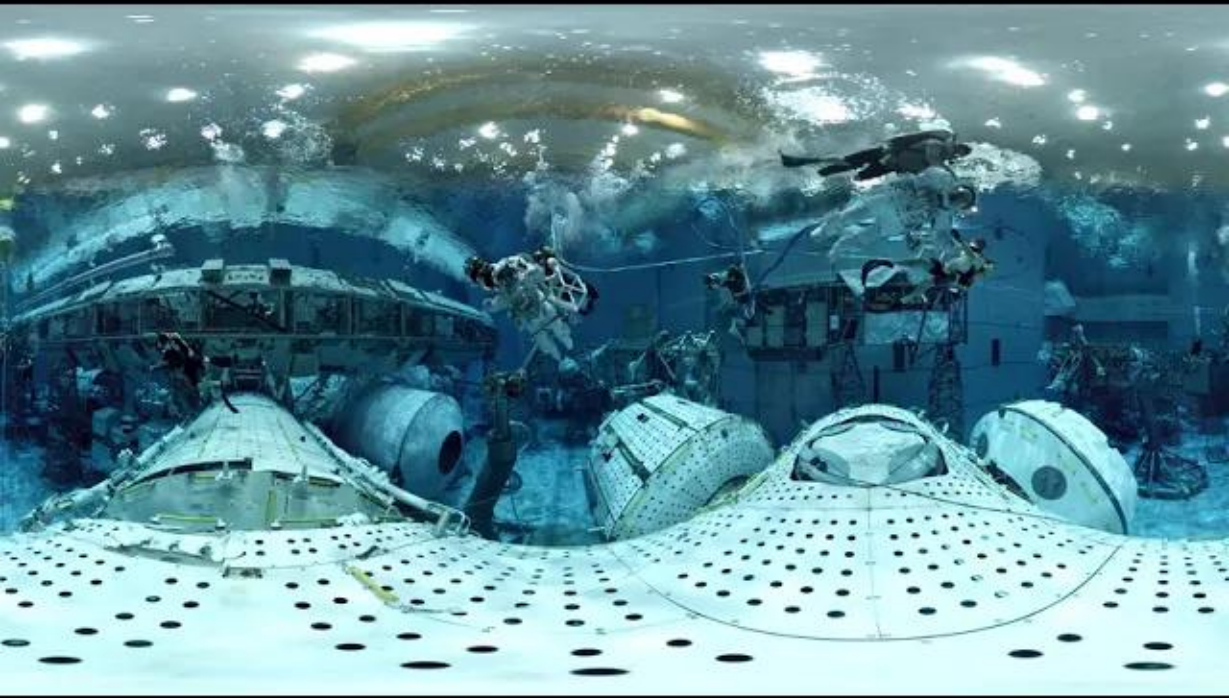

1
00:00:00,030 --> 00:00:13,400
liftoff in five four three two one zero

2
00:00:19,140 --> 00:00:15,869
when you think about an astronaut what

3
00:00:21,480 --> 00:00:19,150
comes to mind spacewalking maybe that

4
00:00:23,460 --> 00:00:21,490
iconic image of them all suited up in

5
00:00:26,340 --> 00:00:23,470
the Astro van on the ride out to the

6
00:00:28,529 --> 00:00:26,350
launch pad or those historic videos of

7
00:00:30,750 --> 00:00:28,539
them walking on the moon what you

8
00:00:33,540 --> 00:00:30,760
probably don't think about is a swimming

9
00:00:36,540 --> 00:00:33,550
pool but believe it or not that's our

10
00:00:38,400 --> 00:00:36,550
final stop on this virtual tour hi i'm

11
00:00:41,040 --> 00:00:38,410
rachel power and today we're gonna take

12
00:00:42,690 --> 00:00:41,050
a look at astronaut training for living

13
00:00:47,369 --> 00:00:42,700

and working on the International Space

14
00:00:49,979 --> 00:00:47,379
Station we're here in Mission Control at

15
00:00:51,420 --> 00:00:49,989
the Johnson Space Center this is where

16
00:00:53,670 --> 00:00:51,430
much of the communication takes place

17
00:00:55,830 --> 00:00:53,680
with astronauts after they've left Earth

18
00:00:56,850 --> 00:00:55,840
and until they return home and that

19
00:00:59,549 --> 00:00:56,860
includes when they're on the space

20
00:01:02,610 --> 00:00:59,559
station as the Commercial Crew program

21
00:01:05,400 --> 00:01:02,620
nears its primary objective launching

22
00:01:07,020 --> 00:01:05,410
humans safely to the space station more

23
00:01:08,790 --> 00:01:07,030
and more focus is being placed I'm

24
00:01:11,940 --> 00:01:08,800
making sure those astronauts are ready

25
00:01:16,199 --> 00:01:11,950
to fly we've got a lot to see today are

26
00:01:17,580 --> 00:01:16,209
you ready let's go just like a swimming

27
00:01:20,130 --> 00:01:17,590
pool isn't what you typically think

28
00:01:21,359 --> 00:01:20,140
about when you think astronaut you

29
00:01:24,180 --> 00:01:21,369
probably also don't think about a

30
00:01:26,520 --> 00:01:24,190
classroom but after the application and

31
00:01:27,960 --> 00:01:26,530
selection process these women and men

32
00:01:30,120 --> 00:01:27,970
they're not automatically given the

33
00:01:32,699 --> 00:01:30,130
title vas or not they have to earn it

34
00:01:34,469 --> 00:01:32,709
so the astronaut candidates as we call

35
00:01:36,480 --> 00:01:34,479
them have to go through about two years

36
00:01:39,180 --> 00:01:36,490
of training before they can be eligible

37
00:01:40,919 --> 00:01:39,190
for assignment two our mission that

38
00:01:43,620 --> 00:01:40,929

training includes what we call

39
00:01:45,410 --> 00:01:43,630
expeditionary behavior the things it

40
00:01:48,240 --> 00:01:45,420
takes to be a good teammate like

41
00:01:51,540 --> 00:01:48,250
communication leadership skills and

42
00:01:53,940 --> 00:01:51,550
followership skills all US astronauts

43
00:01:56,279 --> 00:01:53,950
must be proficient in Russian they're

44
00:01:58,080 --> 00:01:56,289
gonna learn survival skills they have to

45
00:02:00,690 --> 00:01:58,090
be able to make split-second decisions

46
00:02:02,510 --> 00:02:00,700
in life or death situations and that's

47
00:02:04,770 --> 00:02:02,520
why they learn how to fly 238 jets

48
00:02:08,040 --> 00:02:04,780
they'll also have to learn how to

49
00:02:10,529 --> 00:02:08,050
conduct spacewalks they'll have to

50
00:02:12,570 --> 00:02:10,539
conduct research projects they're going

51
00:02:14,309 --> 00:02:12,580
to control the space station robotic arm

52
00:02:16,140 --> 00:02:14,319
and they have to operate the many

53
00:02:18,660 --> 00:02:16,150
technical systems on the space station

54
00:02:20,160 --> 00:02:18,670
so as you might have guessed its

55
00:02:21,150 --> 00:02:20,170
candidates they don't just learn in this

56
00:02:22,920 --> 00:02:21,160
classroom

57
00:02:25,890 --> 00:02:22,930
there's lots of hands-on training as

58
00:02:27,990 --> 00:02:25,900
well so let's go take a look we are now

59
00:02:30,360 --> 00:02:28,000
inside building 9 at the Johnson Space

60
00:02:33,470 --> 00:02:30,370
Center where astronaut training is a

61
00:02:36,090 --> 00:02:33,480
major focus behind me you can see

62
00:02:38,490 --> 00:02:36,100
full-scale mock-ups of the International

63
00:02:40,560 --> 00:02:38,500

Space Station in fact over here to my

64
00:02:43,290 --> 00:02:40,570
left you see one of the last existing

65
00:02:44,970 --> 00:02:43,300
Space Shuttle trainers and peeking up

66
00:02:48,540 --> 00:02:44,980
over the top of it on the other side you

67
00:02:52,920 --> 00:02:48,550
can see the very big robotic arm behind

68
00:02:57,120 --> 00:02:52,930
me is Leonardo or the PMM and it's used

69
00:02:59,010 --> 00:02:57,130
for cargo and storage right down here to

70
00:03:00,720 --> 00:02:59,020
my right you can see the top of the

71
00:03:02,310 --> 00:03:00,730
cupola that's one of the favorite

72
00:03:04,470 --> 00:03:02,320
hangout spots on the International Space

73
00:03:07,290 --> 00:03:04,480
Station it gets you a beautiful view of

74
00:03:08,790 --> 00:03:07,300
Earth below and in the forward section

75
00:03:11,190 --> 00:03:08,800
of the station you can see the smaller

76
00:03:13,710 --> 00:03:11,200
robotic arm attached to the outside of

77
00:03:17,070 --> 00:03:13,720
the Japanese module but we're gonna get

78
00:03:20,610 --> 00:03:17,080
to go inside node to Harmony and take a

79
00:03:23,250 --> 00:03:20,620
closer look welcome to node 2 or Harmony

80
00:03:26,550 --> 00:03:23,260
here you'll find the astronaut sleeping

81
00:03:28,710 --> 00:03:26,560
quarters the crew workbench and if you

82
00:03:32,280 --> 00:03:28,720
look behind me you can see into Destiny

83
00:03:33,990 --> 00:03:32,290
the u.s. laboratory to your left you're

84
00:03:36,000 --> 00:03:34,000
looking into the European module

85
00:03:39,150 --> 00:03:36,010
Columbus which focuses on the human

86
00:03:41,550 --> 00:03:39,160
research program and to your right you

87
00:03:44,160 --> 00:03:41,560
can see into gen the Japanese module

88
00:03:46,410 --> 00:03:44,170

where there's an airlock to pass large

89
00:03:49,380 --> 00:03:46,420
experiments outside into the vacuum of

90
00:03:51,750 --> 00:03:49,390
space don't forget to look above you and

91
00:03:53,850 --> 00:03:51,760
also behind you where you're gonna find

92
00:03:55,380 --> 00:03:53,860
two airlocks these will be used for

93
00:03:58,740 --> 00:03:55,390
docking the new Commercial Crew program

94
00:04:01,110 --> 00:03:58,750
spacecraft and astronauts time and space

95
00:04:03,900 --> 00:04:01,120
is very limited and extremely valuable

96
00:04:06,600 --> 00:04:03,910
so mock-ups like these allow them plenty

97
00:04:08,220 --> 00:04:06,610
of time to learn where to find the tools

98
00:04:10,410 --> 00:04:08,230
they're gonna need to be successful on

99
00:04:12,120 --> 00:04:10,420
their mission it also allows them to

100
00:04:14,370 --> 00:04:12,130
simulate and rehearse emergency

101
00:04:17,430 --> 00:04:14,380
situations they need to know what to do

102
00:04:20,099 --> 00:04:17,440
and where to go to be safe just like you

103
00:04:22,350 --> 00:04:20,109
practice safety drills at school so

104
00:04:24,270 --> 00:04:22,360
tools like this are invaluable while

105
00:04:26,520 --> 00:04:24,280
they're working inside the station but

106
00:04:29,190 --> 00:04:26,530
what if their work takes them outside

107
00:04:32,550 --> 00:04:29,200
the station well we have just the tool

108
00:04:34,100 --> 00:04:32,560
for that too as promised this is our

109
00:04:37,490 --> 00:04:34,110
final stop

110
00:04:39,860 --> 00:04:37,500
take a look over here yes add this most

111
00:04:41,540 --> 00:04:39,870
basic level this is a swimming pool but

112
00:04:45,260 --> 00:04:41,550
we call it the neutral buoyancy

113
00:04:47,720 --> 00:04:45,270

laboratory or NBL for short in a moment

114
00:04:49,790 --> 00:04:47,730
you're gonna find out why now I'm not

115
00:04:52,310 --> 00:04:49,800
gonna go with you for this next part but

116
00:04:56,090 --> 00:04:52,320
you are gonna take a dip in the pool

117
00:04:59,300 --> 00:04:56,100
have fun right now you're witnessing

118
00:05:01,880 --> 00:04:59,310
astronaut training in progress the

119
00:05:04,670 --> 00:05:01,890
person in the giant white suit is well

120
00:05:06,380 --> 00:05:04,680
you guessed it an astronaut we've

121
00:05:08,440 --> 00:05:06,390
discovered that being underwater is a

122
00:05:11,600 --> 00:05:08,450
great way to simulate working in space

123
00:05:14,000 --> 00:05:11,610
the movements in both locations are slow

124
00:05:16,010 --> 00:05:14,010
going and methodical you have the

125
00:05:18,350 --> 00:05:16,020
ability to move in any direction and

126
00:05:22,070 --> 00:05:18,360
you're able to practice doing full

127
00:05:24,490 --> 00:05:22,080
operations in real space suits the suits

128
00:05:27,920 --> 00:05:24,500
they wear during spacewalks weigh around

129
00:05:30,110 --> 00:05:27,930
300 pounds so practicing with them

130
00:05:31,360 --> 00:05:30,120
outside the pool is pretty much out of

131
00:05:33,650 --> 00:05:31,370
the question

132
00:05:35,270 --> 00:05:33,660
underwater those suits have to be

133
00:05:38,420 --> 00:05:35,280
airtight to prevent the water from

134
00:05:41,420 --> 00:05:38,430
flooding inside and space a similar

135
00:05:44,090 --> 00:05:41,430
hazard exists just like water takes the

136
00:05:46,400 --> 00:05:44,100
shape of its container gas does the same

137
00:05:49,040 --> 00:05:46,410
and spreads to fill all the space

138
00:05:51,410 --> 00:05:49,050

available so the gas in the spacesuit

139
00:05:54,160 --> 00:05:51,420
needs to stay inside for the astronaut

140
00:05:56,780 --> 00:05:54,170
to breathe so it has to be airtight

141
00:06:00,410 --> 00:05:56,790
you'll also notice that the astronaut is

142
00:06:02,780 --> 00:06:00,420
not alone for safety and support a team

143
00:06:05,860 --> 00:06:02,790
of divers assists each astronaut with

144
00:06:09,470 --> 00:06:05,870
relocations safety concerns in

145
00:06:11,840 --> 00:06:09,480
documenting their work those giant

146
00:06:15,020 --> 00:06:11,850
structures you see there are full-size

147
00:06:16,970 --> 00:06:15,030
replicas of the space station since any

148
00:06:19,280 --> 00:06:16,980
station astronaut could be called on to

149
00:06:22,460 --> 00:06:19,290
fix something on the outside they all

150
00:06:24,910 --> 00:06:22,470
practice here underwater many times to

151
00:06:28,220 --> 00:06:24,920
be ready for the real thing

152
00:06:30,260 --> 00:06:28,230
welcome back since you've had a chance

153
00:06:32,630 --> 00:06:30,270
to see how massive those structures are

154
00:06:36,200 --> 00:06:32,640
you now know why we need to pull this

155
00:06:37,100 --> 00:06:36,210
big the NBL is one of the largest indoor

156
00:06:41,120 --> 00:06:37,110
pools in the

157
00:06:44,650 --> 00:06:41,130
world it measures about 200 feet long by

158
00:06:47,690 --> 00:06:44,660
a hundred feet wide and 40 feet deep

159
00:06:49,820 --> 00:06:47,700
through the use of VR technology there's

160
00:06:54,950 --> 00:06:49,830
one thing you didn't have to worry about

161
00:06:57,320 --> 00:06:54,960
on your dodge air even though you can't

162
00:06:59,450 --> 00:06:57,330
see it every breath you take is a

163
00:07:01,760 --> 00:06:59,460

reminder that you're constantly relying

164
00:07:04,250 --> 00:07:01,770
on it and it's one of the reasons why we

165
00:07:06,800 --> 00:07:04,260
train in a pool it's just like in space

166
00:07:10,760 --> 00:07:06,810
if you go underwater without oxygen you

167
00:07:12,950 --> 00:07:10,770
can't survive long in space astronauts

168
00:07:15,370 --> 00:07:12,960
need to wear a pressurized spacesuit in

169
00:07:18,170 --> 00:07:15,380
order to survive outside of a spacecraft

170
00:07:21,440 --> 00:07:18,180
one way to think of it is like flying in

171
00:07:23,570 --> 00:07:21,450
an airplane a plane is pressurized just

172
00:07:26,000 --> 00:07:23,580
like a spacesuit so as you fly higher

173
00:07:29,510 --> 00:07:26,010
and higher you have all the oxygen you

174
00:07:32,840 --> 00:07:29,520
need to survive take a moment to look

175
00:07:35,420 --> 00:07:32,850
around you over there are the cranes

176
00:07:39,890 --> 00:07:35,430
that help astronauts get suited up and

177
00:07:42,980 --> 00:07:39,900
into and out of the pool up above is the

178
00:07:45,080 --> 00:07:42,990
control room where all operations on top

179
00:07:48,080 --> 00:07:45,090
of and under the water are managed and

180
00:07:50,830 --> 00:07:48,090
monitored that's right there are

181
00:07:53,420 --> 00:07:50,840
training exercises on top of the water -

182
00:07:55,640 --> 00:07:53,430
one of those is a simulated water

183
00:07:58,240 --> 00:07:55,650
landing where crews practice getting

184
00:08:01,100 --> 00:07:58,250
astronauts out of the capsule safely

185
00:08:03,350 --> 00:08:01,110
well what we've covered here today in

186
00:08:05,980 --> 00:08:03,360
just a few minutes it takes these

187
00:08:08,960 --> 00:08:05,990
brilliant women and men years to master

188
00:08:12,260 --> 00:08:08,970

but they're committed to continuing the

189
00:08:15,650 --> 00:08:12,270
quest of pioneering beyond Earth that's

190
00:08:19,190 --> 00:08:15,660
it for today but we'll see you next time

191
00:08:20,450 --> 00:08:19,200
as we prepare to launch America hi my

192
00:08:21,680 --> 00:08:20,460
name is Steve stitch I'm the deputy

193
00:08:24,530 --> 00:08:21,690
program manager for Commercial Crew