1
00:00:08,160 --> 00:00:23,429
orion is getting ready to launch

2
00:00:27,830 --> 00:00:25,189
my name is kelly smith and i work on

3
00:00:30,150 --> 00:00:27,840
navigation and guidance for orion orion

4
00:00:31,830 --> 00:00:30,160
is nasa's next generation spacecraft

5
00:00:33,670 --> 00:00:31,840
built with versatility in mind it can

6
00:00:36,310 --> 00:00:33,680
take astronauts deeper into space than

7
00:00:37,990 --> 00:00:36,320
we've ever gone before to an asteroid or

8
00:00:39,910 --> 00:00:38,000
even onto mars

9
00:00:41,830 --> 00:00:39,920
for these missions orion has to be one

10
00:00:43,990 --> 00:00:41,840
tough spacecraft withstanding high

11
00:00:45,830 --> 00:00:44,000
speeds searing temperatures and extreme

12
00:00:48,069 --> 00:00:45,840
radiation

13
00:00:50,069 --> 00:00:48,079

before we can send astronauts into space

14
00:00:52,069 --> 00:00:50,079
on orion we have to test all of its

15
00:00:55,750 --> 00:00:52,079
systems and there's only one way to know

16
00:00:58,229 --> 00:00:55,760
if we got it right fly it in space

17
00:01:00,630 --> 00:00:58,239
for orion's first flight no astronauts

18
00:01:03,110 --> 00:01:00,640
will be aboard the spacecraft is loaded

19
00:01:06,230 --> 00:01:03,120
with sensors to record and measure all

20
00:01:07,990 --> 00:01:06,240
aspects of the flight in every detail

21
00:01:34,230 --> 00:01:08,000
it all begins with launch

22
00:01:39,590 --> 00:01:36,789
as it punches into earth orbit orion

23
00:01:41,830 --> 00:01:39,600
will jettison its launch abort

24
00:01:44,069 --> 00:01:41,840
the abort system is a safety feature

25
00:01:45,590 --> 00:01:44,079
designed to pull orion and its crew out

26
00:01:47,510 --> 00:01:45,600
of danger if there were a problem with

27
00:01:49,030 --> 00:01:47,520
the rocket during ascent

28
00:01:53,350 --> 00:01:49,040
orion's journey

29
00:01:57,350 --> 00:01:55,109
as the spacecraft and the upper stage

30
00:01:59,030 --> 00:01:57,360
begin their first lap around earth

31
00:02:01,429 --> 00:01:59,040
mission control in houston is monitoring

32
00:02:03,510 --> 00:02:01,439
the progress of the flight

33
00:02:06,709 --> 00:02:03,520
orion's over a hundred miles up and

34
00:02:09,669 --> 00:02:06,719
going about 17 000 miles per hour

35
00:02:17,190 --> 00:02:09,679
just as it passes over the indian ocean

36
00:02:21,670 --> 00:02:19,750
this is expected the communications link

37
00:02:24,390 --> 00:02:21,680
we have through satellites to orion is

38
00:02:26,630 --> 00:02:24,400

momentarily lost but orion continues to

39
00:02:29,030 --> 00:02:26,640
receive and process data

40
00:02:32,309 --> 00:02:29,040
its computers can handle 480 million

41
00:02:36,630 --> 00:02:34,470
imagine you are traveling with orion as

42
00:02:39,110 --> 00:02:36,640
the flight test continues one orbit

43
00:02:40,790 --> 00:02:39,120
completed time to go

44
00:02:42,710 --> 00:02:40,800
the upper stage of the rocket fires

45
00:02:44,710 --> 00:02:42,720
again like the setup for a roller

46
00:02:50,309 --> 00:02:44,720
coaster ride this is the big climb we've

47
00:02:56,869 --> 00:02:54,550
we are headed 3 600 miles above earth

48
00:03:02,470 --> 00:02:56,879
15 times higher from the planet than the

49
00:03:07,030 --> 00:03:04,470
as we get further away from earth we'll

50
00:03:08,630 --> 00:03:07,040
pass through the van allen belts an area

51
00:03:12,550 --> 00:03:08,640
of dangerous

52
00:03:16,070 --> 00:03:13,990
radiation like this could harm the

53
00:03:18,949 --> 00:03:16,080
guidance systems onboard computers or

54
00:03:20,470 --> 00:03:18,959
other electronics on orion naturally we

55
00:03:21,430 --> 00:03:20,480
have to pass through this danger zone

56
00:03:26,789 --> 00:03:21,440
twice

57
00:03:30,550 --> 00:03:28,789
but orion has protection

58
00:03:31,990 --> 00:03:30,560
shielding will be put to the test as the

59
00:03:33,190 --> 00:03:32,000
vehicle cuts through the waves of

60
00:03:37,670 --> 00:03:33,200
radiation

61
00:03:39,270 --> 00:03:37,680
levels for scientists to study we must

62
00:03:41,670 --> 00:03:39,280
solve these challenges before we send

63
00:03:45,270 --> 00:03:41,680

people through this region of space

64
00:03:47,110 --> 00:03:45,280
for this flight it's time to head home

65
00:03:48,550 --> 00:03:47,120
the upper stage of the rocket triggers

66
00:03:50,470 --> 00:03:48,560
separation

67
00:03:52,390 --> 00:03:50,480
orion's jets fire to turn it into the

68
00:03:54,869 --> 00:03:52,400
proper position to re-enter earth's

69
00:03:56,869 --> 00:03:54,879
atmosphere no matter what happens now

70
00:03:59,429 --> 00:03:56,879
we're coming in

71
00:04:01,429 --> 00:03:59,439
75 miles above earth the spacecraft

72
00:04:03,589 --> 00:04:01,439
enters the atmosphere things happen

73
00:04:06,229 --> 00:04:03,599
quickly we're now traveling more than 20

74
00:04:08,229 --> 00:04:06,239
000 miles per hour air particles pushed

75
00:04:10,470 --> 00:04:08,239
out of the way heat up an envelope of

76
00:04:12,149 --> 00:04:10,480
hot plasma surrounds the vehicle as it

77
00:04:14,470 --> 00:04:12,159
plummets towards earth

78
00:04:16,949 --> 00:04:14,480
the plasma reaches temperatures of 4 000

79
00:04:18,469 --> 00:04:16,959
degrees fahrenheit almost twice as hot

80
00:04:20,229 --> 00:04:18,479
as molten lava

81
00:04:22,550 --> 00:04:20,239
this may be the most dangerous part of

82
00:04:24,230 --> 00:04:22,560
the flight mission control is monitoring

83
00:04:25,430 --> 00:04:24,240
all the data from the spacecraft and

84
00:04:27,430 --> 00:04:25,440
then

85
00:04:30,070 --> 00:04:27,440
we lose communication again

86
00:04:33,350 --> 00:04:30,080
no data can penetrate the plasma orion

87
00:04:37,990 --> 00:04:35,990
orion is inside a fireball

88
00:04:40,070 --> 00:04:38,000

onboard systems ignite jets to keep the

89
00:04:41,670 --> 00:04:40,080
ship pointed correctly so the specially

90
00:04:43,270 --> 00:04:41,680
constructed heat shield takes the full

91
00:04:44,950 --> 00:04:43,280
brunt of the inferno

92
00:04:47,749 --> 00:04:44,960
this is the largest heat shield of its

93
00:04:49,830 --> 00:04:47,759
kind ever made orion's computers command

94
00:04:51,590 --> 00:04:49,840
the spacecraft to bank like an airplane

95
00:04:53,909 --> 00:04:51,600
keeping a precise path to the landing

96
00:04:56,230 --> 00:04:53,919
site even though we've slowed from 20

97
00:04:58,710 --> 00:04:56,240
000 miles per hour to about 300 miles

98
00:05:01,270 --> 00:04:58,720
per hour we're still traveling amazingly

99
00:05:02,469 --> 00:05:01,280
fast we must slow down to safely land in

100
00:05:03,670 --> 00:05:02,479
the ocean

101
00:05:07,189 --> 00:05:03,680
luckily

102
00:05:11,189 --> 00:05:09,270
especially designed for orion the

103
00:05:13,430 --> 00:05:11,199
parachutes help us hit the brakes but

104
00:05:15,590 --> 00:05:13,440
not too quickly one day people will be

105
00:05:17,189 --> 00:05:15,600
aboard so deceleration must happen in

106
00:05:19,430 --> 00:05:17,199
stages to keep things comfortable for

107
00:05:26,230 --> 00:05:19,440
the crew

108
00:05:31,110 --> 00:05:28,230
two drone shoots deploy and slow the

109
00:05:38,710 --> 00:05:31,120
returning spacecraft down to 175 miles

110
00:05:38,720 --> 00:05:45,749
then the three main parachutes open

111
00:05:52,550 --> 00:05:47,830
once fully engaged this canopy would

112
00:05:56,790 --> 00:05:54,390
it takes parachutes this size and

113
00:05:59,510 --> 00:05:56,800

strength to slow our descent to 20 miles

114
00:06:03,350 --> 00:05:59,520
per hour and then

115
00:06:07,110 --> 00:06:05,029
for this first flight we won't have

116
00:06:09,670 --> 00:06:07,120
astronauts inside but we still have some

117
00:06:11,590 --> 00:06:09,680
very precious cargo the flight data from

118
00:06:12,870 --> 00:06:11,600
this mission is stored inside the orion

119
00:06:14,469 --> 00:06:12,880
spacecraft

120
00:06:16,230 --> 00:06:14,479
while our flight might be over there is

121
00:06:18,390 --> 00:06:16,240
still a lot of work to do onboard

122
00:06:21,270 --> 00:06:18,400
sensors recorded every detail from

123
00:06:29,189 --> 00:06:21,280
launch to flying in space to reentry to

124
00:06:33,189 --> 00:06:31,749
flight tests are difficult and complex

125
00:06:35,350 --> 00:06:33,199
but they give us confidence that the

126
00:06:36,870 --> 00:06:35,360
systems we have designed work under real

127
00:06:38,469 --> 00:06:36,880
flight conditions

128
00:06:40,550 --> 00:06:38,479
it's great to be a part of this first

129
00:06:42,469 --> 00:06:40,560
space flight for orion and we're looking