1
00:00:00,030 --> 00:00:13,820
liftoff in five four three two one zero

2
00:00:18,859 --> 00:00:16,410
welcome to the sunny east coast of

3
00:00:21,179 --> 00:00:18,869
Central Florida take a look around you

4
00:00:24,839 --> 00:00:21,189
back here you can see part of the mobile

5
00:00:26,490 --> 00:00:24,849
launcher over here is the crawler and

6
00:00:29,910 --> 00:00:26,500
back behind you that's the Vehicle

7
00:00:32,220 --> 00:00:29,920
Assembly Building formerly the home of

8
00:00:33,869 --> 00:00:32,230
the Space Shuttle this facility is now

9
00:00:38,220 --> 00:00:33,879
called the Commercial Crew and cargo

10
00:00:41,130 --> 00:00:38,230
processing facility or c3 PF and it has

11
00:00:43,200 --> 00:00:41,140
been repurposed by Boeing we're proud to

12
00:00:44,970 --> 00:00:43,210
have them so close as they prepare to

13
00:00:47,700 --> 00:00:44,980

launch humans in support of the

14
00:00:50,760 --> 00:00:47,710
Commercial Crew program the Commercial

15
00:00:52,709 --> 00:00:50,770
Crew program or CCP is focused on

16
00:00:54,840 --> 00:00:52,719
launching humans safely to the

17
00:00:58,590 --> 00:00:54,850
International Space Station with our

18
00:01:00,360 --> 00:00:58,600
partners Boeing and SpaceX hi i'm rachel

19
00:01:03,380 --> 00:01:00,370
power and today we're going to get an

20
00:01:07,200 --> 00:01:03,390
up-close look at the cst-100 Starliner

21
00:01:11,010 --> 00:01:07,210
Boeing's crew capsule CST stands for

22
00:01:13,440 --> 00:01:11,020
crew space transportation and the 100

23
00:01:15,510 --> 00:01:13,450
refers to the carbon line that's the

24
00:01:17,990 --> 00:01:15,520
common reference to the point where

25
00:01:21,839 --> 00:01:18,000
you've left earth and here now in space

26
00:01:25,320 --> 00:01:21,849
100 kilometers up now let's go take a

27
00:01:27,540 --> 00:01:25,330
look inside this is the location where

28
00:01:29,609 --> 00:01:27,550
we once processed and stored Space

29
00:01:31,770 --> 00:01:29,619
Shuttle main engines and now it's being

30
00:01:34,260 --> 00:01:31,780
used for the Starliner service module

31
00:01:36,990 --> 00:01:34,270
these engineering masterpieces come

32
00:01:40,260 --> 00:01:37,000
together piece by piece starting with a

33
00:01:43,169 --> 00:01:40,270
giant metal cylinder waiting just beyond

34
00:01:46,800 --> 00:01:43,179
that wall once they make their way in

35
00:01:48,870 --> 00:01:46,810
here the process includes installing and

36
00:01:51,270 --> 00:01:48,880
testing all of the systems needed to

37
00:01:53,520 --> 00:01:51,280
support Starliner flight this includes

38
00:01:57,240 --> 00:01:53,530

electrical life-support systems

39
00:01:58,800 --> 00:01:57,250
communications fuel systems the actual

40
00:02:01,139 --> 00:01:58,810
capsule which we'll go take a look at in

41
00:02:04,199 --> 00:02:01,149
a minute we'll eventually be attached to

42
00:02:06,089 --> 00:02:04,209
the top of this element the two will

43
00:02:08,580 --> 00:02:06,099
stay connected through docking at the

44
00:02:10,740 --> 00:02:08,590
space station and then separate before

45
00:02:13,380 --> 00:02:10,750
the capsule enters Earth's atmosphere to

46
00:02:14,670 --> 00:02:13,390
return home we're gonna go take a look

47
00:02:16,710 --> 00:02:14,680
in the high bay to see if we could look

48
00:02:19,980 --> 00:02:16,720
at another service module that's further

49
00:02:21,640 --> 00:02:19,990
along and processing we are inside the

50
00:02:23,530 --> 00:02:21,650
high bay where the crew capsule

51
00:02:25,630 --> 00:02:23,540
are assembled and if you take the peak

52
00:02:28,059 --> 00:02:25,640
behind you you might get to see some of

53
00:02:29,800 --> 00:02:28,069
that but first let's take a look over

54
00:02:32,800 --> 00:02:29,810
here because this is a service module

55
00:02:34,690 --> 00:02:32,810
that is currently undergoing testing on

56
00:02:36,880 --> 00:02:34,700
the outside you might notice some pink

57
00:02:38,920 --> 00:02:36,890
wrapping those are rocket nozzles and

58
00:02:42,069 --> 00:02:38,930
these are used to steer a spacecraft

59
00:02:44,440 --> 00:02:42,079
wallets in space in orbit there's no up

60
00:02:46,420 --> 00:02:44,450
or down there's no left or right you

61
00:02:49,089 --> 00:02:46,430
can't turn a wheel or steer like you'd

62
00:02:50,890 --> 00:02:49,099
drive a car or ride a bike you have to

63
00:02:53,740 --> 00:02:50,900

actually use another physics principle

64
00:02:56,500 --> 00:02:53,750
you remember for every action there's an

65
00:02:59,949 --> 00:02:56,510
equal but opposite reaction so if I want

66
00:03:01,780 --> 00:02:59,959
my spacecraft to go that way I fire a

67
00:03:04,750 --> 00:03:01,790
small burst of propellant in the

68
00:03:07,960 --> 00:03:04,760
opposite direction so if the action is

69
00:03:10,990 --> 00:03:07,970
to fire that way the reaction is the

70
00:03:13,569 --> 00:03:11,000
spacecraft shifts this way you might

71
00:03:14,920 --> 00:03:13,579
also see underneath the spacecraft it's

72
00:03:17,080 --> 00:03:14,930
actually kind of hard to tell from this

73
00:03:20,080 --> 00:03:17,090
angle but there are four larger nozzles

74
00:03:22,599 --> 00:03:20,090
these make up the launch abort system if

75
00:03:25,089 --> 00:03:22,609
there's an emergency before or during

76
00:03:28,479 --> 00:03:25,099
flight prior to reaching orbit these

77
00:03:31,180 --> 00:03:28,489
ignites producing nearly 40,000 pounds

78
00:03:34,089 --> 00:03:31,190
of thrust each to safely move the crew

79
00:03:36,580 --> 00:03:34,099
away from the rocket the capsule then

80
00:03:40,030 --> 00:03:36,590
deploys parachutes to return the crew

81
00:03:41,649 --> 00:03:40,040
safely to Earth by integrating the

82
00:03:43,839 --> 00:03:41,659
launch abort system into the service

83
00:03:46,420 --> 00:03:43,849
module we actually don't carry any extra

84
00:03:48,460 --> 00:03:46,430
weight and fuel if the fuel is needed

85
00:03:51,129 --> 00:03:48,470
for an abort then you're not going to

86
00:03:53,140 --> 00:03:51,139
need it on orbit and if it's not then

87
00:03:54,879 --> 00:03:53,150
it's used for the orbital maneuvering

88
00:03:56,979 --> 00:03:54,889

system rockets the thrusters you see on

89
00:03:58,659 --> 00:03:56,989
the side now we're gonna take a look

90
00:04:00,430 --> 00:03:58,669
over on the other side of the high bay

91
00:04:03,430 --> 00:04:00,440
to see how these crew capsules come

92
00:04:05,409 --> 00:04:03,440
together take a moment to look around

93
00:04:07,409 --> 00:04:05,419
you at all of this cool space hardware

94
00:04:10,059 --> 00:04:07,419
you have the back shelves over here

95
00:04:14,009 --> 00:04:10,069
behind you is the NASA docking system

96
00:04:16,930 --> 00:04:14,019
the airbags the forward heat shield

97
00:04:19,390 --> 00:04:16,940
what's important to remember is that the

98
00:04:21,129 --> 00:04:19,400
Starliner crew capsule isn't just used

99
00:04:23,920 --> 00:04:21,139
to bring astronauts into space that's

100
00:04:25,719 --> 00:04:23,930
only half the job the same capsule must

101
00:04:28,629 --> 00:04:25,729
also be used to bring the astronauts

102
00:04:31,089 --> 00:04:28,639
home safely one of the final steps in

103
00:04:33,050 --> 00:04:31,099
preparation is installing the Boeing

104
00:04:35,810 --> 00:04:33,060
lightweight of later

105
00:04:38,330 --> 00:04:35,820
especially design heat shield used to

106
00:04:40,880 --> 00:04:38,340
disperse the heat by going through a

107
00:04:42,800 --> 00:04:40,890
phase change from solid to liquid this

108
00:04:44,870 --> 00:04:42,810
creates a buffer from the high

109
00:04:46,750 --> 00:04:44,880
temperatures of reentry which can reach

110
00:04:49,760 --> 00:04:46,760
up to four thousand degrees Fahrenheit

111
00:04:51,640 --> 00:04:49,770
the heat seal will not be reusable but

112
00:04:55,460 --> 00:04:51,650
it does protect the capsule and

113
00:04:57,110 --> 00:04:55,470

everything and everyone inside after it

114
00:04:59,630 --> 00:04:57,120
goes through the hottest part of reentry

115
00:05:02,300 --> 00:04:59,640
the space capsule has slowed

116
00:05:05,750 --> 00:05:02,310
considerably from its initial speed of

117
00:05:07,400 --> 00:05:05,760
almost 17,000 miles per hour then a

118
00:05:10,070 --> 00:05:07,410
series of parachutes will deploy

119
00:05:12,470 --> 00:05:10,080
designed to gradually slow the descent

120
00:05:16,070 --> 00:05:12,480
to about the speed of its ascent a

121
00:05:20,480 --> 00:05:16,080
descending elevator the final stage of

122
00:05:22,310 --> 00:05:20,490
landing is inflating giant air bags the

123
00:05:25,060 --> 00:05:22,320
ones behind you which will help to

124
00:05:28,100 --> 00:05:25,070
cushion the landing even further

125
00:05:29,810 --> 00:05:28,110
once the astronaut crew is safely on the

126
00:05:31,700 --> 00:05:29,820
ground at one of our five landing

127
00:05:34,310 --> 00:05:31,710
locations across the western United

128
00:05:36,980 --> 00:05:34,320
States crews will drive out to help them

129
00:05:39,770 --> 00:05:36,990
safely egress from the capsule barring

130
00:05:41,660 --> 00:05:39,780
any unforeseen circumstances the capsule

131
00:05:44,300 --> 00:05:41,670
will be able to be reused up to ten

132
00:05:47,150 --> 00:05:44,310
times part of the reason the Starliner

133
00:05:50,540 --> 00:05:47,160
is reusable is that it was designed to

134
00:05:53,180 --> 00:05:50,550
land on land it's the first and only

135
00:05:56,270 --> 00:05:53,190
American orbital capsule which is able

136
00:05:57,920 --> 00:05:56,280
to do so afterwards the capsule is

137
00:05:59,660 --> 00:05:57,930
brought back here to the Kennedy Space

138
00:06:02,750 --> 00:05:59,670

Center where it will be readied for

139
00:06:05,180 --> 00:06:02,760
flight again it's docked to one of the

140
00:06:08,450 --> 00:06:05,190
service modules move to that back room

141
00:06:11,060 --> 00:06:08,460
again where we sealed off and fueled for

142
00:06:12,980 --> 00:06:11,070
flight it's just a few short miles out

143
00:06:14,740 --> 00:06:12,990
to the launch pad and that's where its

144
00:06:17,180 --> 00:06:14,750
journey for the space station begins

145
00:06:19,850 --> 00:06:17,190
we're gonna leave you with one final

146
00:06:21,500 --> 00:06:19,860
look inside the Starliner mock-up

147
00:06:25,640 --> 00:06:21,510
trainer at the Kennedy Space Center

148
00:06:27,710 --> 00:06:25,650
Visitor Complex you're getting a chance

149
00:06:30,350 --> 00:06:27,720
to feel what the astronauts will

150
00:06:33,740 --> 00:06:30,360
experience when they strap in and

151
00:06:37,370 --> 00:06:33,750
prepare to blast off into space Alan

152
00:06:40,940 --> 00:06:37,380
Shepard unlocked a new frontier by being

153
00:06:43,790 --> 00:06:40,950
the first American to fly into space Bob

154
00:06:45,700 --> 00:06:43,800
Crippen and John Young unlocked a

155
00:06:48,250 --> 00:06:45,710
30-year legacy

156
00:06:50,410 --> 00:06:48,260
of living and working in space by being

157
00:06:55,390 --> 00:06:50,420
the first astronauts to fly aboard the

158
00:06:57,850 --> 00:06:55,400
space shuttle and this this is where we

159
00:07:01,660 --> 00:06:57,860
unlock the future of commercial space

160
00:07:04,780 --> 00:07:01,670
travel we'll see you next time as we

161
00:07:06,040 --> 00:07:04,790
prepare to launch America hi my name is

162
00:07:07,230 --> 00:07:06,050
Steve stitch I'm the deputy program

163
00:07:09,950 --> 00:07:07,240

manager for Commercial Crew program