



1
00:00:27,000 --> 00:00:32,000
This is the Constellation
Year in Review for 2009.

2
00:00:32,000 --> 00:00:37,216
Constellation is America's new space program
which has the flexibility to take crews

3
00:00:37,216 --> 00:00:42,046
to the International Space
Station, return humans to the Moon

4
00:00:42,046 --> 00:00:45,546
and even extend human presence beyond.

5
00:00:45,546 --> 00:00:49,476
NASA centers around the country
are working together to design,

6
00:00:49,476 --> 00:00:55,326
test and manufacture hardware for this
new era in human space exploration.

7
00:00:56,856 --> 00:01:01,206
From the Kennedy Space Center in
Florida, NASA took a huge step forward

8
00:01:01,206 --> 00:01:05,466
in its exploration goals with
the flight of the Ares 1-X.

9
00:01:05,466 --> 00:01:12,886
An unmanned test vehicle, the Ares 1-X was
loaded with 700 sensors to monitor every aspect

10
00:01:12,886 --> 00:01:18,286
of the flight, providing engineers with volumes
of data to be used to improve the design

11

00:01:18,286 --> 00:01:23,456
and safety of the next generation
of human spaceflight vehicles.

12

00:01:23,456 --> 00:01:33,086
At liftoff, the over 300 foot rocket
produced 2.6 million pounds of thrust,

13

00:01:33,086 --> 00:01:35,956
accelerating to near hypersonic speeds.

14

00:01:35,956 --> 00:01:45,226
The flight test included separation of the first
and second stages, monitoring of controllability

15

00:01:45,226 --> 00:01:53,806
and aerodynamics and the re-entry and recovery
of the first stage solid rocket booster.

16

00:01:53,806 --> 00:02:00,000
Ares 1-X not only tested the rocket
design, but also provided an opportunity

17

00:02:00,000 --> 00:02:13,116
to test facilities and ground operations.

18

00:02:13,116 --> 00:02:19,436
The ground rumbled again in Promontory Utah
where another test for Constellation took place.

19

00:02:19,436 --> 00:02:25,676
Development Motor 1, or DM-1 is the first
test of a five-segment solid rocket booster

20

00:02:25,676 --> 00:02:28,356
in the Ares rocket configuration.

21

00:02:28,356 --> 00:02:32,696
Similar in design to the four-segment
shuttle solid rocket motor,

22
00:02:32,696 --> 00:02:36,246
DM-1 features several upgrades
and technology improvements,

23
00:02:36,246 --> 00:02:41,426
as well as the fifth segment needed
to deliver its 3.6 million pounds

24
00:02:41,426 --> 00:02:48,546
of lifting power for the Constellation program.

25
00:02:52,956 --> 00:02:59,566
Other rocket tests, including the firing of the
first stage igniter...and the Ullage Motor Test,

26
00:02:59,566 --> 00:03:02,586
further advance the development
of hardware as it moves

27
00:03:02,586 --> 00:03:06,596
from the drawing board to the test stand.

28
00:03:06,596 --> 00:03:11,526
The Crew Exploration Vehicle for
Constellation is called Orion.

29
00:03:11,526 --> 00:03:15,946
Orion borrows its shape and
aerodynamic performance from Apollo.

30
00:03:15,946 --> 00:03:21,236
However, the new spacecraft is greater in
size than Apollo, featuring updated computers,

31
00:03:21,236 --> 00:03:26,526
life support, electronics, heat
protection and other systems.

32

00:03:26,526 --> 00:03:30,596

This year, Orion completed
it Preliminary Design Review.

33

00:03:30,596 --> 00:03:35,516

This major milestone in the spacecraft's
development approves how all the systems

34

00:03:35,516 --> 00:03:38,666

of Orion will work together when built.

35

00:03:40,456 --> 00:03:45,456

At the NASA Michoud Assembly Facility in New
Orleans, Louisiana, construction continues

36

00:03:45,456 --> 00:03:48,636

on the Orion crew module Ground Test Article.

37

00:03:48,636 --> 00:03:54,546

The full-sized module will be tested in
a variety of ground based simulations,

38

00:03:54,546 --> 00:03:57,976

designed to recreate the
Orion flight environment.

39

00:03:57,976 --> 00:04:02,776

The structure will then undergo mechanical
assembly, integration and testing

40

00:04:02,776 --> 00:04:05,906

in New Orleans and Denver, Colorado.

41

00:04:07,406 --> 00:04:13,086

This year the Constellation Program completed
its first Post-landing Orion Recovery Tests,

42

00:04:13,086 --> 00:04:14,566

or PORT.

43

00:04:14,566 --> 00:04:18,756

Simulating a recovery in the open ocean, PORT not only reveals

44

00:04:18,756 --> 00:04:22,776

to engineers how the spacecraft will behave in these conditions,

45

00:04:22,776 --> 00:04:27,816

but also gives recovery teams their first experience with recovery procedures and gear.

46

00:04:27,816 --> 00:04:35,646

Sitting on top of Orion is the Launch Abort System, designed to pull the crew to safety

47

00:04:35,646 --> 00:04:42,446

in the event of an emergency on the launch pad, or in the early stage of the climb to orbit.

48

00:04:42,446 --> 00:04:48,016

Preparations are in full swing for the first test of the multi-faceted Launch Abort System.

49

00:04:48,016 --> 00:04:53,976

Called Pad Abort 1, the test simulates an abort while still on the launch pad.

50

00:04:53,976 --> 00:04:59,436

Components include an Abort Motor which pulls the Orion spacecraft from danger,

51

00:04:59,436 --> 00:05:04,956

an Attitude Control Motor which provides directional control, and a Jettison Motor

52

00:05:04,956 --> 00:05:09,906

that separates the system from the crew module.

53

00:05:11,466 --> 00:05:13,996
The Pad Abort 1 test will take place

54
00:05:13,996 --> 00:05:17,396
at the White Sands Missile
Range in Las Cruces New Mexico.

55
00:05:17,396 --> 00:05:23,226
A 92-acre launch facility has been developed
to support this and other Orion flight tests.

56
00:05:23,226 --> 00:05:34,256
Parts for the Pad Abort 1 Test rolled in to
White Sands, including the Orion Crew Module.

57
00:05:34,256 --> 00:05:40,336
Outfitted at the Dryden Flight Research Center
in California, the Crew Module contains an array

58
00:05:40,336 --> 00:05:44,126
of sensors to help analyze the flight test.

59
00:05:44,126 --> 00:05:49,966
The crew module joins the Abort Motor, Jettison
Motor and other Launch Abort System components,

60
00:05:49,966 --> 00:05:54,796
which will all be assembled
together for the test.

61
00:06:00,236 --> 00:06:06,166
. Other activity this year included parachute
tests for a rocket deceleration system.

62
00:06:06,166 --> 00:06:10,806
Managed by the Marshall Space Flight Center
in Huntsville, Alabama...and taking place

63
00:06:10,806 --> 00:06:15,086
at the U.S. Army's Yuma Proving

Grounds in Yuma, Arizona,

64

00:06:15,086 --> 00:06:19,736

the tests featured the largest
rocket parachutes ever manufactured.

65

00:06:19,736 --> 00:06:24,026

The three main parachutes measure
one-hundred-fifty feet in diameter

66

00:06:24,026 --> 00:06:27,046

and weigh two-thousand pounds each.

67

00:06:27,046 --> 00:06:31,246

They are designed to slow the descent
of a five segment solid rocket motor

68

00:06:31,246 --> 00:06:35,596

and provide a soft landing in the
ocean, allowing crews to recover

69

00:06:35,596 --> 00:06:37,526

and recycle the stage for a later launch.

70

00:06:37,526 --> 00:06:49,116

Constellation is engaging the
talents of engineers, scientists,

71

00:06:49,116 --> 00:06:55,786

and manufacturers across the country, with
every NASA center involved with its development.

72

00:06:55,786 --> 00:07:01,396

From flight tests, to wind tunnel testing,
to computer modeling, to manufacturing,

73

00:07:01,396 --> 00:07:07,306

Constellation is trailblazing relationships
between NASA centers and commercial industry.

74

00:07:08,816 --> 00:07:14,406

With the first flight test complete, and more on the way, engineers are learning more

75

00:07:14,406 --> 00:07:18,146

about how real hardware behaves in flight conditions.