1
00:00:07,030 --> 00:00:04,150
while the expedition 40 station crew

2
00:00:09,350 --> 00:00:07,040
continues it's a busy day some 260

3
00:00:11,190 --> 00:00:09,360
statute miles above earth another crew

4
00:00:14,230 --> 00:00:11,200
of astronauts took space exploration

5
00:00:16,470 --> 00:00:14,240
below the sea the nemo 18 crew

6
00:00:20,150 --> 00:00:16,480
japanese astronaut aki hoshide who is

7
00:00:22,630 --> 00:00:20,160
serving as the nemo 18 commander and is

8
00:00:24,710 --> 00:00:22,640
his uh crew nasa astronauts jeanette

9
00:00:27,189 --> 00:00:24,720
epps and mark vande high and

10
00:00:28,310 --> 00:00:27,199
european space agency astronaut thomas

11
00:00:30,470 --> 00:00:28,320
pesquet

12
00:00:33,030 --> 00:00:30,480
who are now at submerged underwater for

13
00:00:34,790 --> 00:00:33,040

their third day of its nine-day

14
00:00:37,350 --> 00:00:34,800
underwater mission at the aquarius

15
00:00:39,430 --> 00:00:37,360
habitat that is serving as a test bed

16
00:00:40,950 --> 00:00:39,440
for new space tools as well as training

17
00:00:43,030 --> 00:00:40,960
grounds for the astronauts getting

18
00:00:45,110 --> 00:00:43,040
first-hand experience and knowledge

19
00:00:47,029 --> 00:00:45,120
working and living in an extreme

20
00:00:49,430 --> 00:00:47,039
environment in preparation for space

21
00:00:51,430 --> 00:00:49,440
flight this morning i had a chance to go

22
00:00:54,709 --> 00:00:51,440
undersea and talk with one of its crew

23
00:00:56,389 --> 00:00:54,719
members of a nemo 18 aquanaut and nasa

24
00:00:58,150 --> 00:00:56,399
astronaut janette epps to ask her how

25
00:01:01,270 --> 00:00:58,160
it's going

26
00:01:03,189 --> 00:01:01,280
it's actually going really well

27
00:01:04,549 --> 00:01:03,199
and now this week um we're in mission

28
00:01:05,670 --> 00:01:04,559
day three

29
00:01:09,030 --> 00:01:05,680
of the um

30
00:01:11,350 --> 00:01:09,040
of the mission and yesterday i did eva

31
00:01:13,750 --> 00:01:11,360
with aki and we had a few problems with

32
00:01:16,070 --> 00:01:13,760
comms but everything seemed to work out

33
00:01:18,390 --> 00:01:16,080
in the end we got a lot of good data

34
00:01:21,030 --> 00:01:18,400
and we came back into the habitat

35
00:01:23,749 --> 00:01:21,040
experience and so today we have tama and

36
00:01:26,789 --> 00:01:23,759
market mark outside and um they're in

37
00:01:28,950 --> 00:01:26,799
the melvin eva right now that sounds

38
00:01:31,830 --> 00:01:28,960

great so eva so basically you did a

39
00:01:32,950 --> 00:01:31,840
scuba walk to simulate a space walk what

40
00:01:35,350 --> 00:01:32,960
that would be like and i know i

41
00:01:37,350 --> 00:01:35,360
understand you went out yesterday with

42
00:01:38,710 --> 00:01:37,360
aki hoshide and you guys were working on

43
00:01:40,950 --> 00:01:38,720
doing some drill

44
00:01:43,429 --> 00:01:40,960
core samples is that correct

45
00:01:46,230 --> 00:01:43,439
that is exactly right and um thanks for

46
00:01:48,149 --> 00:01:46,240
explaining these and so yesterday we

47
00:01:50,149 --> 00:01:48,159
went out and we were

48
00:01:53,350 --> 00:01:50,159
pretending that we were excavating or

49
00:01:55,590 --> 00:01:53,360
exploiting an asteroid so we had a

50
00:01:58,550 --> 00:01:55,600
drill with a core on it so that we can

51
00:02:01,270 --> 00:01:58,560
take core samples from a mock asteroid

52
00:02:05,190 --> 00:02:01,280
and we also had cutting tools so that we

53
00:02:07,109 --> 00:02:05,200
can um basically take samples from

54
00:02:09,109 --> 00:02:07,119
the asteroid as well

55
00:02:11,990 --> 00:02:09,119
so you're going underwater for nine days

56
00:02:14,390 --> 00:02:12,000
um can you explain to me how do you feel

57
00:02:16,070 --> 00:02:14,400
being submerged for nine days underwater

58
00:02:17,589 --> 00:02:16,080
at that habitat and doing things like

59
00:02:19,030 --> 00:02:17,599
you did yesterday the scuba walk to

60
00:02:21,190 --> 00:02:19,040
simulate the spacewalk how is that

61
00:02:24,150 --> 00:02:21,200
preparing you to get ready for a space

62
00:02:25,990 --> 00:02:24,160
flight well so i haven't flown but i can

63
00:02:27,270 --> 00:02:26,000

um you know in talking with aki our

64
00:02:28,790 --> 00:02:27,280
commander

65
00:02:31,110 --> 00:02:28,800
some of the things that we experience

66
00:02:32,869 --> 00:02:31,120
here for example um we're

67
00:02:35,110 --> 00:02:32,879
in saturation so that means that we

68
00:02:37,110 --> 00:02:35,120
can't just ascend to the surface anytime

69
00:02:39,110 --> 00:02:37,120
we want and that means we have too much

70
00:02:40,949 --> 00:02:39,120
nitrogen in our blood so we have to

71
00:02:42,630 --> 00:02:40,959
basically

72
00:02:45,430 --> 00:02:42,640
so

73
00:02:47,910 --> 00:02:45,440
even go back home is one way that it's

74
00:02:50,309 --> 00:02:47,920
um simulating space but also there's six

75
00:02:52,710 --> 00:02:50,319
people here and on the space station at

76
00:02:53,750 --> 00:02:52,720
a given time you have maximum six people

77
00:02:55,670 --> 00:02:53,760
right now

78
00:02:57,350 --> 00:02:55,680
and so that's another way and then you

79
00:03:00,229 --> 00:02:57,360
know we have to have things delivered to

80
00:03:02,550 --> 00:03:00,239
us as if we had a a logistics vehicle

81
00:03:04,790 --> 00:03:02,560
that would deliver stuff we have divers

82
00:03:07,190 --> 00:03:04,800
bringing things down from the surface

83
00:03:09,270 --> 00:03:07,200
and um bring them to us so there's a lot

84
00:03:11,509 --> 00:03:09,280
of similarities also our timeline is

85
00:03:14,070 --> 00:03:11,519
such that it's very similar to what we

86
00:03:16,070 --> 00:03:14,080
would have on a space station and i'm

87
00:03:18,869 --> 00:03:16,080
comparing this to what um aki our

88
00:03:21,830 --> 00:03:18,879

commander has told us and it's very fast

89
00:03:22,790 --> 00:03:21,840
pace there's a lot going on all the time

90
00:03:24,710 --> 00:03:22,800
and um

91
00:03:26,309 --> 00:03:24,720
you're really doing a lot of great

92
00:03:29,350 --> 00:03:26,319
things especially some of the experience

93
00:03:31,110 --> 00:03:29,360
that we're doing the um evas the mock

94
00:03:32,470 --> 00:03:31,120
spacewalks that we're doing to simulate

95
00:03:33,910 --> 00:03:32,480
going to an asteroid

96
00:03:35,990 --> 00:03:33,920
so all the things that we're doing

97
00:03:39,190 --> 00:03:36,000
everything is an experiment to further

98
00:03:43,030 --> 00:03:40,789
one other thing i'm hearing just a

99
00:03:44,830 --> 00:03:43,040
couple of breaks as we're talking and so

100
00:03:47,110 --> 00:03:44,840
it just leads me to think about

101
00:03:49,509 --> 00:03:47,120
another activity i think you guys are

102
00:03:51,830 --> 00:03:49,519
working on is uh how to deal with

103
00:03:54,309 --> 00:03:51,840
communication delays can you tell me how

104
00:03:56,710 --> 00:03:54,319
you guys are simulating that

105
00:03:58,390 --> 00:03:56,720
yes so um over the next few days we

106
00:04:00,550 --> 00:03:58,400
haven't started yet but in the next few

107
00:04:03,750 --> 00:04:00,560
days we're going to start having a calm

108
00:04:05,509 --> 00:04:03,760
delay with with the um topside so what

109
00:04:07,350 --> 00:04:05,519
we're simulating is if you go on a

110
00:04:09,190 --> 00:04:07,360
mission to mars it's going to take a

111
00:04:10,470 --> 00:04:09,200
little time for that signal to get back

112
00:04:13,110 --> 00:04:10,480
to earth

113
00:04:15,589 --> 00:04:13,120

so how do we cope with that um it seems

114
00:04:16,550 --> 00:04:15,599
like a simple

115
00:04:19,509 --> 00:04:16,560
and

116
00:04:23,749 --> 00:04:19,519
um interesting when you have a 30-second

117
00:04:27,590 --> 00:04:25,350
and then when you send a message back it

118
00:04:31,990 --> 00:04:27,600
takes another third

119
00:04:37,670 --> 00:04:35,830
so um that time delay in many situations

120
00:04:39,110 --> 00:04:37,680
where we're either performing some kind

121
00:04:40,230 --> 00:04:39,120
of procedure

122
00:04:42,629 --> 00:04:40,240
um

123
00:04:44,629 --> 00:04:42,639
building some kind of piece of equipment

124
00:04:46,150 --> 00:04:44,639
you know if we're running procedures and

125
00:04:48,870 --> 00:04:46,160
different things like that or even an

126
00:04:51,430 --> 00:04:48,880
emergency how do we cope with

127
00:04:54,150 --> 00:04:51,440
um having a time delay like that and so

128
00:04:57,350 --> 00:04:54,160
developing the the methodology to do

129
00:04:59,909 --> 00:04:57,360
that will help us once we go to mars or

130
00:05:02,870 --> 00:04:59,919
even beyond mars so

131
00:05:05,350 --> 00:05:02,880
developing a protocol for communications

132
00:05:07,029 --> 00:05:05,360
is very important because um

133
00:05:09,510 --> 00:05:07,039
you can have

134
00:05:11,029 --> 00:05:09,520
frustrations you can it can even lead to

135
00:05:13,189 --> 00:05:11,039
miscommunication

136
00:05:14,950 --> 00:05:13,199
which we want to avoid so developing a

137
00:05:17,830 --> 00:05:14,960
protocol is um

138
00:05:19,510 --> 00:05:17,840

a good priority for us right now what

139
00:05:20,870 --> 00:05:19,520
other activities are you guys working on

140
00:05:25,189 --> 00:05:20,880
i understand there's some human body

141
00:05:26,629 --> 00:05:25,199
studies so what are you doing to do yes

142
00:05:28,469 --> 00:05:26,639
so we're looking at several different

143
00:05:31,189 --> 00:05:28,479
things so we're wearing these on badges

144
00:05:33,110 --> 00:05:31,199
i don't have my badge on now but um

145
00:05:36,310 --> 00:05:33,120
there's several different badges that

146
00:05:38,469 --> 00:05:36,320
look at team adhesion and cohesion and

147
00:05:40,469 --> 00:05:38,479
how we interact with each other

148
00:05:42,870 --> 00:05:40,479
and so i'm very fortunate because i've

149
00:05:45,270 --> 00:05:42,880
got a good group of guys and so

150
00:05:47,270 --> 00:05:45,280
it's an easy experiment for us but it

151
00:05:49,590 --> 00:05:47,280
looks at proximity to each other it

152
00:05:51,350 --> 00:05:49,600
looks at our heart rate it looks at um

153
00:05:53,830 --> 00:05:51,360
there's other studies that look at the

154
00:05:56,710 --> 00:05:53,840
um hormones that we produce when we're

155
00:05:57,830 --> 00:05:56,720
in a attention uh

156
00:06:00,150 --> 00:05:57,840
from

157
00:06:02,309 --> 00:06:00,160
experiments where we're playing sort of

158
00:06:04,870 --> 00:06:02,319
a game and it looks at our hormones

159
00:06:06,629 --> 00:06:04,880
before and after there's another study

160
00:06:09,270 --> 00:06:06,639
that looks at how our inner ear

161
00:06:12,230 --> 00:06:09,280
stability is affected

162
00:06:14,070 --> 00:06:12,240
um so we there's several other um

163
00:06:16,550 --> 00:06:14,080

techniques we're looking at

164
00:06:18,629 --> 00:06:16,560
where certain types of um

165
00:06:21,189 --> 00:06:18,639
monitor

166
00:06:23,110 --> 00:06:21,199
so we're looking at many different ways

167
00:06:25,909 --> 00:06:23,120
for our health and human performance as

168
00:06:27,590 --> 00:06:25,919
well so all of it seems to work together

169
00:06:29,909 --> 00:06:27,600
human being that's going to be deployed

170
00:06:32,309 --> 00:06:29,919
into space as well as some of the tools

171
00:06:34,469 --> 00:06:32,319
that we use on the surface if we ever go