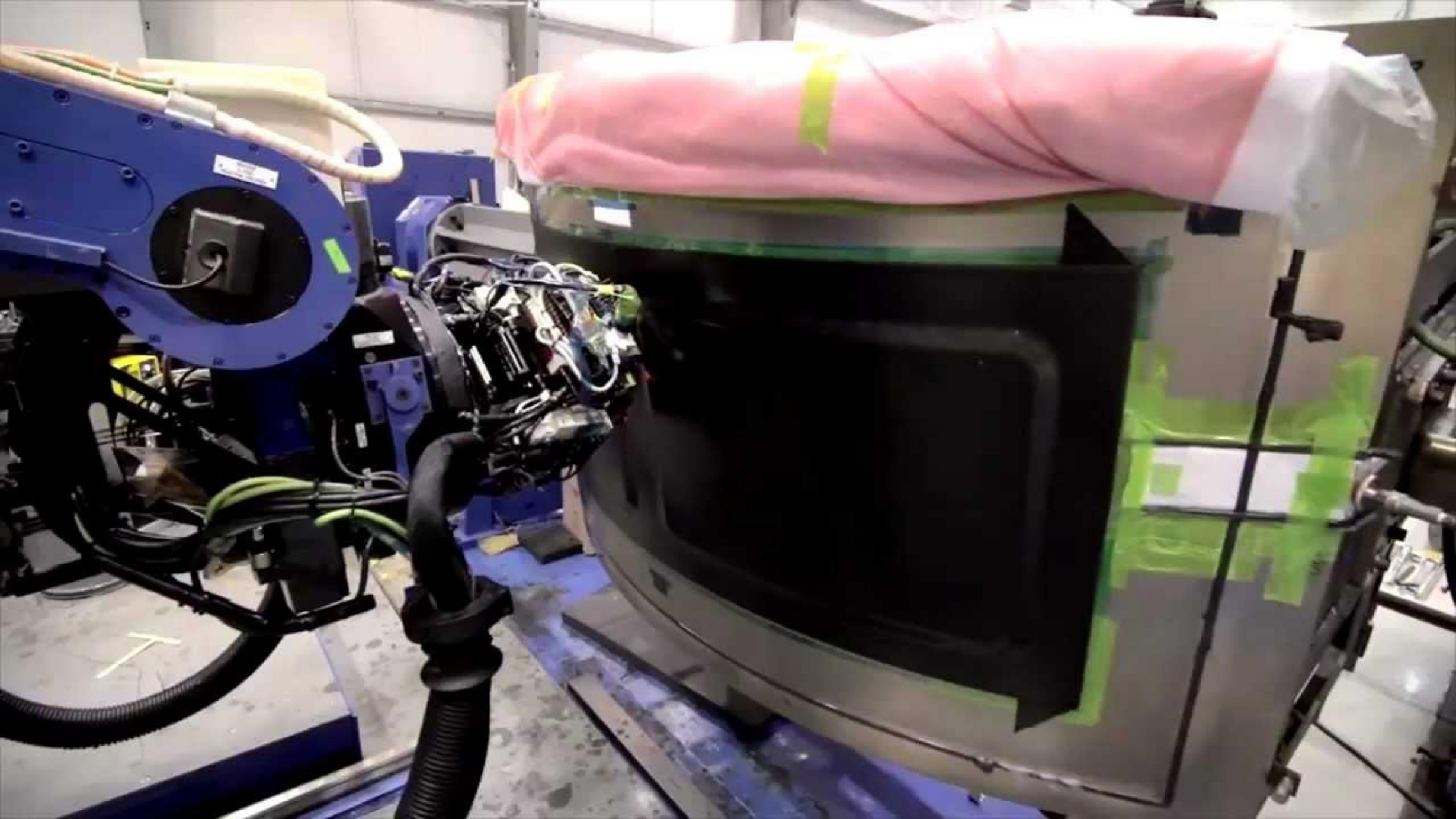

1
00:00:00,351 --> 00:00:02,351
[music]

2
00:00:02,696 --> 00:00:04,936
[Narrator:] America has a new spacecraft.

3
00:00:05,586 --> 00:00:06,836
Its name is Orion.

4
00:00:07,836 --> 00:00:11,506
It will take us beyond Earth orbit
for the first time in a generation.

5
00:00:11,576 --> 00:00:17,626
It will be able to travel farther out into our
solar system than we have ever gone before,

6
00:00:18,516 --> 00:00:25,876
allowing humankind to extend its
reach to new and exciting places.

7
00:00:25,876 --> 00:00:28,366
Orion is not a blueprint or an idea.

8
00:00:28,806 --> 00:00:30,066
It is real.

9
00:00:31,026 --> 00:00:35,796
Across the United States, people are
building, testing and getting ready

10
00:00:36,196 --> 00:00:40,866
for Orion's first flight test into space.

11
00:00:40,866 --> 00:00:48,466
Creating a space ship is hard work; work
that satisfies a desire to lead...a desire

12

00:00:48,466 --> 00:00:52,676
to achieve...and a desire to explore.

13
00:01:15,810 --> 00:01:08,743
[music]

14
00:01:15,810 --> 00:01:20,526
[Narrator:] At a factory deep in southern
Louisiana, workers are cutting metal,

15
00:01:20,526 --> 00:01:24,276
welding and building the first Orion
vehicle that will fly into space.

16
00:01:24,426 --> 00:01:29,236
The flight is called Exploration Flight Test 1

17
00:01:29,236 --> 00:01:32,746
and it will launch an uncrewed
Orion vehicle into Earth orbit.

18
00:01:32,896 --> 00:01:35,556
Orion has a big job.

19
00:01:35,846 --> 00:01:42,116
Its design allows for missions deeper into our
solar system than we have ever gone before.

20
00:01:42,226 --> 00:01:44,616
[Mark Geyer:] In NASA's history,
we've designed spacecraft

21
00:01:44,616 --> 00:01:48,156
for sometimes very specific
missions, like Mercury and Gemini.

22
00:01:48,556 --> 00:01:52,756
With Orion we've designed and developed it
from the beginning with exploration in mind.

23
00:01:52,756 --> 00:01:57,146
It can go to the moon, Mars, an asteroid,
take our crews and bring them home safely.

24
00:01:57,476 --> 00:01:59,436
So, Orion will be able to
do all of those things.

25
00:01:59,576 --> 00:02:05,876
[Narrator:] As engineers prepare to test Orion
in space, other tests also put the vehicle

26
00:02:05,876 --> 00:02:12,326
through its paces...on land...in
the water...and in the air.

27
00:02:12,326 --> 00:02:18,676
In Colorado, engineers conduct acoustic
tests, blasting Orion with a wall of sound

28
00:02:18,746 --> 00:02:23,986
that simulates the extreme noise and
vibration experienced during a launch.

29
00:02:24,156 --> 00:02:29,526
More than 600 instruments test the
durability of Orion's avionics,

30
00:02:30,036 --> 00:02:32,166
propulsion and crew life support.

31
00:02:32,166 --> 00:02:32,296
[music]

32
00:02:32,296 --> 00:02:42,776
Orion will land in the ocean, and at
the Langley Research Center in Virginia,

33
00:02:42,916 --> 00:02:47,926

a 22,000-pound Orion test article
undergoes a series of drop tests

34
00:02:48,426 --> 00:02:50,996
to certify the vehicle for water landings.

35
00:02:52,356 --> 00:02:59,116
The drop velocities differ from test to test,
representing different landing positions

36
00:02:59,246 --> 00:03:02,766
and conditions Orion might
face in the Pacific Ocean.

37
00:03:03,816 --> 00:03:07,216
Some tests even turn the vehicle
upside down, deliberately.

38
00:03:07,816 --> 00:03:12,016
It's all part of the test.

39
00:03:12,296 --> 00:03:16,086
Flying at 25,000 feet, a drop test article

40
00:03:16,156 --> 00:03:22,946
that mimics the Orion parachute compartment
is released from a C-130 aircraft.

41
00:03:22,946 --> 00:03:28,066
One of many tests for the Orion parachute
system, the parachutes slow the speed

42
00:03:28,066 --> 00:03:33,266
of the drop test article to roughly 25
feet per second as it comes to a stop

43
00:03:33,636 --> 00:03:35,326
on the sands of the Arizona desert.

44

00:03:36,126 --> 00:03:40,706
The lessons learned during Orion's
parachute development are also being applied

45
00:03:40,826 --> 00:03:45,636
by NASA's commercial partners as they
design low-Earth orbit spacecraft.

46
00:03:46,136 --> 00:03:52,096
[music]

47
00:03:52,596 --> 00:03:56,806
For safety, Orion has its
own Launch Abort System,

48
00:03:57,386 --> 00:04:02,746
a 35-foot tower which can pull the spacecraft
away from danger if there are problems

49
00:04:02,796 --> 00:04:06,546
with the rocket it sits upon before
or during the climb to space.

50
00:04:06,546 --> 00:04:11,776
This test of the Launch Abort
System, called Pad Abort 1,

51
00:04:11,776 --> 00:04:14,966
simulates an escape while still
sitting on the launch pad.

52
00:04:15,406 --> 00:04:16,376
>>...1...Launch!

53
00:04:16,806 --> 00:04:17,696
Launch! Launch!

54
00:04:17,996 --> 00:04:23,696
Too fast for normal cameras to observe, the
test is really only visible in slow motion.

55
00:04:27,036 --> 00:04:30,916
Abort motors fire, applying five
hundred thousand pounds of thrust,

56
00:04:31,386 --> 00:04:37,406
accelerating from zero to 450 miles per
hour in the first two seconds of flight.

57
00:04:38,456 --> 00:04:42,516
This is the kind of speed needed to
escape the top of a speeding rocket.

58
00:04:43,806 --> 00:04:48,226
Simultaneously, another set of motors
is designed to do the steering,

59
00:04:48,786 --> 00:04:54,336
keeping the vehicle clear of any danger and
positioning the craft for a parachuted landing.

60
00:04:55,606 --> 00:04:58,556
Finally, the Launch Abort
System jettisons itself,

61
00:04:59,616 --> 00:05:04,016
successfully completing the first flight
test of this important safety feature.

62
00:05:05,736 --> 00:05:10,856
Engineers have gathered data from this
flight and prepare for Ascent Abort Tests,

63
00:05:11,576 --> 00:05:17,486
which will fire the Launch Abort
System while on a moving rocket,

64
00:05:17,486 --> 00:05:29,766
a tougher and higher fidelity
workout for the system.

65
00:05:29,766 --> 00:05:29,833
[music]

66
00:05:29,833 --> 00:05:35,856
For all the important testing that takes place
on Earth, the ultimate test for Orion will be

67
00:05:35,856 --> 00:05:38,246
in the unique environment of space.

68
00:05:38,606 --> 00:05:42,506
[Geyer:] Exploration Test Flight
1 will put critical Orion systems

69
00:05:42,636 --> 00:05:44,696
to the test in the real flight environments.

70
00:05:45,076 --> 00:05:47,206
We'll see if Orion's design
performs the way we expect,

71
00:05:47,206 --> 00:05:50,286
and by doing that it helps us
correct any issues we find now,

72
00:05:50,606 --> 00:05:53,076
which will avoid costly changes
to the design in the future.

73
00:05:53,896 --> 00:05:55,876
So it's a really smart investment
to add a flight

74
00:05:55,876 --> 00:05:57,496
like this early in the development process.

75
00:05:58,076 --> 00:06:03,046
[Narrator:] Exploration Flight Test 1 will

launch an uncrewed Orion test spacecraft

76
00:06:03,136 --> 00:06:04,706
on a heavy lift rocket.

77
00:06:05,036 --> 00:06:08,386
The Launch Abort System will
separate from the craft.

78
00:06:08,386 --> 00:06:12,446
Then Orion will go for two
orbits around the Earth.

79
00:06:12,446 --> 00:06:17,976
While in space, critical systems in the vehicle
will be put to the test, both validating

80
00:06:18,286 --> 00:06:20,156
and influencing design decisions.

81
00:06:20,976 --> 00:06:23,716
The test continues with a high speed re-entry,

82
00:06:24,326 --> 00:06:28,076
rivaling conditions a spacecraft would
experience returning from the moon

83
00:06:28,776 --> 00:06:32,676
and giving engineers important
data about this phase of flight.

84
00:06:33,556 --> 00:06:38,576
Finally, the spacecraft's parachute system
will be deployed for a landing in the ocean,

85
00:06:39,246 --> 00:06:42,776
where recovery teams will get a chance
to test their techniques and equipment.

86

00:06:42,776 --> 00:06:42,843
[music]

87
00:06:42,843 --> 00:06:51,696
For Orion, the tests will
continue and the work is underway.

88
00:06:52,616 --> 00:06:59,346
People across the nation are pouring their
skills, knowledge and enthusiasm for exploration

89
00:07:00,096 --> 00:07:03,666
into the development of America's
next spacecraft.

90
00:07:04,336 --> 00:07:07,906
[Geyer:] So, it's an incredibly exciting
time to be working on the Orion project.

91
00:07:08,276 --> 00:07:11,766
Of course we're building the spacecraft that
going to take us further than we've ever gone,

92
00:07:12,226 --> 00:07:15,776
and the team that's working on it
is extremely talented and dedicated,

93
00:07:15,776 --> 00:07:17,836
both from NASA and the industry team.

94
00:07:17,836 --> 00:07:23,166
Human exploration of space is a dream we
all believe in, and we're turning our dreams