
F2 A
08

1
00:00:05,910 --> 00:00:03,830
there are many of the activities and

2
00:00:08,150 --> 00:00:05,920
experiments that are going on on board

3
00:00:10,390 --> 00:00:08,160
the international space station they're

4
00:00:13,110 --> 00:00:10,400
actually aimed at getting

5
00:00:15,669 --> 00:00:13,120
uh getting us human beings ready to

6
00:00:16,710 --> 00:00:15,679
expand human exploration out into deep

7
00:00:22,150 --> 00:00:16,720
space

8
00:00:24,870 --> 00:00:22,160
nasa's springboard to the exploration of

9
00:00:27,029 --> 00:00:24,880
asteroids and eventually to mars and

10
00:00:28,790 --> 00:00:27,039
nasa is actively preparing for those

11
00:00:30,710 --> 00:00:28,800
missions right now

12
00:00:32,630 --> 00:00:30,720
in fact today underwater out at the

13
00:00:35,350 --> 00:00:32,640

neutral buoyancy laboratory here at the

14
00:00:37,670 --> 00:00:35,360
johnson space center uh astronauts stan

15
00:00:39,830 --> 00:00:37,680
love and steve bowen are trying out some

16
00:00:42,229 --> 00:00:39,840
of the tools and techniques that we

17
00:00:44,150 --> 00:00:42,239
would use to explore an asteroid they've

18
00:00:46,389 --> 00:00:44,160
agreed to take a few minutes right now

19
00:00:48,389 --> 00:00:46,399
to talk with us about what they're doing

20
00:00:50,950 --> 00:00:48,399
it's our first underwater interview from

21
00:00:52,229 --> 00:00:50,960
the nbl good morning gentlemen stan love

22
00:00:54,150 --> 00:00:52,239
can you hear me

23
00:00:56,389 --> 00:00:54,160
loud and clear how do you have me we got

24
00:00:58,229 --> 00:00:56,399
you a five by five stan would you start

25
00:00:59,990 --> 00:00:58,239
by explaining to us what you guys are

26
00:01:02,389 --> 00:01:00,000
doing down there today

27
00:01:03,670 --> 00:01:02,399
sure we're doing two main things here

28
00:01:05,910 --> 00:01:03,680
first of all

29
00:01:08,870 --> 00:01:05,920
we're working on the techniques and

30
00:01:11,429 --> 00:01:08,880
tools that we might use someday

31
00:01:13,670 --> 00:01:11,439
to explore a small asteroid it was

32
00:01:15,749 --> 00:01:13,680
captured from orbit around the sun and

33
00:01:17,429 --> 00:01:15,759
brought back by a robot spacecraft to

34
00:01:19,429 --> 00:01:17,439
orbit around the moon

35
00:01:21,429 --> 00:01:19,439
and when it's there we can send people

36
00:01:23,590 --> 00:01:21,439
there to take samples and take a look at

37
00:01:24,950 --> 00:01:23,600
it up close so that's our one main task

38
00:01:27,990 --> 00:01:24,960

we're looking at the tools we've used

39
00:01:30,630 --> 00:01:28,000
for that how we take those samples

40
00:01:34,230 --> 00:01:30,640
the second thing we're doing is testing

41
00:01:36,789 --> 00:01:34,240
whether a an upgraded version of our

42
00:01:38,550 --> 00:01:36,799
bailout and survival suit

43
00:01:40,469 --> 00:01:38,560
basically similar to the one we used on

44
00:01:42,789 --> 00:01:40,479
the space shuttle can work as a

45
00:01:44,230 --> 00:01:42,799
full-blown space suit for doing space

46
00:01:46,550 --> 00:01:44,240
walk and that's the suit you're wearing

47
00:01:48,710 --> 00:01:46,560
now right correct that's the orange it's

48
00:01:50,870 --> 00:01:48,720
called a modified asus suit

49
00:01:52,389 --> 00:01:50,880
and if you remember the uh all the

50
00:01:53,830 --> 00:01:52,399
footage you saw of shuttle crews

51
00:01:55,350 --> 00:01:53,840
marching out to go strap into the space

52
00:01:56,950 --> 00:01:55,360
shuttle wearing those orange suits

53
00:01:58,069 --> 00:01:56,960
that's this suit with some important

54
00:01:59,990 --> 00:01:58,079
upgrades

55
00:02:02,389 --> 00:02:00,000
for example what's different about it

56
00:02:04,469 --> 00:02:02,399
other than the color

57
00:02:06,389 --> 00:02:04,479
the color's still the same

58
00:02:07,830 --> 00:02:06,399
it's uh life support connectors are

59
00:02:11,430 --> 00:02:07,840
completely different it's also been

60
00:02:12,710 --> 00:02:11,440
modified so that it fits us more snugly

61
00:02:14,869 --> 00:02:12,720
and gives you a little bit more body

62
00:02:16,949 --> 00:02:14,879
mobility and it's been biased to put the

63
00:02:20,630 --> 00:02:16,959

arms in a better working location for

64
00:02:25,350 --> 00:02:23,350
steve is is there behind you uh can you

65
00:02:27,510 --> 00:02:25,360
tell us a little steve how working in

66
00:02:29,830 --> 00:02:27,520
this suit and on this this sort of a

67
00:02:31,990 --> 00:02:29,840
project would be different than the the

68
00:02:35,030 --> 00:02:32,000
kind of tasks you've done on seven space

69
00:02:37,430 --> 00:02:35,040
walks on the space station

70
00:02:39,509 --> 00:02:37,440
well when you are working in the

71
00:02:41,830 --> 00:02:39,519
emu you know it was designed to operate

72
00:02:43,910 --> 00:02:41,840
in space and to do those tasks and

73
00:02:45,430 --> 00:02:43,920
uh so two other upgrades to these suits

74
00:02:48,470 --> 00:02:45,440
the gloves

75
00:02:50,390 --> 00:02:48,480
and the boots are both from the emu

76
00:02:52,790 --> 00:02:50,400
so they help with your ability to do

77
00:02:55,589 --> 00:02:52,800
work and originally orion was designed

78
00:02:57,589 --> 00:02:55,599
without any eva capability at all

79
00:02:59,670 --> 00:02:57,599
and the crew office and some others felt

80
00:03:02,149 --> 00:02:59,680
very strongly that we needed to have a

81
00:03:04,390 --> 00:03:02,159
contingency capability

82
00:03:06,149 --> 00:03:04,400
and so the idea of using doing an

83
00:03:08,309 --> 00:03:06,159
umbilical spacewalk

84
00:03:11,030 --> 00:03:08,319
in a in the suit you were launching and

85
00:03:12,630 --> 00:03:11,040
landing in aces at the time

86
00:03:14,869 --> 00:03:12,640
uh

87
00:03:17,110 --> 00:03:14,879
came to be a concept and so once we

88
00:03:18,630 --> 00:03:17,120

tested that

89
00:03:21,350 --> 00:03:18,640
we found that we actually had better

90
00:03:23,509 --> 00:03:21,360
mobility than we anticipated uh still

91
00:03:25,190 --> 00:03:23,519
have a long way to go to get any real

92
00:03:26,550 --> 00:03:25,200
useful mobility

93
00:03:28,550 --> 00:03:26,560
um

94
00:03:29,830 --> 00:03:28,560
and as far as what we're what we will be

95
00:03:31,190 --> 00:03:29,840
able to do in this suit we just don't

96
00:03:33,430 --> 00:03:31,200
know because it needs some significant

97
00:03:35,910 --> 00:03:33,440
modifications to make it uh easy to

98
00:03:37,990 --> 00:03:35,920
translate as you can see you know i

99
00:03:40,630 --> 00:03:38,000
can't stretch my arms out as quite as

100
00:03:42,390 --> 00:03:40,640
far as we're used to in the emu and

101
00:03:44,630 --> 00:03:42,400
the work envelope is very small it's

102
00:03:47,030 --> 00:03:44,640
hard to go all the way across

103
00:03:48,789 --> 00:03:47,040
so uh as we get through as stan said as

104
00:03:51,110 --> 00:03:48,799
we look at these tasks these tasks are

105
00:03:53,670 --> 00:03:51,120
outstanding to help us develop what

106
00:03:54,630 --> 00:03:53,680
needs to be modified in the suit as well

107
00:03:55,990 --> 00:03:54,640
uh

108
00:03:57,670 --> 00:03:56,000
they're just two concepts that seem to

109
00:04:00,229 --> 00:03:57,680
work well together to

110
00:04:02,070 --> 00:04:00,239
potentially achieve this mission apart

111
00:04:04,149 --> 00:04:02,080
from the suits what else do we still

112
00:04:05,670 --> 00:04:04,159
need to work out before we can

113
00:04:08,710 --> 00:04:05,680

go to an asteroid and do something

114
00:04:11,990 --> 00:04:10,390
i'll let stan explain that he's the one

115
00:04:14,470 --> 00:04:12,000
playing with the coals today

116
00:04:16,229 --> 00:04:14,480
oh there's all sorts of things um

117
00:04:18,310 --> 00:04:16,239
uh for instance from lessons learned

118
00:04:20,150 --> 00:04:18,320
this is uh steve's in my second uh

119
00:04:21,430 --> 00:04:20,160
second run in this suit last time we

120
00:04:24,230 --> 00:04:21,440
learned that if you try to use a

121
00:04:25,430 --> 00:04:24,240
geologic hammer in a spacesuit where

122
00:04:27,110 --> 00:04:25,440
your work envelopes right in front of

123
00:04:29,830 --> 00:04:27,120
your faceplate that's not really a very

124
00:04:32,310 --> 00:04:29,840
good idea so we still have a lot of uh

125
00:04:35,110 --> 00:04:32,320
room for improvement on tools and then i

126
00:04:36,070 --> 00:04:35,120
guess the the biggest unknown for going

127
00:04:38,469 --> 00:04:36,080
out and

128
00:04:41,189 --> 00:04:38,479
doing a spacewalk on a captured asteroid

129
00:04:42,629 --> 00:04:41,199
is what the asteroid is going to be like

130
00:04:44,790 --> 00:04:42,639
the small asteroids that we could go and

131
00:04:46,230 --> 00:04:44,800
get with the robot ship are tiny they're

132
00:04:48,710 --> 00:04:46,240
you know

133
00:04:51,270 --> 00:04:48,720
a few yards across and even in the

134
00:04:53,430 --> 00:04:51,280
world's finest telescopes they're a dot

135
00:04:55,670 --> 00:04:53,440
so you may not know till you get there

136
00:04:58,469 --> 00:04:55,680
whether you're dealing with basically a

137
00:05:00,790 --> 00:04:58,479
pile of gravel

138
00:05:02,550 --> 00:05:00,800

that's loosely held together by its own

139
00:05:04,790 --> 00:05:02,560
weak self-gravity

140
00:05:05,909 --> 00:05:04,800
or it could be a solid chunk of nickel

141
00:05:08,150 --> 00:05:05,919
iron

142
00:05:09,510 --> 00:05:08,160
and the way you would move around on

143
00:05:11,430 --> 00:05:09,520
those the way you would take samples

144
00:05:12,710 --> 00:05:11,440
from them are completely different and

145
00:05:14,550 --> 00:05:12,720
at this point we just don't know what

146
00:05:16,550 --> 00:05:14,560
we're getting so we're kind of exploring

147
00:05:17,909 --> 00:05:16,560
what we can here in the pool so that on

148
00:05:19,749 --> 00:05:17,919
the real day we can have a better chance

149
00:05:21,110 --> 00:05:19,759
of doing it correctly and that's exactly

150
00:05:23,189 --> 00:05:21,120
why we do it

151
00:05:24,550 --> 00:05:23,199
uh stan and steve i really appreciate

152
00:05:26,790 --> 00:05:24,560
you taking a couple of minutes to talk

153
00:05:27,990 --> 00:05:26,800
to us it's it's fun to to do that and to

154
00:05:29,350 --> 00:05:28,000
see what you're working on there good