1
00:00:04,950 --> 00:00:03,590
good morning and welcome to the

2
00:00:06,710 --> 00:00:04,960
international space station flight

3
00:00:08,790 --> 00:00:06,720
control room where we're joined today by

4
00:00:11,270 --> 00:00:08,800
yuri ganart ramirez who is the

5
00:00:12,950 --> 00:00:11,280
expedition 40 lead scientist she

6
00:00:14,549 --> 00:00:12,960
actually joined us um at the beginning

7
00:00:16,470 --> 00:00:14,559
of expedition 40 and told us about all

8
00:00:17,990 --> 00:00:16,480
the science that is uh was at that time

9
00:00:19,590 --> 00:00:18,000
coming up for the crew onboard the

10
00:00:21,189 --> 00:00:19,600
station and now she's back to tell us

11
00:00:23,109 --> 00:00:21,199
what the crew accomplished while they

12
00:00:24,470 --> 00:00:23,119
have been in space for about uh six

13
00:00:26,790 --> 00:00:24,480

months for the three that are leaving

14
00:00:28,390 --> 00:00:26,800
tomorrow thanks so much for coming back

15
00:00:30,950 --> 00:00:28,400
and thanks for having me brandi it's

16
00:00:32,470 --> 00:00:30,960
been very exciting expedition to be able

17
00:00:34,069 --> 00:00:32,480
to be part of it well it definitely

18
00:00:35,510 --> 00:00:34,079
seems like the crew spent a lot of time

19
00:00:37,670 --> 00:00:35,520
on science can you tell us some of the

20
00:00:39,190 --> 00:00:37,680
highlights of what they've done

21
00:00:41,430 --> 00:00:39,200
we have been

22
00:00:42,950 --> 00:00:41,440
doing of course a variety of science all

23
00:00:44,950 --> 00:00:42,960
the way from

24
00:00:47,110 --> 00:00:44,960
cellular biology

25
00:00:49,750 --> 00:00:47,120
technology type of investigations uh

26
00:00:52,389 --> 00:00:49,760
combustion um human research of course

27
00:00:55,350 --> 00:00:52,399
never stops with our our crew members

28
00:00:57,590 --> 00:00:55,360
being our main subjects there as well

29
00:01:00,229 --> 00:00:57,600
one of the very interesting activities

30
00:01:02,310 --> 00:01:00,239
we were able to witness in a privilege

31
00:01:03,590 --> 00:01:02,320
for my from my perspective to be part of

32
00:01:06,070 --> 00:01:03,600
is to see

33
00:01:08,230 --> 00:01:06,080
an investigation come to a conclusion

34
00:01:09,270 --> 00:01:08,240
uh in the sense of the data acquisition

35
00:01:13,429 --> 00:01:09,280
so

36
00:01:15,510 --> 00:01:13,439
had crew members

37
00:01:17,510 --> 00:01:15,520
that had just returned at the beginning

38
00:01:19,670 --> 00:01:17,520

of our expedition 40

39
00:01:21,030 --> 00:01:19,680
with the prior crew members

40
00:01:23,510 --> 00:01:21,040
okay so they've been in space before and

41
00:01:25,990 --> 00:01:23,520
we're back they departed and and when

42
00:01:27,510 --> 00:01:26,000
they departed they go through the post

43
00:01:29,429 --> 00:01:27,520
data collection

44
00:01:31,030 --> 00:01:29,439
when they get back to the ground okay

45
00:01:33,030 --> 00:01:31,040
and spinal ultrasound was one of those

46
00:01:35,030 --> 00:01:33,040
investigations where we were able to say

47
00:01:37,190 --> 00:01:35,040
yes we got the last subject for this

48
00:01:38,469 --> 00:01:37,200
investigation and we called it

49
00:01:40,789 --> 00:01:38,479
complete

50
00:01:43,030 --> 00:01:40,799
in in our esa counterparts we had a very

51
00:01:44,630 --> 00:01:43,040
similar uh situation as well with the

52
00:01:45,910 --> 00:01:44,640
previous crew members that returned uh

53
00:01:47,350 --> 00:01:45,920
that i'm talking about our u.s crew

54
00:01:48,389 --> 00:01:47,360
members wakata and mastaki on the

55
00:01:49,749 --> 00:01:48,399
previous

56
00:01:51,590 --> 00:01:49,759
uh return

57
00:01:53,350 --> 00:01:51,600
uh and again through as we were kicking

58
00:01:54,630 --> 00:01:53,360
off our expedition 40 the the crew on

59
00:01:56,630 --> 00:01:54,640
the ground the teams on the ground the

60
00:01:59,270 --> 00:01:56,640
scientists are collecting the final data

61
00:02:01,749 --> 00:01:59,280
points for reversible figures uh a nissa

62
00:02:03,429 --> 00:02:01,759
investigation that's also human research

63
00:02:07,429 --> 00:02:03,439

related in terms of the vision and how

64
00:02:08,710 --> 00:02:07,439
that affects your ability to see in 3ds

65
00:02:11,430 --> 00:02:08,720
in space

66
00:02:13,830 --> 00:02:11,440
uh which was also completed uh uh with

67
00:02:16,070 --> 00:02:13,840
the the the final collections uh so that

68
00:02:17,750 --> 00:02:16,080
that's always a very uh exciting

69
00:02:19,990 --> 00:02:17,760
opportunity to see that

70
00:02:21,990 --> 00:02:20,000
come to a closure of sorts of course

71
00:02:24,070 --> 00:02:22,000
these experiments go on for a long time

72
00:02:26,150 --> 00:02:24,080
so it's not always uh

73
00:02:27,430 --> 00:02:26,160
not always a easy to see the end of the

74
00:02:29,190 --> 00:02:27,440
of them i'm sure

75
00:02:31,430 --> 00:02:29,200
that's correct so being able being able

76
00:02:32,869 --> 00:02:31,440
to be a part of that closure is always a

77
00:02:34,229 --> 00:02:32,879
very exciting for us

78
00:02:36,309 --> 00:02:34,239
well can you tell us a little bit about

79
00:02:38,710 --> 00:02:36,319
how like we said this crew spent a lot

80
00:02:40,790 --> 00:02:38,720
of time on science how does it compare a

81
00:02:42,790 --> 00:02:40,800
number of hours to some of the past uh

82
00:02:44,150 --> 00:02:42,800
expeditions

83
00:02:45,509 --> 00:02:44,160
well we um

84
00:02:47,589 --> 00:02:45,519
uh this is one of those moments where

85
00:02:50,309 --> 00:02:47,599
you go back after after you've been

86
00:02:52,070 --> 00:02:50,319
through the six month course and you see

87
00:02:54,229 --> 00:02:52,080
that we were able to

88
00:02:56,070 --> 00:02:54,239

to accomplish a lot of objectives when

89
00:02:58,390 --> 00:02:56,080
you look at

90
00:03:00,149 --> 00:02:58,400
crew crew hours are certainly one way of

91
00:03:01,190 --> 00:03:00,159
measuring it of course there's many

92
00:03:03,350 --> 00:03:01,200
different ways of looking at all the

93
00:03:06,470 --> 00:03:03,360
science objectives that get accomplished

94
00:03:07,589 --> 00:03:06,480
but we were very fortunate to be able to

95
00:03:10,309 --> 00:03:07,599
meet all the hours that we had

96
00:03:12,070 --> 00:03:10,319
originally planned for the increment and

97
00:03:14,390 --> 00:03:12,080
go a little bit beyond that

98
00:03:16,070 --> 00:03:14,400
uh and we also were fortunate to be able

99
00:03:18,790 --> 00:03:16,080
to get in be in a position where all the

100
00:03:20,869 --> 00:03:18,800
teams came together and we

101
00:03:22,949 --> 00:03:20,879
were able to break the

102
00:03:25,270 --> 00:03:22,959
number of hours in one week oh wow

103
00:03:27,350 --> 00:03:25,280
dedicated to utilization of over 38

104
00:03:29,910 --> 00:03:27,360
hours in one week i'm sorry 83 hours in

105
00:03:32,229 --> 00:03:29,920
one week that's a lot it is a lot and

106
00:03:33,990 --> 00:03:32,239
and and this comes the part where the

107
00:03:35,910 --> 00:03:34,000
entire team not just

108
00:03:37,509 --> 00:03:35,920
the scientists and

109
00:03:39,030 --> 00:03:37,519
and all of the different control centers

110
00:03:41,509 --> 00:03:39,040
international partners

111
00:03:43,030 --> 00:03:41,519
everybody uh helps make it happen as

112
00:03:44,949 --> 00:03:43,040
well as the flight control team here and

113
00:03:47,830 --> 00:03:44,959

the engineering community and everybody

114
00:03:50,149 --> 00:03:47,840
that is is behind it so that that really

115
00:03:51,910 --> 00:03:50,159
is a testament to to the entire team and

116
00:03:53,270 --> 00:03:51,920
being able to keep the station going

117
00:03:56,789 --> 00:03:53,280
while they're doing all this science i'm

118
00:03:58,949 --> 00:03:56,799
sure is not always the the easiest task

119
00:04:01,270 --> 00:03:58,959
exactly we have had uh some challenges

120
00:04:02,789 --> 00:04:01,280
uh in terms of systems that the teams

121
00:04:03,830 --> 00:04:02,799
have had to maneuver through and and

122
00:04:05,589 --> 00:04:03,840
with all that we've been able to

123
00:04:07,110 --> 00:04:05,599
accomplish all the science so that is

124
00:04:08,470 --> 00:04:07,120
the remarkable part

125
00:04:10,309 --> 00:04:08,480
as well as part of it

126
00:04:11,910 --> 00:04:10,319
well i know on top of um kind of the

127
00:04:13,509 --> 00:04:11,920
regular things that we think of as

128
00:04:15,190 --> 00:04:13,519
science there were also a couple of

129
00:04:17,030 --> 00:04:15,200
american technology demonstrations

130
00:04:18,870 --> 00:04:17,040
during the past few months

131
00:04:20,629 --> 00:04:18,880
legs for robonaut and a few other things

132
00:04:23,430 --> 00:04:20,639
why don't you tell us about that

133
00:04:25,830 --> 00:04:23,440
we yes we robonaut we were able to to

134
00:04:27,510 --> 00:04:25,840
kick off that augmentation if you would

135
00:04:30,870 --> 00:04:27,520
uh where we went and get a lot of the

136
00:04:32,870 --> 00:04:30,880
mobility upgrades and it it culminated

137
00:04:34,150 --> 00:04:32,880
in the legs the installation of the legs

138
00:04:36,070 --> 00:04:34,160

but behind that there was almost a

139
00:04:38,230 --> 00:04:36,080
robotic brain surgery going on when they

140
00:04:41,189 --> 00:04:38,240
were uh we had our crew members going

141
00:04:43,590 --> 00:04:41,199
through and and re-wire

142
00:04:46,390 --> 00:04:43,600
per se the the robonaut so that can

143
00:04:47,990 --> 00:04:46,400
eventually become mobile uh and we will

144
00:04:49,350 --> 00:04:48,000
be uh

145
00:04:51,909 --> 00:04:49,360
waiting for the backpack to come in so

146
00:04:54,150 --> 00:04:51,919
that he can continue with some of those

147
00:04:56,629 --> 00:04:54,160
demonstrations as well but it was a big

148
00:04:58,790 --> 00:04:56,639
overhaul of the robonaut in a big

149
00:05:01,110 --> 00:04:58,800
surgery and technology behind that and

150
00:05:02,550 --> 00:05:01,120
and finally uh the leg attachment and

151
00:05:04,629 --> 00:05:02,560
hopefully we'll be seeing a little bit

152
00:05:05,670 --> 00:05:04,639
more work from robonaut in the coming

153
00:05:07,749 --> 00:05:05,680
months

154
00:05:10,790 --> 00:05:07,759
uh yes i think uh it's probably in the

155
00:05:13,110 --> 00:05:10,800
plans for the next few expeditions uh

156
00:05:14,790 --> 00:05:13,120
what about um i know there was a

157
00:05:17,749 --> 00:05:14,800
the veggie greenhouse that we got a crop

158
00:05:19,350 --> 00:05:17,759
from how how is that started looking

159
00:05:21,270 --> 00:05:19,360
that was another very successful

160
00:05:23,510 --> 00:05:21,280
demonstration uh it was a twofold

161
00:05:25,430 --> 00:05:23,520
objective to demonstrate the facility in

162
00:05:27,270 --> 00:05:25,440
itself the veggie facility

163
00:05:29,590 --> 00:05:27,280

and its ability to grow

164
00:05:31,749 --> 00:05:29,600
plants and we had our veggie one

165
00:05:34,230 --> 00:05:31,759
investigation where we were able to

166
00:05:36,550 --> 00:05:34,240
grow uh romaine lettuce uh red romaine

167
00:05:39,189 --> 00:05:36,560
lettuce and you could see some of those

168
00:05:41,510 --> 00:05:39,199
yes and and they had they were having a

169
00:05:43,590 --> 00:05:41,520
competition between the ground teams and

170
00:05:45,189 --> 00:05:43,600
of course our ground controls and and

171
00:05:47,510 --> 00:05:45,199
the crew on board i think steve spent a

172
00:05:49,510 --> 00:05:47,520
lot of time uh growing that that led us

173
00:05:51,350 --> 00:05:49,520
very successfully and

174
00:05:53,189 --> 00:05:51,360
we will return samples in a future

175
00:05:55,830 --> 00:05:53,199
mission and the teams will be able to

176
00:05:58,150 --> 00:05:55,840
analyze that and continue to tweak the

177
00:05:59,110 --> 00:05:58,160
the processes by which we grow

178
00:06:01,350 --> 00:05:59,120
um

179
00:06:02,390 --> 00:06:01,360
all different kinds of of plants on

180
00:06:04,309 --> 00:06:02,400
space

181
00:06:06,150 --> 00:06:04,319
all right well in addition to all the

182
00:06:07,510 --> 00:06:06,160
the new experiments and science that we

183
00:06:09,029 --> 00:06:07,520
saw there were also some some old

184
00:06:11,430 --> 00:06:09,039
favorites i guess that that we're seeing

185
00:06:13,189 --> 00:06:11,440
again and again like bass and spears how

186
00:06:15,909 --> 00:06:13,199
are those going

187
00:06:18,070 --> 00:06:15,919
we did extremely well we were able to to

188
00:06:19,350 --> 00:06:18,080

recover from uh some of the situations

189
00:06:21,670 --> 00:06:19,360
in coming through with the bass

190
00:06:24,550 --> 00:06:21,680
experiment facility and and continue

191
00:06:26,309 --> 00:06:24,560
through a variety of the fuel uh

192
00:06:27,430 --> 00:06:26,319
samples that we were burning uh and

193
00:06:29,189 --> 00:06:27,440
different crew i think did some

194
00:06:31,909 --> 00:06:29,199
maintenance and and looked into some

195
00:06:33,350 --> 00:06:31,919
some issues with the the igniter was it

196
00:06:35,430 --> 00:06:33,360
it was a door then we had to restore the

197
00:06:36,790 --> 00:06:35,440
door uh and we fixed that successfully

198
00:06:39,270 --> 00:06:36,800
and we're able to

199
00:06:41,510 --> 00:06:39,280
to continue the study of suppressing

200
00:06:43,270 --> 00:06:41,520
fire um and how

201
00:06:44,629 --> 00:06:43,280
different kinds of fuels burn and

202
00:06:45,510 --> 00:06:44,639
different flow rates and how that

203
00:06:48,469 --> 00:06:45,520
affects

204
00:06:49,510 --> 00:06:48,479
the that burning process so clearly it's

205
00:06:51,270 --> 00:06:49,520
something that we need to continue to

206
00:06:53,270 --> 00:06:51,280
investigate for for fire safety in the

207
00:06:54,790 --> 00:06:53,280
future those are really interesting uh

208
00:06:56,390 --> 00:06:54,800
to watch from here on the ground as well

209
00:06:58,230 --> 00:06:56,400
as is spheres which we're seeing a

210
00:07:00,469 --> 00:06:58,240
little bit of today so

211
00:07:02,950 --> 00:07:00,479
that's right a sphere's slosh as you

212
00:07:05,430 --> 00:07:02,960
mentioned earlier it is a a an

213
00:07:08,469 --> 00:07:05,440

investigation to see how the liquids

214
00:07:09,909 --> 00:07:08,479
will move inside containers and

215
00:07:11,029 --> 00:07:09,919
one of the very direct applications we

216
00:07:11,990 --> 00:07:11,039
could have

217
00:07:15,510 --> 00:07:12,000
for

218
00:07:17,270 --> 00:07:15,520
liquid propulsion systems so we can

219
00:07:20,390 --> 00:07:17,280
understand that slosh

220
00:07:22,309 --> 00:07:20,400
effect as tanks are going into

221
00:07:23,749 --> 00:07:22,319
microgravity and

222
00:07:25,270 --> 00:07:23,759
moves a little different microgravity

223
00:07:28,070 --> 00:07:25,280
and this helps us understand that

224
00:07:29,749 --> 00:07:28,080
exactly okay well thanks sink in um i

225
00:07:31,670 --> 00:07:29,759
guess before you go i know it's it's not

226
00:07:32,870 --> 00:07:31,680
going to be um you're not going to be

227
00:07:34,870 --> 00:07:32,880
the lead for the next one but maybe you

228
00:07:37,350 --> 00:07:34,880
can give us a quick uh preview of what

229
00:07:39,350 --> 00:07:37,360
we'll see in for expedition 41.

230
00:07:42,070 --> 00:07:39,360
yeah i'm sure you will have uh our the

231
00:07:44,869 --> 00:07:42,080
next lead increment scientist vic cooley

232
00:07:46,629 --> 00:07:44,879
will probably be stopping by

233
00:07:48,710 --> 00:07:46,639
in the next week or so but

234
00:07:50,550 --> 00:07:48,720
very quickly i know we have a lot of

235
00:07:52,629 --> 00:07:50,560
things in store not only to continue a

236
00:07:54,629 --> 00:07:52,639
lot of the human research investigations

237
00:07:56,869 --> 00:07:54,639
we've started

238
00:07:58,790 --> 00:07:56,879

but also

239
00:08:00,230 --> 00:07:58,800
we'll be able to look at spacex four

240
00:08:02,550 --> 00:08:00,240
coming up which will bring a lot of

241
00:08:04,469 --> 00:08:02,560
exciting uh investigations like rodent

242
00:08:06,869 --> 00:08:04,479
research with it and some other plant

243
00:08:08,230 --> 00:08:06,879
gravity sensing kind of investigations

244
00:08:10,070 --> 00:08:08,240
all right we'll be sure and aspect about

245
00:08:11,990 --> 00:08:10,080
those when he's visiting with us thanks

246
00:08:14,309 --> 00:08:12,000
again for coming back this again was uh

247
00:08:15,830 --> 00:08:14,319
yuri ganar ramirez the lead expedition

248
00:08:17,350 --> 00:08:15,840
40 scientist