,610 --> 00:04:25,380
attitude control motor and the jettison

90
00:04:31,850 --> 00:04:28,620
motor because exploration flight test-1

91
00:04:33,920 --> 00:04:31,860
is an uncrewed launch only the jettison

92
00:04:35,840 --> 00:04:33,930
motor of the abort system will be used

93
00:04:38,840 --> 00:04:35,850
to separate the structure from the crew

94
00:04:39,620 --> 00:04:38,850
module across the country in Sunnyvale

95
00:04:41,960 --> 00:04:39,630
California

96
00:04:44,420 --> 00:04:41,970
Lockheed Martin conducted secondary

97
00:04:47,510 --> 00:04:44,430
testing of the fairing panel separation

98
00:04:50,480 --> 00:04:47,520
from Orion's service module these

99
00:04:52,490 --> 00:04:50,490
14-foot tall protective panels will be

100
00:04:55,100 --> 00:04:52,500
jettisoned after the craft reaches an

101
00:04:58,250 --> 00:04:55,110
altitude of five hundred sixty thousand

102
00:05:00,710 --> 00:04:58,260
feet each panel has six breakable joints

103
00:05:03,380 --> 00:05:00,720
that fire apart followed by six

104
00:05:05,510 --> 00:05:03,390
explosive separation bolts sending them

105
00:05:07,120 --> 00:05:05,520
safely away from the capsule and service

106
00:05:09,800 --> 00:05:07,130
module

107
00:05:12,050 --> 00:05:09,810
Lockheed Martin also successfully

108
00:05:15,590 --> 00:05:12,060
conducted the first of many forward Bay

109
00:05:17,510 --> 00:05:15,600
cover jettison tests after Orion

110
00:05:19,850 --> 00:05:17,520
completes a deep-space mission and

111
00:05:22,210 --> 00:05:19,860
returns to earth it will jettison its

112
00:05:26,300 --> 00:05:22,220
forward Bay cover at an altitude of

113
00:05:29,390 --> 00:05:26,310

23,000 feet the cover protects the crew

114
00:05:31,760 --> 00:05:29,400
during launch flight and reentry but

115
00:05:42,830 --> 00:05:31,770
must be jettisoned to allow Orion's main

116
00:05:45,740 --> 00:05:42,840
parachutes to deploy at KSC's Vehicle

117
00:05:48,350 --> 00:05:45,750
Assembly Building engineers test fit for

118
00:05:51,380 --> 00:05:48,360
a jive panels to the Orion ground test

119
00:05:53,810 --> 00:05:51,390
article these four panels will cover the

120
00:05:56,630 --> 00:05:53,820
Orion capsule during launch and attached

121
00:05:58,970 --> 00:05:56,640
to the launch abort system the ogive

122
00:06:00,890 --> 00:05:58,980
panel confidence fit was one of many

123
00:06:03,440 --> 00:06:00,900
tests designed to simulate the

124
00:06:07,220 --> 00:06:03,450
procedures for manufacture assembly and

125
00:06:09,800 --> 00:06:07,230
stacking although NASA and the US Army

126
00:06:12,710 --> 00:06:09,810
may seem like unlikely collaborators

127
00:06:14,600 --> 00:06:12,720
both agencies face the same challenges

128
00:06:16,940 --> 00:06:14,610
of keeping their men and women's safe

129
00:06:19,910 --> 00:06:16,950
from chemicals and explosive projectiles

130
00:06:22,610 --> 00:06:19,920
this mutual interest led to NASA's

131
00:06:25,310 --> 00:06:22,620
acquisition of four mine-resistant

132
00:06:27,440 --> 00:06:25,320
ambush-protected trucks for use as

133
00:06:31,640 --> 00:06:27,450
emergency escape vehicles from launch

134
00:06:34,310 --> 00:06:31,650
complex 39 the 40,000 pound M wraps came

135
00:06:36,080 --> 00:06:34,320
from Red River Depot in Texas and will

136
00:06:40,820 --> 00:06:36,090
be ready for use after some minor

137
00:06:42,620 --> 00:06:40,830
modifications launch complex 39 is also

138
00:06:46,580 --> 00:06:42,630

getting an upgrade to its mobile

139
00:06:49,100 --> 00:06:46,590
launcher the 405 foot steel Tower is

140
00:06:51,770 --> 00:06:49,110
being reconfigured and strengthened to

141
00:06:55,670 --> 00:06:51,780
accommodate the weight size and thrust

142
00:06:58,940 --> 00:06:55,680
of the SLS vehicle after a successful

143
00:07:01,790 --> 00:06:58,950
year of construction and testing in 2013

144
00:07:02,270 --> 00:07:01,800
NASA's exploration systems development

145
00:07:04,250 --> 00:07:02,280
division

146
00:07:09,559 --> 00:07:04,260
looks forward to its biggest test yet