1
00:00:00,980 --> 00:00:03,260
>> We are with Dave Cohen
here at this time back

2
00:00:03,260 --> 00:00:05,330
in the space vehicle
mockup facility.

3
00:00:05,330 --> 00:00:07,620
Dave is one of the RATs
crew members this year

4
00:00:07,620 --> 00:00:09,840
so he's had probably a lot
of interesting adventures

5
00:00:09,840 --> 00:00:11,440
over the past 10 or so days.

6
00:00:11,440 --> 00:00:12,150
>> Dave Cohen: Has been, yeah.

7
00:00:12,150 --> 00:00:13,100
>> Thanks for joining us.

8
00:00:13,100 --> 00:00:13,660
>> Dave Cohen: Sure.

9
00:00:13,660 --> 00:00:14,370
>> So tell us ...

10
00:00:14,370 --> 00:00:14,460
>> Dave Cohen: Sure.

11
00:00:14,460 --> 00:00:16,540
>> Tell us a little -- give
us an overview of what you

12

00:00:16,540 --> 00:00:18,040
as a crew member
have been doing.

13
00:00:18,040 --> 00:00:21,650
>> Dave Cohen: Well we've been
testing now for nine days or so

14
00:00:21,650 --> 00:00:24,470
and just doing different
valuations of how we might fly

15
00:00:24,470 --> 00:00:27,990
around an asteroid and actually
take some geological samples.

16
00:00:27,990 --> 00:00:30,760
So we've been trying various
things and using various tools

17
00:00:30,760 --> 00:00:34,100
and areas of testing
to simulate that.

18
00:00:34,100 --> 00:00:37,400
And just kind of get a feel
for how we might do stuff

19
00:00:37,400 --> 00:00:38,780
and really evaluate
our operations

20
00:00:38,780 --> 00:00:41,930
from both a technical point
of view for the engineering

21
00:00:41,930 --> 00:00:44,260
of the tools and the vehicles
and also from a geological

22

00:00:44,260 --> 00:00:46,070
and kind of science
point of view.

23
00:00:46,070 --> 00:00:48,050
>> So has it felt like you've
been exploring an asteroid?

24
00:00:48,050 --> 00:00:49,630
>> Dave Cohen: Actually you know
at times it really has been.

25
00:00:49,630 --> 00:00:52,940
When you're in a MMSCV flying
around and they project

26
00:00:52,940 --> 00:00:55,570
out a SIM during
virtual world and it --

27
00:00:55,570 --> 00:00:57,530
when you're flying that
vehicle that's all you see

28
00:00:57,530 --> 00:00:59,260
out the front windows
and it looks

29
00:00:59,260 --> 00:01:01,000
like you're actually there.

30
00:01:01,000 --> 00:01:02,950
>> That's sort of the
Rover, basically ...

31
00:01:02,950 --> 00:01:03,130
>> Dave Cohen: Yes.

32
00:01:03,130 --> 00:01:04,370
>> ... that would fly

along the surface,

33
00:01:04,370 --> 00:01:05,750
the space exploration vehicle.

34
00:01:05,750 --> 00:01:06,230
>> Dave Cohen: That's right.

35
00:01:06,230 --> 00:01:08,820
>> And I think you've
spent some nights

36
00:01:08,820 --> 00:01:10,200
in that vehicle as well, right?

37
00:01:10,200 --> 00:01:10,850
>> Dave Cohen: We did, yeah.

38
00:01:10,850 --> 00:01:13,330
I spent three full days
in there and two nights.

39
00:01:13,330 --> 00:01:15,640
So that was quite
a little adventure.

40
00:01:15,640 --> 00:01:18,480
You know it's about the
size of a van on the inside.

41
00:01:18,480 --> 00:01:20,930
So it was interesting
to be stuck in there

42
00:01:20,930 --> 00:01:21,850
and not be allowed to leave.

43
00:01:21,850 --> 00:01:23,340
The only time we were

allowed to leave is

44
00:01:23,340 --> 00:01:25,050
when we did our space walks.

45
00:01:25,050 --> 00:01:27,950
>> So you ate in there,
slept in there, everything.

46
00:01:27,950 --> 00:01:28,550
>> Dave Cohen: Slept,

47
00:01:28,550 --> 00:01:30,050
did everything we had
to do inside there.

48
00:01:30,050 --> 00:01:30,820
>> What's the point of that?

49
00:01:30,820 --> 00:01:32,930
Why have somebody spend
the night in there?

50
00:01:32,930 --> 00:01:33,910
>> Dave Cohen: Well
they're thinking of --

51
00:01:33,910 --> 00:01:36,110
so it would a long
mission to an asteroid.

52
00:01:36,110 --> 00:01:38,490
You know it could be
several weeks to even months

53
00:01:38,490 --> 00:01:42,150
so they're looking at going in
a large habitat but then to get

54

00:01:42,150 --> 00:01:44,560
down to the asteroid they've
developed this multi-mission

55
00:01:44,560 --> 00:01:45,590
space exploration vehicle

56
00:01:45,590 --> 00:01:47,700
to actually fly towards
the surface.

57
00:01:47,700 --> 00:01:51,840
And that way they don't - your
ride home doesn't get endangered

58
00:01:51,840 --> 00:01:53,140
by being too close
to the asteroid.

59
00:01:53,140 --> 00:01:53,310
>> Okay.

60
00:01:53,310 --> 00:01:54,710
>> Dave Cohen: So when
you fly down in order

61
00:01:54,710 --> 00:01:57,370
to save fuel they want to
stay there for a few days.

62
00:01:57,370 --> 00:02:00,560
So they're thinking three
days to maybe 14 days.

63
00:02:00,560 --> 00:02:03,010
So we were doing a three
day habitability study

64
00:02:03,010 --> 00:02:06,180
to see how comfortable it is

to stay in there for three days

65
00:02:06,180 --> 00:02:08,310
and what other stuff you
would need in the vehicle

66
00:02:08,310 --> 00:02:09,110
that they haven't thought of

67
00:02:09,110 --> 00:02:11,210
yet to make it more
comfortable and survivable.

68
00:02:11,210 --> 00:02:12,950
>> So what's the verdict?

69
00:02:12,950 --> 00:02:13,910
>> Dave Cohen: It's
not too bad actually.

70
00:02:13,910 --> 00:02:15,080
You know it looks really small.

71
00:02:15,080 --> 00:02:17,110
It looks small from the
outside and even on the inside

72
00:02:17,110 --> 00:02:19,750
when you first get in
there it's kind of small.

73
00:02:19,750 --> 00:02:21,680
But living in there
it's not too bad.

74
00:02:21,680 --> 00:02:23,000
It's kind of like camping.

75
00:02:23,000 --> 00:02:24,420

>> Okay.

76
00:02:24,420 --> 00:02:26,270
>> Dave Cohen: You just don't
get to go outside too much.

77
00:02:26,270 --> 00:02:28,670
>> And so you let's
see you also mentioned

78
00:02:28,670 --> 00:02:31,040
that you've participated
in space walks

79
00:02:31,040 --> 00:02:33,300
from the virtual
[inaudible] and probably some

80
00:02:33,300 --> 00:02:34,960
on ARGUS here behind us,

81
00:02:34,960 --> 00:02:37,440
the active response
gravity upload system,

82
00:02:37,440 --> 00:02:38,210
did I get that right?

83
00:02:38,210 --> 00:02:39,780
>> Dave Cohen: Right, very good.

84
00:02:39,780 --> 00:02:42,000
>> Okay, so what did
you learn through that?

85
00:02:42,000 --> 00:02:43,340
>> Dave Cohen: So yeah we
would do those two types

86

00:02:43,340 --> 00:02:45,890
and we'd use them
both differently.

87
00:02:45,890 --> 00:02:48,430
You know we'd go to the
[inaudible] laboratory

88
00:02:48,430 --> 00:02:49,980
and put on some VR goggles.

89
00:02:49,980 --> 00:02:52,640
So that made it look like we
were looking at the asteroid

90
00:02:52,640 --> 00:02:53,860
and really immersed us in it.

91
00:02:53,860 --> 00:02:55,480
>> And you're basically seeing
the same thing they were

92
00:02:55,480 --> 00:02:57,810
through the windows of the space
exploration vehicle, right.

93
00:02:57,810 --> 00:03:00,170
>> Dave Cohen: Right so those
two worlds are tied together

94
00:03:00,170 --> 00:03:02,230
and we can fly our jet
packs around there.

95
00:03:02,230 --> 00:03:03,660
So, you know, one concept is

96
00:03:03,660 --> 00:03:06,050
to have a little individual
jet pack and to fly

97
00:03:06,050 --> 00:03:08,310
around the surface and
collect samples that way.

98
00:03:08,310 --> 00:03:11,040
So in the VR lab we could do
that kind of thing and it's,

99
00:03:11,040 --> 00:03:12,830
you know, really
high fidelity visual.

100
00:03:12,830 --> 00:03:15,350
So you, again, you feel
like you're right there.

101
00:03:15,350 --> 00:03:17,480
But the only downside is
you can't really do anything

102
00:03:17,480 --> 00:03:19,820
in the virtual world because
it's all computer generated.

103
00:03:19,820 --> 00:03:21,820
So the other type of space
walk we do would be to come

104
00:03:21,820 --> 00:03:23,910
over to the ARGUS system
and actually physically pick

105
00:03:23,910 --> 00:03:28,080
up some tools and actually,
you know, use hammers to hammer

106
00:03:28,080 --> 00:03:30,880
on a rock and collect a sample
or use some of our other tools

107
00:03:30,880 --> 00:03:33,670
to collect some soil
samples or actually evaluate

108
00:03:33,670 --> 00:03:35,220
that long boom back
there is one thing.

109
00:03:35,220 --> 00:03:38,920
You know so some actual physical
space walk hardware so kind

110
00:03:38,920 --> 00:03:40,250
of two different ways to do it

111
00:03:40,250 --> 00:03:41,840
and give us two different
valuations and kind

112
00:03:41,840 --> 00:03:44,300
of put the whole big picture
thing together at the end

113
00:03:44,300 --> 00:03:47,680
to give an overall
evaluation of the condition.

114
00:03:47,680 --> 00:03:51,420
>> Well and so you
actually may recognize Dave

115
00:03:51,420 --> 00:03:53,880
from some other activities
that he's been involved in.

116
00:03:53,880 --> 00:03:56,310
He's a space walker
officer for Mission Control,

117
00:03:56,310 --> 00:03:58,790
kind of moonlighting here for
the RATs position, I guess.

118
00:03:58,790 --> 00:03:59,920
>> Dave Cohen: Yeah
that's right.

119
00:03:59,920 --> 00:04:01,690
>> So you now have kind of
been on both sides of it.

120
00:04:01,690 --> 00:04:04,090
You've been the person
back at mission control

121
00:04:04,090 --> 00:04:05,660
and now performing space walks.

122
00:04:05,660 --> 00:04:07,230
Does it give you a
different perspective?

123
00:04:07,230 --> 00:04:08,790
>> Dave Cohen: Actually
it does, actually.

124
00:04:08,790 --> 00:04:12,190
You know I've done like I
said the mission control stuff

125
00:04:12,190 --> 00:04:14,090
so I've done the training
and sat in mission control

126
00:04:14,090 --> 00:04:16,010
and watched, you know,
other individuals go out

127

00:04:16,010 --> 00:04:17,580
and do their space walks.

128
00:04:17,580 --> 00:04:19,820
And then come in here and doing
it yourself it's yeah it's a

129
00:04:19,820 --> 00:04:21,690
different perspective
and actually having

130
00:04:21,690 --> 00:04:23,740
to be the one physically
getting it done.

131
00:04:23,740 --> 00:04:26,730
You know at times in mission
control you might get, you know,

132
00:04:26,730 --> 00:04:29,490
wonder why things aren't
progressing the way you planned

133
00:04:29,490 --> 00:04:31,850
it or want it to go
and you get over here

134
00:04:31,850 --> 00:04:34,000
and you're actually physically
doing it yourself you can kind

135
00:04:34,000 --> 00:04:36,300
of see why things
can deviate a little

136
00:04:36,300 --> 00:04:38,670
from how you thought
it was going to happen.

137
00:04:38,670 --> 00:04:39,680

>> And can you see, you know,

138
00:04:39,680 --> 00:04:41,890
how we would use this
information in the future?

139
00:04:41,890 --> 00:04:43,270
Why, you know, why this --

140
00:04:43,270 --> 00:04:45,480
why these are good
questions to ask now?

141
00:04:45,480 --> 00:04:46,090
>> Dave Cohen: Oh absolutely.

142
00:04:46,090 --> 00:04:48,010
You know going to
an asteroid is going

143
00:04:48,010 --> 00:04:49,770
to be a very challenging thing.

144
00:04:49,770 --> 00:04:52,710
And we go to space station and
we designed it to do space walks

145
00:04:52,710 --> 00:04:54,970
on so there are hand rails
that you can hang on to

146
00:04:54,970 --> 00:04:56,900
and places you can plug
into for stability.

147
00:04:56,900 --> 00:04:59,930
You know, an asteroid
doesn't have any of that

148

00:04:59,930 --> 00:05:01,440
but then it also
doesn't have any gravity

149
00:05:01,440 --> 00:05:02,900
so you can't stand up.

150
00:05:02,900 --> 00:05:04,680
So yeah we definitely need
to put a lot of thought

151
00:05:04,680 --> 00:05:06,900
into what kind of
tools we would use

152
00:05:06,900 --> 00:05:08,230
and how we're going
to actually do stuff.

153
00:05:08,230 --> 00:05:11,020
And this is giving us a
lot of good information

154
00:05:11,020 --> 00:05:13,930
about the various methods
that will and won't work.

155
00:05:13,930 --> 00:05:15,900
And I think we've learned some
of both of those, you know,

156
00:05:15,900 --> 00:05:17,780
some of the things we've tried
didn't work so well and some

157
00:05:17,780 --> 00:05:19,040
of the things we've
tried worked really well.

158
00:05:19,040 --> 00:05:21,730

So we'll go and refine that

159
00:05:21,730 --> 00:05:23,940
and do some better
testing in the future.

160
00:05:23,940 --> 00:05:25,970
>> What's been your
favorite part?

161
00:05:25,970 --> 00:05:30,540
>> You know it's flying the
SEV is actually really fun.

162
00:05:30,540 --> 00:05:32,280
It's got a really
nice control system

163
00:05:32,280 --> 00:05:33,770
and when you're flying
it again you're looking

164
00:05:33,770 --> 00:05:35,770
at that virtual world
and you feel like --

165
00:05:35,770 --> 00:05:36,750
you feel like you're
there doing it.

166
00:05:36,750 --> 00:05:39,040
But actually I really
enjoy ARGUS too.

167
00:05:39,040 --> 00:05:42,320
It's a lot like being
almost like Peter Pan.

168
00:05:42,320 --> 00:05:44,590
You can fly around here very

easily, it will suspend you

169
00:05:44,590 --> 00:05:46,740
from this cable and
just a slight push

170
00:05:46,740 --> 00:05:49,270
and you start floating
across a surface.

171
00:05:49,270 --> 00:05:49,670
It's really neat.

172
00:05:49,670 --> 00:05:52,110
This really makes it feel
like you're in zero gravity.