
MED
2.0
MINIATURE EXERCISE DEVICE
NASA
SPACESTATION
LIVE

1
00:00:09,669 --> 00:00:07,829
the cygnus cargo ship headed to the

2
00:00:11,669 --> 00:00:09,679
international space station later

3
00:00:13,830 --> 00:00:11,679
tonight will deliver supplies for the

4
00:00:16,150 --> 00:00:13,840
crew and more science experiments just

5
00:00:18,230 --> 00:00:16,160
as previous ones have done before but

6
00:00:20,310 --> 00:00:18,240
this cygnus will also be carrying a new

7
00:00:22,230 --> 00:00:20,320
all-in-one exercise device which was

8
00:00:24,070 --> 00:00:22,240
prepared for flight in just about a

9
00:00:26,390 --> 00:00:24,080
year's time

10
00:00:28,230 --> 00:00:26,400
recently my colleague brandy dean spoke

11
00:00:29,910 --> 00:00:28,240
with fernando zumbato the project

12
00:00:31,189 --> 00:00:29,920
manager for the miniature exercise

13
00:00:33,110 --> 00:00:31,199

device too

14
00:00:35,430 --> 00:00:33,120
and she started by asking just how much

15
00:00:37,670 --> 00:00:35,440
smaller this miniature device is

16
00:00:40,069 --> 00:00:37,680
compared to the hardware on orbit right

17
00:00:42,950 --> 00:00:41,270
give you a reference on what we have on

18
00:00:45,110 --> 00:00:42,960
orbit right now air at the advanced

19
00:00:46,709 --> 00:00:45,120
resistive exercise device wonderful

20
00:00:48,630 --> 00:00:46,719
piece of equipment weighs several

21
00:00:50,549 --> 00:00:48,640
thousand pounds it's about the size of a

22
00:00:52,389 --> 00:00:50,559
phone booth large phone booth

23
00:00:54,549 --> 00:00:52,399
um and that's four we do for strength

24
00:00:56,069 --> 00:00:54,559
training now for aerobic or cardio what

25
00:00:58,630 --> 00:00:56,079
we use is a treadmill and it's similar

26
00:01:01,189 --> 00:00:58,640
to what you see in in a gym now the

27
00:01:03,189 --> 00:01:01,199
miniature exercise device is 65 pounds

28
00:01:04,630 --> 00:01:03,199
wow and it's about the size of a large

29
00:01:05,750 --> 00:01:04,640
backpack so you can actually take it on

30
00:01:07,750 --> 00:01:05,760
your car and

31
00:01:09,429 --> 00:01:07,760
drive away that's a that's a big change

32
00:01:11,670 --> 00:01:09,439
it is a big change order magnitude at

33
00:01:13,590 --> 00:01:11,680
least and size and volume we're really

34
00:01:15,429 --> 00:01:13,600
pushing the engineering so how did you

35
00:01:17,109 --> 00:01:15,439
um how did you do that how did you how

36
00:01:18,550 --> 00:01:17,119
did you size it down like that

37
00:01:21,510 --> 00:01:18,560
so unlike

38
00:01:23,109 --> 00:01:21,520

t2 and a red we use an electric motor

39
00:01:25,109 --> 00:01:23,119
that has a pulley attached to it and the

40
00:01:26,870 --> 00:01:25,119
user pulls on that pulley now we can

41
00:01:29,030 --> 00:01:26,880
control the force

42
00:01:30,710 --> 00:01:29,040
that the user sees by controlling the

43
00:01:32,630 --> 00:01:30,720
torque on the motor so there's something

44
00:01:34,710 --> 00:01:32,640
unique that hasn't been done yet and it

45
00:01:36,149 --> 00:01:34,720
provides a lot of flexibility to make

46
00:01:37,670 --> 00:01:36,159
sure that we're providing with the crew

47
00:01:40,230 --> 00:01:37,680
needs for exercise and you can change

48
00:01:42,310 --> 00:01:40,240
the load by just pushing a button so

49
00:01:45,109 --> 00:01:42,320
it's very dynamic and very versatile

50
00:01:47,429 --> 00:01:45,119
that sounds nifty so this is the uh

51
00:01:48,469 --> 00:01:47,439
miniature exercise device two right

52
00:01:50,550 --> 00:01:48,479
correct that will be going up on the

53
00:01:51,670 --> 00:01:50,560
next cygnus vehicle absolutely and i

54
00:01:54,550 --> 00:01:51,680
assume that means there is a miniature

55
00:01:56,310 --> 00:01:54,560
exercise device one it is uh it was a

56
00:01:57,990 --> 00:01:56,320
proof of concept that we just had some

57
00:02:00,149 --> 00:01:58,000
spare parts in the lab and we put them

58
00:02:02,950 --> 00:02:00,159
together and we actually

59
00:02:04,550 --> 00:02:02,960
had the equinox at c-test two try it out

60
00:02:06,550 --> 00:02:04,560
so we just want to make sure that it was

61
00:02:07,749 --> 00:02:06,560
a capability that we could expand on and

62
00:02:09,350 --> 00:02:07,759
they actually enjoyed it they made some

63
00:02:11,670 --> 00:02:09,360

good comments and we incorporated those

64
00:02:13,510 --> 00:02:11,680
into the med too and

65
00:02:15,910 --> 00:02:13,520
aquanauts on c test two that's um an

66
00:02:17,830 --> 00:02:15,920
underwater project to test out some of

67
00:02:20,150 --> 00:02:17,840
the concepts for that we'd like to spend

68
00:02:21,589 --> 00:02:20,160
send into space um underwater

69
00:02:23,110 --> 00:02:21,599
coastal florida in an environment

70
00:02:24,949 --> 00:02:23,120
similar to space that's not actually

71
00:02:27,910 --> 00:02:24,959
quite so hard to get to

72
00:02:29,910 --> 00:02:27,920
um but how did that test out go

73
00:02:31,589 --> 00:02:29,920
it went well um we realized that for

74
00:02:32,790 --> 00:02:31,599
what we had in the lab it was a little

75
00:02:34,229 --> 00:02:32,800
underpowered

76
00:02:35,110 --> 00:02:34,239
it was a little noisy so we wanted to

77
00:02:37,110 --> 00:02:35,120
bring that

78
00:02:39,350 --> 00:02:37,120
noise level down but we got some really

79
00:02:41,990 --> 00:02:39,360
good lessons learned from there and

80
00:02:44,790 --> 00:02:42,000
now we're actually taking md2 hopefully

81
00:02:46,150 --> 00:02:44,800
to another nemo mission to an underwater

82
00:02:47,830 --> 00:02:46,160
environment so we can kind of compare

83
00:02:50,070 --> 00:02:47,840
the two in the same environment as well

84
00:02:52,150 --> 00:02:50,080
as comparing it to a space station okay

85
00:02:53,670 --> 00:02:52,160
well if we've already got an exercise

86
00:02:55,190 --> 00:02:53,680
device or a few that work on the space

87
00:02:56,630 --> 00:02:55,200
station why is it important to

88
00:02:58,550 --> 00:02:56,640

miniaturize them

89
00:03:00,949 --> 00:02:58,560
very good question uh

90
00:03:03,110 --> 00:03:00,959
if you go on a mars transit it's going

91
00:03:05,270 --> 00:03:03,120
to be a really long time period and the

92
00:03:07,350 --> 00:03:05,280
crew actually lives in a much smaller

93
00:03:10,309 --> 00:03:07,360
volume that they do on space station so

94
00:03:11,589 --> 00:03:10,319
having a big exercise device um is not

95
00:03:13,750 --> 00:03:11,599
conducive because usually it's a lot

96
00:03:15,589 --> 00:03:13,760
more power you lose a lot more mass

97
00:03:17,830 --> 00:03:15,599
and our current architecture you would

98
00:03:20,309 --> 00:03:17,840
need one for strength and one for cardio

99
00:03:21,110 --> 00:03:20,319
okay so our device combines both into

100
00:03:23,509 --> 00:03:21,120
one

101
00:03:25,430 --> 00:03:23,519
so it reduces mass it reduces the volume

102
00:03:26,550 --> 00:03:25,440
that they need to use it and so it's

103
00:03:28,710 --> 00:03:26,560
something that we would need to

104
00:03:31,270 --> 00:03:28,720
regardless okay yeah i've seen the

105
00:03:33,030 --> 00:03:31,280
inside of orion and the cockpit and i

106
00:03:35,190 --> 00:03:33,040
don't think you can fit an a red in

107
00:03:36,789 --> 00:03:35,200
there so no certainly not all right but

108
00:03:38,229 --> 00:03:36,799
we of course want to the crew to keep

109
00:03:39,990 --> 00:03:38,239
exercising that's going to be important

110
00:03:41,430 --> 00:03:40,000
no matter where we go but especially on

111
00:03:42,869 --> 00:03:41,440
long duration missions yeah just

112
00:03:44,390 --> 00:03:42,879
maintaining the strength of their bones

113
00:03:45,990 --> 00:03:44,400

and their muscles it's really important

114
00:03:47,750 --> 00:03:46,000
for the crew so has it been an

115
00:03:50,309 --> 00:03:47,760
interesting project for you to work on

116
00:03:52,309 --> 00:03:50,319
yeah it's been fantastic um i have a

117
00:03:54,789 --> 00:03:52,319
great engineering team and we've come

118
00:03:55,910 --> 00:03:54,799
across several challenges and just like

119
00:03:57,990 --> 00:03:55,920
any new

120
00:03:59,270 --> 00:03:58,000
engineering endeavor it's just the proof

121
00:04:01,670 --> 00:03:59,280
is in the pudding and we're actually

122
00:04:02,949 --> 00:04:01,680
very excited to see it on orbit okay

123
00:04:05,030 --> 00:04:02,959
well i understand this kind of came

124
00:04:07,509 --> 00:04:05,040
about through um initiative here at

125
00:04:09,110 --> 00:04:07,519
johnson space center con 5 by 2015. can

126
00:04:10,949 --> 00:04:09,120
you tell us what that's about yeah it's

127
00:04:13,030 --> 00:04:10,959
a really interesting initiative that

128
00:04:15,509 --> 00:04:13,040
started at the center level and at the

129
00:04:17,670 --> 00:04:15,519
space station program level where they

130
00:04:20,310 --> 00:04:17,680
wanted to get some payloads flowing to

131
00:04:22,790 --> 00:04:20,320
the space station um within one calendar

132
00:04:24,710 --> 00:04:22,800
year and they met design fabricated and

133
00:04:26,230 --> 00:04:24,720
certified to fly wow that's that's

134
00:04:29,110 --> 00:04:26,240
accelerated

135
00:04:31,830 --> 00:04:29,120
and we're so um concerned about safety

136
00:04:33,990 --> 00:04:31,840
obviously that some of the processes

137
00:04:35,990 --> 00:04:34,000
um for payloads that are non-safety

138
00:04:37,749 --> 00:04:36,000

critical items were sometimes too

139
00:04:40,629 --> 00:04:37,759
extraneous so we wanted to make sure

140
00:04:42,310 --> 00:04:40,639
that we tailor down up to the to the

141
00:04:43,909 --> 00:04:42,320
minimum things that were needed to

142
00:04:45,670 --> 00:04:43,919
maintain safety and then improve the

143
00:04:48,310 --> 00:04:45,680
usability for research on the space

144
00:04:49,670 --> 00:04:48,320
station okay and apparently it was a

145
00:04:52,150 --> 00:04:49,680
pretty good success it was a great

146
00:04:53,990 --> 00:04:52,160
success um they liked it so much that

147
00:04:56,870 --> 00:04:54,000
there's actually a new class um they're

148
00:04:58,790 --> 00:04:56,880
called project x and and 2016 has some

149
00:05:01,350 --> 00:04:58,800
really neat development so i'm actually

150
00:05:02,950 --> 00:05:01,360
excited to see what they uh provide okay

151
00:05:04,710 --> 00:05:02,960
space station so are we yeah we'll hope

152
00:05:06,710 --> 00:05:04,720
to hear more about those in the future

153
00:05:08,310 --> 00:05:06,720
but in the meantime we've got to get the

154
00:05:10,469 --> 00:05:08,320
miniature exercise device 2 up to the

155
00:05:11,590 --> 00:05:10,479
space station on sickness uh what

156
00:05:13,510 --> 00:05:11,600
happens then i assume it doesn't

157
00:05:15,270 --> 00:05:13,520
immediately replace a red

158
00:05:17,270 --> 00:05:15,280
no actually our goal is not to replace

159
00:05:19,510 --> 00:05:17,280
everything again it's just an experiment

160
00:05:21,029 --> 00:05:19,520
that we're doing so first we're doing

161
00:05:22,870 --> 00:05:21,039
what we're calling like the engineering

162
00:05:24,310 --> 00:05:22,880
eval the shake out of the system we want

163
00:05:25,430 --> 00:05:24,320

to make sure that the device works

164
00:05:26,710 --> 00:05:25,440
appropriately and the crew is

165
00:05:28,070 --> 00:05:26,720
comfortable with it

166
00:05:29,749 --> 00:05:28,080
once we accomplish that that's when the

167
00:05:30,950 --> 00:05:29,759
fun starts and that's when the research

168
00:05:32,469 --> 00:05:30,960
really begins

169
00:05:34,710 --> 00:05:32,479
we're looking at the efficacy of the

170
00:05:37,350 --> 00:05:34,720
exercise meaning that can the crew do

171
00:05:39,830 --> 00:05:37,360
their exercise appropriately do get the

172
00:05:41,510 --> 00:05:39,840
loads that we need and once we complete

173
00:05:42,310 --> 00:05:41,520
that we'll get some feedback from the

174
00:05:44,469 --> 00:05:42,320
crew

175
00:05:47,029 --> 00:05:44,479
look at what we can improve

176
00:05:49,350 --> 00:05:47,039
in the control algorithm of the motor or

177
00:05:50,870 --> 00:05:49,360
sometimes we'll have to change our gui

178
00:05:52,950 --> 00:05:50,880
our graphical user interface to make it

179
00:05:55,189 --> 00:05:52,960
more friendly and we'll go from there so

180
00:05:57,189 --> 00:05:55,199
the the future is really bright for md2

181
00:05:59,189 --> 00:05:57,199
and i'm really excited to see it do you

182
00:06:01,510 --> 00:05:59,199
expect to eventually send an md3 up to

183
00:06:03,590 --> 00:06:01,520
the space station or that would be a

184
00:06:05,909 --> 00:06:03,600
great goal um

185
00:06:07,749 --> 00:06:05,919
currently we're providing both resistive

186
00:06:09,909 --> 00:06:07,759
and aerobic exercise

187
00:06:11,590 --> 00:06:09,919
there's a new modality of aerobic

188
00:06:13,430 --> 00:06:11,600

exercise which is wrong which currently

189
00:06:15,830 --> 00:06:13,440
doesn't exist in on space issue right

190
00:06:18,950 --> 00:06:15,840
now so hopefully if the crew liked it so

191
00:06:21,110 --> 00:06:18,960
much then we'll get the gig for an mbd3

192
00:06:23,270 --> 00:06:21,120
okay well good luck with that we look

193
00:06:26,150 --> 00:06:23,280
forward to seeing it in action in space

194
00:06:27,990 --> 00:06:26,160
um after it does arrive on cygnus

195
00:06:29,350 --> 00:06:28,000
thank you so much okay thank you for

196
00:06:30,950 --> 00:06:29,360
joining us again this was fernando