



1
00:00:05,829 --> 00:00:03,510
now expedition 40 began on board the

2
00:00:08,310 --> 00:00:05,839
international space station in mid-may

3
00:00:10,230 --> 00:00:08,320
it runs through mid-september when the

4
00:00:13,110 --> 00:00:10,240
swanson schwarzoff and artemia have

5
00:00:15,350 --> 00:00:13,120
returned home which makes this roughly

6
00:00:17,189 --> 00:00:15,360
the midpoint of this increment and today

7
00:00:19,510 --> 00:00:17,199
we get an update on the science of this

8
00:00:21,269 --> 00:00:19,520
mission from yuri grenade ramirez who is

9
00:00:23,590 --> 00:00:21,279
the expedition 40 lead increment

10
00:00:25,589 --> 00:00:23,600
scientist good morning

11
00:00:28,150 --> 00:00:25,599
halfway through this increment has there

12
00:00:29,910 --> 00:00:28,160
been a science highlight so far

13
00:00:32,870 --> 00:00:29,920

good morning pat thank you for having me

14

00:00:35,270 --> 00:00:32,880

again uh we have had uh the initiation

15

00:00:37,910 --> 00:00:35,280

of expedition 40 with

16

00:00:40,310 --> 00:00:37,920

in a tumult of activities uh spacex 3

17

00:00:41,830 --> 00:00:40,320

was completing its mission uh and we

18

00:00:45,270 --> 00:00:41,840

wrapped up all of the crossover science

19

00:00:46,549 --> 00:00:45,280

that took place during that mission

20

00:00:49,110 --> 00:00:46,559

and

21

00:00:51,990 --> 00:00:49,120

after that was completed we were able to

22

00:00:53,910 --> 00:00:52,000

engage in the completion of several an

23

00:00:56,310 --> 00:00:53,920

initiation and completion of several of

24

00:00:58,229 --> 00:00:56,320

the experiments that arrived

25

00:01:01,110 --> 00:00:58,239

like opals for example on the external

26

00:01:02,470 --> 00:01:01,120

platform uh side of the house we were

27

00:01:04,229 --> 00:01:02,480

able to finish all the checkout

28

00:01:06,710 --> 00:01:04,239

activation commissioning type of

29

00:01:10,149 --> 00:01:06,720

activities and

30

00:01:12,950 --> 00:01:10,159

successfully transmitted uh a data

31

00:01:15,830 --> 00:01:12,960

set uh in a video i had definition video

32

00:01:17,350 --> 00:01:15,840

from the station via laser right and

33

00:01:19,670 --> 00:01:17,360

that was very exciting to see that the

34

00:01:23,109 --> 00:01:19,680

technology worked uh really well

35

00:01:24,310 --> 00:01:23,119

uh the investigation will continue uh to

36

00:01:25,830 --> 00:01:24,320

understand better uh the

37

00:01:27,270 --> 00:01:25,840

characterization of the atmosphere and

38

00:01:28,550 --> 00:01:27,280

how that interferes with the laser

39

00:01:31,429 --> 00:01:28,560

communication

40

00:01:33,749 --> 00:01:31,439

and uh but it certainly is opening up

41

00:01:36,310 --> 00:01:33,759

our ability to transmit

42

00:01:39,510 --> 00:01:36,320

bigger and larger types of files in a

43

00:01:42,310 --> 00:01:39,520

much more fast time

44

00:01:44,389 --> 00:01:42,320

um i mentioned earlier in the program

45

00:01:45,910 --> 00:01:44,399

today the work with an experiment called

46

00:01:48,069 --> 00:01:45,920

forced shoes and this has just gotten

47

00:01:49,350 --> 00:01:48,079

started in the last couple of days

48

00:01:51,030 --> 00:01:49,360

what is that about what are the crew

49

00:01:52,630 --> 00:01:51,040

members doing here

50

00:01:54,550 --> 00:01:52,640

that's right

51
00:01:56,870 --> 00:01:54,560
we have uh several countermeasure

52
00:01:59,429 --> 00:01:56,880
exercise devices on station to keep the

53
00:02:02,310 --> 00:01:59,439
uh cruise health as as most everybody is

54
00:02:04,550 --> 00:02:02,320
aware in microgravity the body suffers a

55
00:02:06,310 --> 00:02:04,560
toll by not having that constant pull of

56
00:02:08,150 --> 00:02:06,320
the gravity so we have to work very hard

57
00:02:09,589 --> 00:02:08,160
at maintaining that

58
00:02:12,550 --> 00:02:09,599
that muscle mass

59
00:02:14,470 --> 00:02:12,560
in in the bone atrophy prevention so

60
00:02:15,910 --> 00:02:14,480
one of the exercise devices that we have

61
00:02:17,110 --> 00:02:15,920
on board is arid

62
00:02:18,070 --> 00:02:17,120
and

63
00:02:20,070 --> 00:02:18,080

one of the

64

00:02:22,710 --> 00:02:20,080

pieces that we've been missing is being

65

00:02:24,309 --> 00:02:22,720

able to correlate the data of the force

66

00:02:25,270 --> 00:02:24,319

that is being impacted as the crew

67

00:02:27,190 --> 00:02:25,280

members

68

00:02:29,270 --> 00:02:27,200

perform the exercises

69

00:02:32,550 --> 00:02:29,280

and as you mentioned earlier we we will

70

00:02:34,869 --> 00:02:32,560

be able to take this data and

71

00:02:37,830 --> 00:02:34,879

analyze it and be able to come up with a

72

00:02:38,949 --> 00:02:37,840

much more customized workout for the

73

00:02:40,949 --> 00:02:38,959

crew members

74

00:02:42,949 --> 00:02:40,959

which has a range of applications down

75

00:02:45,830 --> 00:02:42,959

here on on earth as well for for folks

76

00:02:47,270 --> 00:02:45,840

that may need a a very specific set of

77

00:02:48,630 --> 00:02:47,280

exercise

78

00:02:51,670 --> 00:02:48,640

devices they're going to be wearing

79

00:02:53,509 --> 00:02:51,680

these shoes that are are somehow helping

80

00:02:54,630 --> 00:02:53,519

to measure the forces that are being

81

00:02:56,470 --> 00:02:54,640

imparted

82

00:02:57,750 --> 00:02:56,480

up toward them that's correct that's

83

00:03:00,070 --> 00:02:57,760

exactly how it works and they'll collect

84

00:03:02,149 --> 00:03:00,080

the data transmit it down for the the

85

00:03:03,430 --> 00:03:02,159

community to review they will go through

86

00:03:04,550 --> 00:03:03,440

a range of

87

00:03:05,670 --> 00:03:04,560

of

88

00:03:07,750 --> 00:03:05,680

pound force

89
00:03:09,990 --> 00:03:07,760
measurements and try to characterize how

90
00:03:11,190 --> 00:03:10,000
the arid is

91
00:03:12,630 --> 00:03:11,200
impacting that

92
00:03:15,190 --> 00:03:12,640
imparting that load

93
00:03:16,949 --> 00:03:15,200
there's also a new uh experiment that's

94
00:03:19,030 --> 00:03:16,959
i believe coming up on the cygnus

95
00:03:21,509 --> 00:03:19,040
vehicle uh next week that has to do with

96
00:03:23,830 --> 00:03:21,519
the clothes the crew members wear

97
00:03:25,750 --> 00:03:23,840
that's right um you you know one of the

98
00:03:27,270 --> 00:03:25,760
questions that people may may or may not

99
00:03:29,430 --> 00:03:27,280
think about is we don't really have a

100
00:03:31,110 --> 00:03:29,440
good way of doing laundry on space we

101
00:03:33,030 --> 00:03:31,120
have no way of doing it there's no

102
00:03:35,910 --> 00:03:33,040
washing machine right once you wear an

103
00:03:37,350 --> 00:03:35,920
apparel and it's it's worn to the very

104
00:03:39,430 --> 00:03:37,360
end um

105
00:03:42,710 --> 00:03:39,440
you have to dispose of it and there's a

106
00:03:44,710 --> 00:03:42,720
lot of up mass cargo that comes up

107
00:03:47,670 --> 00:03:44,720
that we we dedicate to be able to have

108
00:03:50,949 --> 00:03:47,680
the clothes for the the crew members

109
00:03:52,390 --> 00:03:50,959
typically we are use cotton type fabrics

110
00:03:54,149 --> 00:03:52,400
and in this investigation they're

111
00:03:56,390 --> 00:03:54,159
investigating they're looking at

112
00:03:57,350 --> 00:03:56,400
new types of material in these fabrics

113
00:03:59,509 --> 00:03:57,360

that are

114

00:04:02,229 --> 00:03:59,519

not only lighter in in the weight aspect

115

00:04:05,190 --> 00:04:02,239

which will can reduce the up mass but

116

00:04:09,990 --> 00:04:05,200

they're also treated with antimicrobial

117

00:04:15,270 --> 00:04:13,670

substance treatment to to prevent that

118

00:04:16,949 --> 00:04:15,280

bacteria growth so

119

00:04:18,390 --> 00:04:16,959

we are trying to figure out how long can

120

00:04:20,390 --> 00:04:18,400

we have the crew members wear these

121

00:04:23,270 --> 00:04:20,400

clothes will it last a lot longer than

122

00:04:24,550 --> 00:04:23,280

their cotton counterparts and

123

00:04:25,830 --> 00:04:24,560

by virtue of

124

00:04:27,189 --> 00:04:25,840

the crew member being able to wear it

125

00:04:28,950 --> 00:04:27,199

longer

126

00:04:31,430 --> 00:04:28,960

and it being lighter it'll save up mass

127

00:04:33,990 --> 00:04:31,440

that will allow us to bring other cargo

128

00:04:36,469 --> 00:04:34,000

but it will also

129

00:04:38,710 --> 00:04:36,479

by not having the cotton fabric

130

00:04:40,710 --> 00:04:38,720

may also reduce maintenance on station

131

00:04:42,710 --> 00:04:40,720

because of all the filters that get

132

00:04:44,550 --> 00:04:42,720

clogged up with the materials so we're

133

00:04:45,990 --> 00:04:44,560

looking at several benefits uh and and

134

00:04:48,629 --> 00:04:46,000

of course some of the applications could

135

00:04:51,270 --> 00:04:48,639

be down here on earth uh we might be

136

00:04:53,270 --> 00:04:51,280

able to to have that for areas with

137

00:04:53,990 --> 00:04:53,280

remote locations where laundry is not as

138

00:04:56,230 --> 00:04:54,000

uh

139

00:04:58,710 --> 00:04:56,240

speaking of up mass the cygnus vehicle

140

00:05:00,469 --> 00:04:58,720

is carrying a lot of different

141

00:05:02,230 --> 00:05:00,479

experiments that are

142

00:05:03,909 --> 00:05:02,240

coming from students around the world

143

00:05:05,749 --> 00:05:03,919

what kind of things are they are these

144

00:05:07,430 --> 00:05:05,759

experiments looking into

145

00:05:09,670 --> 00:05:07,440

it's really fascinating to look at some

146

00:05:11,670 --> 00:05:09,680

of the descriptions of the students

147

00:05:14,950 --> 00:05:11,680

hypotheses that they've come up with

148

00:05:15,749 --> 00:05:14,960

that the range is wide in variety you

149

00:05:17,749 --> 00:05:15,759

have

150

00:05:19,909 --> 00:05:17,759

anywhere from radiation

151
00:05:22,310 --> 00:05:19,919
investigations to

152
00:05:24,390 --> 00:05:22,320
growth of different kinds of plants

153
00:05:26,629 --> 00:05:24,400
impacts on on

154
00:05:28,790 --> 00:05:26,639
even a jellyfish type of investigation

155
00:05:30,950 --> 00:05:28,800
where they're they're looking at

156
00:05:33,189 --> 00:05:30,960
whether or not growing in space could

157
00:05:34,870 --> 00:05:33,199
affect the ability of the the jellyfish

158
00:05:39,830 --> 00:05:34,880
to

159
00:05:41,990 --> 00:05:39,840
navigation kind of system as part of the

160
00:05:45,110 --> 00:05:42,000
the vestibular system

161
00:05:49,029 --> 00:05:47,270
anyhow i'm just just a

162
00:05:50,230 --> 00:05:49,039
really really wide variety those are

163
00:05:52,230 --> 00:05:50,240

just some of the examples that come to

164

00:05:54,150 --> 00:05:52,240

mind and it's and and these are a lot of

165

00:05:55,350 --> 00:05:54,160

them being coordinated uh through a

166

00:05:57,590 --> 00:05:55,360

private company that's helping to

167

00:06:00,150 --> 00:05:57,600

arrange the flight of all of these

168

00:06:02,150 --> 00:06:00,160

exactly cases uh i'm sorry an anorex uh

169

00:06:03,430 --> 00:06:02,160

excuse me is um is the company that's

170

00:06:05,110 --> 00:06:03,440

bringing a lot of these we we're

171

00:06:07,270 --> 00:06:05,120

bringing two types of experiments on

172

00:06:08,550 --> 00:06:07,280

orb2 one of them are coming in the

173

00:06:09,909 --> 00:06:08,560

nanorack

174

00:06:12,390 --> 00:06:09,919

modules if you would that will be

175

00:06:14,629 --> 00:06:12,400

connected uh to the platforms on station

176
00:06:17,029 --> 00:06:14,639
and being will be run that way and then

177
00:06:19,029 --> 00:06:17,039
the other set are run through mix sticks

178
00:06:21,590 --> 00:06:19,039
where the crew will essentially activate

179
00:06:22,870 --> 00:06:21,600
them by uh engaging the the mixtig and

180
00:06:25,029 --> 00:06:22,880
breaking it through and having those

181
00:06:26,790 --> 00:06:25,039
contents mix

182
00:06:28,629 --> 00:06:26,800
beyond the things that are on cygnus

183
00:06:30,309 --> 00:06:28,639
what are the uh give me two of the other

184
00:06:32,870 --> 00:06:30,319
things that we should be looking forward

185
00:06:34,710 --> 00:06:32,880
to in the rest of expedition 40. well we

186
00:06:36,629 --> 00:06:34,720
definitely have another education

187
00:06:38,710 --> 00:06:36,639
focused uh activity coming up with

188
00:06:40,870 --> 00:06:38,720

spheres zero robotic

189

00:06:42,629 --> 00:06:40,880

this is a competition that is held

190

00:06:44,230 --> 00:06:42,639

annually with uh

191

00:06:46,469 --> 00:06:44,240

students from all over

192

00:06:48,230 --> 00:06:46,479

the world and mit coordinates that and

193

00:06:50,870 --> 00:06:48,240

the spheres facility which we've already

194

00:06:53,270 --> 00:06:50,880

seen a couple of other investigations uh

195

00:06:55,990 --> 00:06:53,280

being used for that uh will will host uh

196

00:06:57,589 --> 00:06:56,000

host this uh zero robotics competition

197

00:06:58,550 --> 00:06:57,599

and i think that'll be very exciting to

198

00:06:59,909 --> 00:06:58,560

see that

199

00:07:02,710 --> 00:06:59,919

uh we're also

200

00:07:05,029 --> 00:07:02,720

continuing all of the the bass uh

201
00:07:07,830 --> 00:07:05,039
combustion experiments uh and a

202
00:07:10,790 --> 00:07:07,840
counterpart investigation called flex 2

203
00:07:12,070 --> 00:07:10,800
that also looks at combustion and and

204
00:07:13,110 --> 00:07:12,080
trying to understand how to make better

205
00:07:14,230 --> 00:07:13,120
fuels

206
00:07:15,830 --> 00:07:14,240
out of those

207
00:07:17,909 --> 00:07:15,840
so a lot of that um i did want to

208
00:07:19,749 --> 00:07:17,919
mention we also have the

209
00:07:22,070 --> 00:07:19,759
types of investigations that you you

210
00:07:23,589 --> 00:07:22,080
don't see actively uh perform the human

211
00:07:26,390 --> 00:07:23,599
body uh there's a variety of

212
00:07:27,830 --> 00:07:26,400
investigations that are coming up

213
00:07:29,189 --> 00:07:27,840

where we only take data from the crew

214

00:07:31,110 --> 00:07:29,199

members

215

00:07:32,309 --> 00:07:31,120

before they fly and after

216

00:07:34,790 --> 00:07:32,319

they return

217

00:07:36,790 --> 00:07:34,800

and uh they'll be they'll be uh

218

00:07:37,990 --> 00:07:36,800

investigating some of those uh and it's

219

00:07:39,670 --> 00:07:38,000

interesting because you don't see that

220

00:07:41,029 --> 00:07:39,680

happening and we often forget to mention

221

00:07:43,029 --> 00:07:41,039

it we don't have an activity we don't

222

00:07:44,710 --> 00:07:43,039

have anything that you can directly it's

223

00:07:46,869 --> 00:07:44,720

another example of the crew members

224

00:07:48,550 --> 00:07:46,879

being experiment subjects even though

225

00:07:50,550 --> 00:07:48,560

they're not doing something specific to

226

00:07:51,909 --> 00:07:50,560

that experiment during the time they're

227

00:07:53,270 --> 00:07:51,919

up there finding out how they're

228

00:07:54,869 --> 00:07:53,280

impacted exactly we're all looking

229

00:07:55,990 --> 00:07:54,879

forward to seeing what comes next thanks

230

00:07:59,110 --> 00:07:56,000

very much