
NASA
STEPHANIE MURPHY
President
Alpha Space

1
00:00:37,049 --> 00:00:35,009
some of the most common skills we use on

2
00:00:38,729 --> 00:00:37,059
earth proved to be much more tedious in

3
00:00:40,529 --> 00:00:38,739
microgravity but their skills and

4
00:00:42,689 --> 00:00:40,539
astronauts must be able to master as we

5
00:00:44,939 --> 00:00:42,699
journey farther into space an experiment

6
00:00:46,979 --> 00:00:44,949
called fine motor skills is the first to

7
00:00:49,709 --> 00:00:46,989
measure long-term microgravity exposure

8
00:00:51,689 --> 00:00:49,719
different phases of adaptation and since

9
00:00:53,880 --> 00:00:51,699
the remoter recovery after returning to

10
00:00:54,990 --> 00:00:53,890
Earth by calling Rory megs at the

11
00:00:57,869 --> 00:00:55,000
Marshall Space Flight Center in

12
00:01:00,149 --> 00:00:57,879
Huntsville Alabama spoke with cretino

13
00:01:03,329 --> 00:01:00,159

Holden the principal investigator of

14
00:01:05,219 --> 00:01:03,339
this study to learn more we're

15
00:01:06,630 --> 00:01:05,229
interested in finding out if there are

16
00:01:09,690 --> 00:01:06,640
any effects of long-duration

17
00:01:11,490 --> 00:01:09,700
microgravity on fine motor skills we're

18
00:01:13,710 --> 00:01:11,500
particularly interested in looking at

19
00:01:15,719 --> 00:01:13,720
advanced technologies like touch screens

20
00:01:17,130 --> 00:01:15,729
and gesture devices because we think

21
00:01:18,630 --> 00:01:17,140
those are the kind of devices that crew

22
00:01:20,820 --> 00:01:18,640
members will be using on future missions

23
00:01:22,529 --> 00:01:20,830
and we want to make sure that if they're

24
00:01:24,480 --> 00:01:22,539
on a long-duration journey to Mars for

25
00:01:26,730 --> 00:01:24,490
example that they're able to interact

26
00:01:28,949 --> 00:01:26,740
accurately with those devices once they

27
00:01:30,120 --> 00:01:28,959
go to the planet's surface what types of

28
00:01:33,539 --> 00:01:30,130
fine motor skills are we talking about

29
00:01:36,840 --> 00:01:33,549
so we are doing this study on a Apple

30
00:01:38,700 --> 00:01:36,850
iPad and using the touchscreen and so we

31
00:01:40,770 --> 00:01:38,710
have four different tasks that are part

32
00:01:43,260 --> 00:01:40,780
of the investigation they include things

33
00:01:45,690 --> 00:01:43,270
like pointing to a target of dragging to

34
00:01:47,670 --> 00:01:45,700
a target shape tracing a circle and

35
00:01:50,429 --> 00:01:47,680
square shaped tracing and then a pinch

36
00:01:52,950 --> 00:01:50,439
rotate task which is a multi-touch task

37
00:01:56,849 --> 00:01:52,960
or the touchscreen why do we need to

38
00:02:00,569 --> 00:01:56,859

know this well so crew members more and

39
00:02:02,010 --> 00:02:00,579
more using iPads onboard ISS and so

40
00:02:04,219 --> 00:02:02,020
they're using a lot of touchscreen

41
00:02:07,830 --> 00:02:04,229
interfaces and a lot of times if

42
00:02:09,690 --> 00:02:07,840
interfaces aren't designed well there

43
00:02:11,340 --> 00:02:09,700
are a lot of errors and so we want to

44
00:02:13,140 --> 00:02:11,350
make sure we know if there's any

45
00:02:15,240 --> 00:02:13,150
performance decrements after being in

46
00:02:16,620 --> 00:02:15,250
microgravity for a long time that we

47
00:02:18,990 --> 00:02:16,630
might need to accommodate with a

48
00:02:21,150 --> 00:02:19,000
different type of design with this lead

49
00:02:23,309 --> 00:02:21,160
to new designs for our iPads yes we're

50
00:02:24,990 --> 00:02:23,319
very excited about that actually the

51
00:02:28,620 --> 00:02:25,000
particular application we think it has

52
00:02:30,629 --> 00:02:28,630
is for populations who do have problems

53
00:02:33,150 --> 00:02:30,639
with fine motor skills so we're looking

54
00:02:36,300 --> 00:02:33,160
into using the test battery that we've

55
00:02:38,820 --> 00:02:36,310
developed for elderly populations or

56
00:02:41,130 --> 00:02:38,830
brain injured or Parkinson's patients

57
00:02:43,410 --> 00:02:41,140
who need to be tested you could be used

58
00:02:45,560 --> 00:02:43,420
as a diagnostic tool we also think it

59
00:02:48,870 --> 00:02:45,570
could be used as a rehabilitation tool

60
00:02:50,340 --> 00:02:48,880
it's really cool it's really cool we

61
00:02:52,020 --> 00:02:50,350
have a couple of universities that are

62
00:02:53,700 --> 00:02:52,030
very interested in working with us to

63
00:02:56,250 --> 00:02:53,710

kind of move the product in that

64
00:02:58,920 --> 00:02:56,260
direction have you done other studies

65
00:03:01,080 --> 00:02:58,930
like this we've done a number of ground

66
00:03:02,820 --> 00:03:01,090
studies looking at fine motor skills but

67
00:03:05,040 --> 00:03:02,830
this is really the first flight study

68
00:03:06,990 --> 00:03:05,050
that we've done pretty exciting that you

69
00:03:08,910 --> 00:03:07,000
can do it for a year right it is so

70
00:03:10,590 --> 00:03:08,920
exciting you know we come from human

71
00:03:12,900 --> 00:03:10,600
factors and we don't get to do a lot of

72
00:03:14,610 --> 00:03:12,910
flight studies and so we are thrilled to

73
00:03:17,610 --> 00:03:14,620
be part of the one-year mission this is

74
00:03:20,130 --> 00:03:17,620
a really great opportunity to complete a

75
00:03:21,690 --> 00:03:20,140
data set that is a little bit lacking so

76
00:03:24,150 --> 00:03:21,700
there's been some data in the past on

77
00:03:26,070 --> 00:03:24,160
fine motor skills not interacting with

78
00:03:29,490 --> 00:03:26,080
the kind of devices that we're using but

79
00:03:31,530 --> 00:03:29,500
also with a lot of lapses in the data

80
00:03:33,930 --> 00:03:31,540
you know over the mission and so this is

81
00:03:36,000 --> 00:03:33,940
a great opportunity for us to get data

82
00:03:37,590 --> 00:03:36,010
pre-flight throughout a whole one-year

83
00:04:02,070 --> 00:03:37,600
mission and post-flight and I think

84
00:04:05,940 --> 00:04:04,140
I mentioned earlier that Jeff Williams

85
00:04:08,010 --> 00:04:05,950
spent some time this morning on the

86
00:04:10,380 --> 00:04:08,020
NanoRacks experiment several of those

87
00:04:13,080 --> 00:04:10,390
arrived on board dragon last month and

88
00:04:14,850 --> 00:04:13,090

NanoRacks is a multi-purpose research

89
00:04:16,710 --> 00:04:14,860
facility that provides power and data

90
00:04:20,009 --> 00:04:16,720
transfer capability to the NanoRacks

91
00:04:24,060 --> 00:04:20,019
cube labs module each anoraks platform

92
00:04:26,760 --> 00:04:24,070
is about 17 x 9 x 20 inches and weighs

93
00:04:28,290 --> 00:04:26,770
just about 12 pounds they're designed

94
00:04:29,970 --> 00:04:28,300
for use within the pressurized space

95
00:04:32,430 --> 00:04:29,980
station environment and provide room for

96
00:04:35,580 --> 00:04:32,440
up to 16 modules to plug into a standard

97
00:04:37,500 --> 00:04:35,590
USB connection standardized interface

98
00:04:40,800 --> 00:04:37,510
reduces integration cost and schedule

99
00:04:42,390 --> 00:04:40,810
for the research some of the NanoRacks

100
00:04:44,250 --> 00:04:42,400
experiments that Williams is working on

101
00:04:47,040 --> 00:04:44,260
today look at things like the shape and

102
00:04:50,370 --> 00:04:47,050
growth of small mushrooms in space the

103
00:04:53,330 --> 00:04:50,380
effect of microgravity on bacterial

104
00:04:57,240 --> 00:04:53,340
biofilm formation on soft contact lenses

105
00:04:59,250 --> 00:04:57,250
effect of microgravity on e coli growth

106
00:05:02,610 --> 00:04:59,260
and the effect of microgravity on how

107
00:05:06,060 --> 00:05:02,620
detergent plus polymer beans works on

108
00:05:07,770 --> 00:05:06,070
cleaning cotton cloth in microgravity to

109
00:05:10,560 --> 00:05:07,780
work on the experiments Williams simply

110
00:05:13,800 --> 00:05:10,570
has closures that allow two parts of the

111
00:05:15,390 --> 00:05:13,810
experiment to mix he opens those and

112
00:05:17,640 --> 00:05:15,400
gently shakes them for a prescribed

113
00:05:24,600 --> 00:05:17,650

number of seconds anything from 15 to

114
00:05:28,260 --> 00:05:24,610
120 and allows them to mix and then they

115
00:05:31,430 --> 00:05:28,270
are allowed to a scientist on the ground

116
00:05:42,820 --> 00:05:31,440
are able to make that collect that data

117
00:05:47,899 --> 00:05:46,010
takuya she is working now to wrap up an

118
00:05:50,869 --> 00:05:47,909
experiment arrived on the SpaceX Dragon

119
00:05:52,249 --> 00:05:50,879
and as now preparing to return to Earth

120
00:05:55,070 --> 00:05:52,259
on board it as well the mouse

121
00:05:57,049 --> 00:05:55,080
epigenetics experiment laneige is

122
00:05:58,699 --> 00:05:57,059
checking up on that experiment today and

123
00:06:01,209 --> 00:05:58,709
actually getting it ready for return to

124
00:06:03,919 --> 00:06:01,219
home as moves it into a transfer

125
00:06:06,409 --> 00:06:03,929
container for the mice that are part of

126
00:06:09,290 --> 00:06:06,419
that experiment Mouse epigenetics uses

127
00:06:11,119 --> 00:06:09,300
mice as a model organisms for humans to

128
00:06:12,919 --> 00:06:11,129
study how living in space for long

129
00:06:15,230 --> 00:06:12,929
periods of time affects our genetic

130
00:06:17,719 --> 00:06:15,240
activity from changes in gene expression

131
00:06:20,989 --> 00:06:17,729
in individual organisms to changes in

132
00:06:24,199 --> 00:06:20,999
DNA that can be inherited later to make

133
00:06:25,790 --> 00:06:24,209
that possible 12 male mice have been

134
00:06:28,639 --> 00:06:25,800
living on the space station for about 30

135
00:06:31,219 --> 00:06:28,649
days while the dragon is here and then

136
00:06:32,389 --> 00:06:31,229
we'll be returning to earth and the

137
00:06:34,369 --> 00:06:32,399
scientists who are part of the

138
00:06:36,439 --> 00:06:34,379

experiment I thought is that under

139
00:06:38,209 --> 00:06:36,449
microgravity conditions unusual gene

140
00:06:40,759 --> 00:06:38,219
expression patterns and normal body

141
00:06:41,959 --> 00:06:40,769
cells can be induced by the stresses

142
00:06:45,019 --> 00:06:41,969
that come from living without gravity

143
00:06:47,689 --> 00:06:45,029
and other stresses such as cosmic

144
00:06:50,799 --> 00:06:47,699
radiation may cause unexpected genomic

145
00:06:53,389 --> 00:06:50,809
or epigenomic changes in genes in

146
00:06:56,029 --> 00:06:53,399
reproductive cells scientists will look

147
00:06:59,269 --> 00:06:56,039
for changes in the DNA of the mice

148
00:07:39,070 --> 00:06:59,279
organs and then look at their offspring

149
00:07:43,190 --> 00:07:41,150
one of the best ways to keep up with

150
00:07:45,500 --> 00:07:43,200
what's going on onboard the space

151
00:07:47,120 --> 00:07:45,510
station is to find out directly from the

152
00:07:49,280 --> 00:07:47,130
astronauts who are living there many of

153
00:07:51,650 --> 00:07:49,290
them have social media accounts and send

154
00:07:54,250 --> 00:07:51,660
down updates regularly and we have a few

155
00:07:57,260 --> 00:07:54,260
of those here to share with you today

156
00:07:59,720 --> 00:07:57,270
this one's actually from Kate Rubens she

157
00:08:02,060 --> 00:07:59,730
does not maintain her own account but

158
00:08:04,460 --> 00:08:02,070
she is sitting down updates to the NASA

159
00:08:06,530 --> 00:08:04,470
astronauts Twitter account that can be

160
00:08:08,480 --> 00:08:06,540
found at at NASA underscore astronauts

161
00:08:12,230 --> 00:08:08,490
and he or she sent down a photo that she

162
00:08:16,250 --> 00:08:12,240
took during Friday's spacewalk selfie

163
00:08:17,870 --> 00:08:16,260

looking back at herself inside her space

164
00:08:19,490 --> 00:08:17,880
suit with the visor downs you're not

165
00:08:24,409 --> 00:08:19,500
really able to see her face but that is

166
00:08:26,330 --> 00:08:24,419
her behind the visor and this one comes

167
00:08:28,130 --> 00:08:26,340
from jeff williams who does a have a

168
00:08:30,320 --> 00:08:28,140
twitter account that he updates pretty

169
00:08:32,450 --> 00:08:30,330
regularly that can be found at at astro

170
00:08:37,810 --> 00:08:32,460
underscored jeff this one particularly

171
00:08:40,279 --> 00:08:37,820
looking at Glacier Bay National Park the

172
00:08:41,990 --> 00:08:40,289
100th anniversary of the National Park

173
00:08:44,660 --> 00:08:42,000
System is coming up actually tomorrow

174
00:08:47,210 --> 00:08:44,670
and Williams has been taking a number of

175
00:08:50,030 --> 00:08:47,220
photos of the National Parks from space

176
00:08:53,480 --> 00:08:50,040
to share this is a good example he also

177
00:08:55,970 --> 00:08:53,490
sent down this one of black heels South

178
00:09:00,100 --> 00:08:55,980
Dakota and Wyoming another national park

179
00:09:06,770 --> 00:09:03,650
finally he also turned the camera up to

180
00:09:08,840 --> 00:09:06,780
give us a look at what it looks like to

181
00:09:12,079 --> 00:09:08,850
see the full moon from the International

182
00:09:14,600 --> 00:09:12,089
Space Station again you can find jeff

183
00:09:17,300 --> 00:09:14,610
williams updates on Twitter it at a

184
00:09:20,180 --> 00:09:17,310
stroke or jeff or you can also look for

185
00:09:57,889 --> 00:09:20,190
him on facebook he's he's listed as NASA

186
00:10:02,280 --> 00:10:00,449
we talk a lot on Space Station live

187
00:10:03,870 --> 00:10:02,290
about the various benefits that we here

188
00:10:05,370 --> 00:10:03,880

on earth receive from the International

189
00:10:06,360 --> 00:10:05,380
Space Station and coming up next we're

190
00:10:09,180 --> 00:10:06,370
going to take a look at some specific

191
00:10:14,430 --> 00:10:09,190
ones and benefits for Humanity spaces

192
00:10:16,710 --> 00:10:14,440
our business the International Space

193
00:10:19,170 --> 00:10:16,720
Station is the most unique laboratory

194
00:10:21,300 --> 00:10:19,180
that exists there are things that you

195
00:10:23,220 --> 00:10:21,310
can learn things that you can do in

196
00:10:25,500 --> 00:10:23,230
space that you just can't do on the

197
00:10:29,550 --> 00:10:25,510
earth space station really provides an

198
00:10:32,280 --> 00:10:29,560
opportunity to explore for example say

199
00:10:34,019 --> 00:10:32,290
medical applications the aging and the

200
00:10:36,329 --> 00:10:34,029
osteoporosis and muscle wasting

201
00:10:38,670 --> 00:10:36,339
conditions are greatly accelerated in

202
00:10:41,610 --> 00:10:38,680
microgravity understanding those

203
00:10:43,620 --> 00:10:41,620
phenomena allow us to look at how we can

204
00:10:46,259 --> 00:10:43,630
improve treatment of disease here on

205
00:10:49,439 --> 00:10:46,269
earth what we have is the capability to

206
00:10:51,600 --> 00:10:49,449
affect people's quality of life it's not

207
00:10:53,430 --> 00:10:51,610
just drug companies that can benefit

208
00:10:56,430 --> 00:10:53,440
from experiments or research in space

209
00:10:58,439 --> 00:10:56,440
that's a host of industries across the

210
00:11:01,170 --> 00:10:58,449
board but it wasn't always easy to get

211
00:11:03,269 --> 00:11:01,180
there historically access to space was

212
00:11:05,370 --> 00:11:03,279
limited to companies and corporations

213
00:11:08,069 --> 00:11:05,380

which was selected by the government and

214
00:11:10,319 --> 00:11:08,079
what we lost was the true creativity of

215
00:11:12,090 --> 00:11:10,329
so many innovative smaller companies

216
00:11:14,309 --> 00:11:12,100
that really didn't understand how to get

217
00:11:17,550 --> 00:11:14,319
to space when we were doing the

218
00:11:20,309 --> 00:11:17,560
reauthorization of NASA we wanted to

219
00:11:23,220 --> 00:11:20,319
expand the opportunities to different

220
00:11:24,900 --> 00:11:23,230
areas of experimentation and also

221
00:11:26,639 --> 00:11:24,910
different entities recognizing the

222
00:11:29,910 --> 00:11:26,649
untapped potential for commercial access

223
00:11:31,050 --> 00:11:29,920
to space 2005 Congress declared the u.s.

224
00:11:32,809 --> 00:11:31,060
portion of the International Space

225
00:11:35,069 --> 00:11:32,819
Station a national laboratory

226
00:11:38,250 --> 00:11:35,079
essentially it opened up opportunities

227
00:11:40,139 --> 00:11:38,260
for research that could be done on the

228
00:11:42,449 --> 00:11:40,149
space station that would benefit us here

229
00:11:44,699 --> 00:11:42,459
on earth everyday companies and everyday

230
00:11:46,620 --> 00:11:44,709
researchers and everyday people can

231
00:11:48,600 --> 00:11:46,630
think about using the space station

232
00:11:50,819 --> 00:11:48,610
that's that's a fundamental change it

233
00:11:52,650 --> 00:11:50,829
was never allowed before today we offer

234
00:11:54,870 --> 00:11:52,660
opportunities to the researcher that

235
00:11:55,870 --> 00:11:54,880
never existed before whether it be seed

236
00:11:58,480 --> 00:11:55,880
funding to help

237
00:12:01,480 --> 00:11:58,490
support the actual project to access to

238
00:12:03,700 --> 00:12:01,490

experts to create hardware that rocket

239
00:12:05,560 --> 00:12:03,710
ride up the on station time with the

240
00:12:07,750 --> 00:12:05,570
astronaut is your lab technician what

241
00:12:10,750 --> 00:12:07,760
we're doing is really making it as easy

242
00:12:12,670 --> 00:12:10,760
as possible for people here on earth to

243
00:12:15,790 --> 00:12:12,680
do space-based research without becoming

244
00:12:17,880 --> 00:12:15,800
space experts our part of the mission is

245
00:12:20,740 --> 00:12:17,890
to help guide these non-traditional

246
00:12:24,040 --> 00:12:20,750
innovative users from their traditional

247
00:12:27,790 --> 00:12:24,050
labs here on the ground to a very

248
00:12:30,130 --> 00:12:27,800
unusual and important asset in space the

249
00:12:31,990 --> 00:12:30,140
ISS National Lab has space versions of

250
00:12:33,610 --> 00:12:32,000
hardware that you can often find in

251
00:12:35,650 --> 00:12:33,620
laboratories here on the ground

252
00:12:38,140 --> 00:12:35,660
everything from even animal habitats

253
00:12:40,750 --> 00:12:38,150
plant growth chamber reasors 3d printers

254
00:12:43,360 --> 00:12:40,760
observation windows incubators services

255
00:12:45,880 --> 00:12:43,370
the centrifuges microscopes list goes on

256
00:12:48,430 --> 00:12:45,890
and on so we're working with companies

257
00:12:50,170 --> 00:12:48,440
that you would never imagine and they

258
00:12:51,850 --> 00:12:50,180
would never have imagined using the

259
00:12:53,620 --> 00:12:51,860
International Space Station and they're

260
00:12:55,210 --> 00:12:53,630
seeing great results from that the

261
00:12:58,210 --> 00:12:55,220
international space station offers

262
00:13:00,340 --> 00:12:58,220
researchers like me an opportunity to

263
00:13:04,090 --> 00:13:00,350

find the key variables it's helping us

264
00:13:05,440 --> 00:13:04,100
to pinpoint therapeutic molecules the

265
00:13:07,660 --> 00:13:05,450
space station really provides us a

266
00:13:09,430 --> 00:13:07,670
unique opportunity a TKE environment to

267
00:13:11,080 --> 00:13:09,440
do some basic and fundamental research

268
00:13:14,020 --> 00:13:11,090
that allows us to doll products better

269
00:13:16,150 --> 00:13:14,030
the ISS allows us to do a series of

270
00:13:17,940 --> 00:13:16,160
experiments in weightlessness that will

271
00:13:21,430 --> 00:13:17,950
have profound impacts for life on Earth

272
00:13:24,940 --> 00:13:21,440
having a US National Lab in space has

273
00:13:27,190 --> 00:13:24,950
allowed for the formation of a wide

274
00:13:30,850 --> 00:13:27,200
range of companies it's creating a new

275
00:13:33,450 --> 00:13:30,860
economy a sustainable market place that

276
00:13:36,070 --> 00:13:33,460
has services commercial products

277
00:13:55,470 --> 00:13:36,080
competition there's no limit to what we

278
00:13:59,439 --> 00:13:57,970
as August winds down we want to make

279
00:14:01,449 --> 00:13:59,449
sure that everyone gets bored that in

280
00:14:03,549 --> 00:14:01,459
September NASA will bring its online

281
00:14:05,470 --> 00:14:03,559
audience inside the world of human

282
00:14:07,299 --> 00:14:05,480
spaceflight as never before from its

283
00:14:09,129 --> 00:14:07,309
Johnson Space Center in Houston home to

284
00:14:11,049 --> 00:14:09,139
NASA's astronaut corps and the story

285
00:14:13,720 --> 00:14:11,059
admission control and several human

286
00:14:15,100 --> 00:14:13,730
spaceflight programs new and unique

287
00:14:17,229 --> 00:14:15,110
stories from the International Space

288
00:14:18,999 --> 00:14:17,239

Station Orion spacecraft program and

289
00:14:21,129 --> 00:14:19,009
other human spaceflight projects will

290
00:14:23,109 --> 00:14:21,139
take viewers behind the scenes of the

291
00:14:24,939 --> 00:14:23,119
groundbreaking science taking place off

292
00:14:27,039 --> 00:14:24,949
the earth for the earth and the

293
00:14:29,229 --> 00:14:27,049
technology nessa stein to prayer for its

294
00:14:30,939 --> 00:14:29,239
journey to mars this programming will be

295
00:14:32,710 --> 00:14:30,949
available to a worldwide audience on

296
00:14:35,829 --> 00:14:32,720
various NASA social media accounts

297
00:14:37,780 --> 00:14:35,839
including YouTube space station lab will

298
00:14:39,759 --> 00:14:37,790
be phased out in August and discontinued

299
00:14:41,859 --> 00:14:39,769
September first however NASA TV will

300
00:14:43,569 --> 00:14:41,869
continue to air live coverage of dynamic

301
00:14:46,989 --> 00:14:43,579
space station operations including

302
00:14:49,720 --> 00:14:46,999
lunches dockings landings spacewalks and

303
00:14:51,400 --> 00:14:49,730
briefings NASA TV will also continue to

304
00:14:53,710 --> 00:14:51,410
air weekly highlights of life onboard

305
00:14:56,019 --> 00:14:53,720
station in the short format space to

306
00:14:59,530 --> 00:14:56,029
ground program also available on YouTube

307
00:15:01,150 --> 00:14:59,540
and be a podcast these changes will not

308
00:15:03,340 --> 00:15:01,160
affect live video streams from the

309
00:15:05,439 --> 00:15:03,350
International Space Station viewers can

310
00:15:07,869 --> 00:15:05,449
continue to see them those live video

311
00:15:09,879 --> 00:15:07,879
streams as long as the ISS has signal on

312
00:15:13,989 --> 00:15:09,889
Ustream and via the high-definition

313
00:15:15,699 --> 00:15:13,999

Earth viewing or HD payload daily

314
00:15:18,400 --> 00:15:15,709
updates on space station research and

315
00:15:20,109 --> 00:15:18,410
operations will continue to be posted to

316
00:15:22,299 --> 00:15:20,119
the International Space Station blog as

317
00:15:24,669 --> 00:15:22,309
a little more detailed daily rundowns of

318
00:15:29,199 --> 00:15:24,679
crew activities on the in orbit status

319
00:15:30,819 --> 00:15:29,209
report blog digital audiences also have

320
00:15:32,530 --> 00:15:30,829
the option of receiving weekly video

321
00:15:35,079 --> 00:15:32,540
highlights by subscribing to johnson's

322
00:15:36,939 --> 00:15:35,089
newsletter a news release email list or

323
00:15:38,829 --> 00:15:36,949
check out the hundreds of hours of Ravi

324
00:15:40,720 --> 00:15:38,839
you from space station that is available

325
00:15:43,359 --> 00:15:40,730
for download from Johnson's video

326
00:15:45,970 --> 00:15:43,369
collection archive with additional video

327
00:15:48,009 --> 00:15:45,980
added daily for more information and

328
00:15:57,220 --> 00:15:48,019
links to all of those resources you can

329
00:16:01,160 --> 00:15:59,449
we're coming up now on the end of the

330
00:16:02,930 --> 00:16:01,170
day's space station live that of course

331
00:16:05,210 --> 00:16:02,940
you'll want to stay tuned as usual at

332
00:16:07,100 --> 00:16:05,220
11am central for the nasa TV video file

333
00:16:08,720 --> 00:16:07,110
to get a look at other activities going

334
00:16:11,629 --> 00:16:08,730
on at NASA centers across the country

335
00:16:13,550 --> 00:16:11,639
and then for sure stay tuned at one p.m.

336
00:16:15,379 --> 00:16:13,560
central time to get a look at the

337
00:16:16,999 --> 00:16:15,389
spacewalk that Jeff Williams and Kate

338
00:16:19,460 --> 00:16:17,009

Rubens will be performing on sep tember

339
00:16:21,439 --> 00:16:19,470
first that spacewalk preview briefing

340
00:16:24,410 --> 00:16:21,449
again will be taking place here on NASA

341
00:17:24,340 --> 00:16:24,420
TV at one p.m. Central Time this is

342
00:17:29,060 --> 00:17:26,540
attention all cable and satellite

343
00:17:31,790 --> 00:17:29,070
television providers and viewers NASA

344
00:17:34,310 --> 00:17:31,800
television channels MTV one and two are

345
00:17:37,250 --> 00:17:34,320
now transmitting from galaxy 13

346
00:17:39,620 --> 00:17:37,260
transponder 11 please make the switch to

347
00:17:42,920 --> 00:17:39,630
this new satellite to continue receiving

348
00:17:48,410 --> 00:17:42,930
all your favorite TV programs for more

349
00:17:54,550 --> 00:17:48,420
information visit www.fcn and click on

350
00:18:01,430 --> 00:17:58,280
hey you're watching NASA TV on the air

351
00:18:44,880 --> 00:18:01,440
and online every day on this planet and

352
00:18:44,890 --> 00:19:07,370
you

353
00:19:11,090 --> 00:19:09,170
good morning and welcome to Mission

354
00:19:13,820 --> 00:19:11,100
Control Houston in space station live

355
00:19:15,200 --> 00:19:13,830
it's a busy and also historic day on

356
00:19:17,840 --> 00:19:15,210
board the International Space Station

357
00:19:19,880 --> 00:19:17,850
today space station crew is made up of

358
00:19:23,690 --> 00:19:19,890
commander jeff williams and flight

359
00:19:25,760 --> 00:19:23,700
engineer Kate Rubens both of NASA japan

360
00:19:28,070 --> 00:19:25,770
aerospace exploration agency flight

361
00:19:30,260 --> 00:19:28,080
engineer Takuya onishi and russian

362
00:19:35,600 --> 00:19:30,270
flight engineers lexi of chinon oleg

363
00:19:37,130 --> 00:19:35,610

skripochka and anatoly ivanishin volumes

364
00:19:39,350 --> 00:19:37,140
of genetic approach could have been at

365
00:19:40,910 --> 00:19:39,360
the station since March 18th and are

366
00:19:42,200 --> 00:19:40,920
quickly running out of time in their

367
00:19:45,170 --> 00:19:42,210
mission they're scheduled to head home

368
00:19:47,240 --> 00:19:45,180
on sep tember 6 however as of today

369
00:19:49,280 --> 00:19:47,250
Williams has already been in space long

370
00:19:51,110 --> 00:19:49,290
enough to break the previous record for

371
00:19:54,620 --> 00:19:51,120
most time spent in space by u.s.

372
00:19:56,540 --> 00:19:54,630
astronaut that previous record was 520

373
00:19:58,640 --> 00:19:56,550
day set by Scott Kelly during his

374
00:20:00,230 --> 00:19:58,650
year-long mission and Kelly actually

375
00:20:02,120 --> 00:20:00,240
dropped into Mission Control Houston

376
00:20:09,350 --> 00:20:02,130
today to congratulate Williams on the

377
00:20:13,070 --> 00:20:09,360
achievement hey hey jeff it's scott

378
00:20:14,960 --> 00:20:13,080
Kelly hello Scott how you doing I

379
00:20:19,220 --> 00:20:14,970
recognized your voice before you said

380
00:20:23,300 --> 00:20:19,230
Scott Kelly hey I wanted to congratulate

381
00:20:25,370 --> 00:20:23,310
you on passing me up here in total

382
00:20:28,940 --> 00:20:25,380
number of days in space it's great to

383
00:20:31,490 --> 00:20:28,950
see another record broken and especially

384
00:20:36,980 --> 00:20:31,500
by a sardine but I do have one question

385
00:20:41,770 --> 00:20:36,990
for you and my question is you got 100

386
00:20:46,610 --> 00:20:44,840
ever hundred ninety days in me that

387
00:20:53,480 --> 00:20:46,620
question is that for me that's for my

388
00:20:55,700 --> 00:20:53,490

wife okay great job on the EPA's I was

389
00:20:58,460 --> 00:20:55,710
watching you from my house and great job

390
00:21:00,020 --> 00:20:58,470
the Kate and talk forgetting you guys in

391
00:21:02,390 --> 00:21:00,030
and out that was uh that was great that

392
00:21:04,850 --> 00:21:02,400
was supposed to be VA or the first one

393
00:21:06,650 --> 00:21:04,860
that gel and I was going to do I don't

394
00:21:08,810 --> 00:21:06,660
know if you recall that but hey great

395
00:21:12,500 --> 00:21:08,820
job and great to talk to you guys stay

396
00:21:16,370 --> 00:21:12,510
congratulations again I do remember that

397
00:21:18,659 --> 00:21:16,380
and we never expected the Jewish caton

398
00:21:20,340 --> 00:21:18,669
did an awesome job

399
00:21:23,039 --> 00:21:20,350
it was a good day because the hardware

400
00:21:26,489 --> 00:21:23,049
creatures right and the team on the

401
00:21:29,099 --> 00:21:26,499
ground set us up for success so we we

402
00:21:31,799 --> 00:21:29,109
came off at a very happy great to talk

403
00:21:34,470 --> 00:21:31,809
to you and I think I told you

404
00:21:36,119 --> 00:21:34,480
congratulations before your success

405
00:21:38,940 --> 00:21:36,129
although we didn't have much many

406
00:21:40,889 --> 00:21:38,950
opportunities to talk but successfully

407
00:21:44,960 --> 00:21:40,899
doing that one year flight thank you

408
00:21:48,720 --> 00:21:44,970
again for doing it so I didn't have to I

409
00:21:50,970 --> 00:21:48,730
I also saved those are my family they

410
00:21:52,680 --> 00:21:50,980
didn't want me to come I said you know

411
00:21:54,989 --> 00:21:52,690
if I did the one year I'd be home six

412
00:21:58,169 --> 00:21:54,999
months earlier and that never flew it

413
00:21:59,700 --> 00:21:58,179

with anybody they preferred delay in six

414
00:22:03,119 --> 00:21:59,710
months as opposed to go on one year

415
00:22:07,739 --> 00:22:03,129
earlier but well done on you and I hope

416
00:22:11,940 --> 00:22:07,749
your transition to fear Postmaster is

417
00:22:13,649 --> 00:22:11,950
going well yeah yeah so far so good and

418
00:22:15,269 --> 00:22:13,659
yeah having you know obviously I haven't

419
00:22:17,460 --> 00:22:15,279
seen you since I launched there in the

420
00:22:18,509 --> 00:22:17,470
in Baikonur so look forward to seeing

421
00:22:22,259 --> 00:22:18,519
you when you get back hopefully I'll be

422
00:22:23,909 --> 00:22:22,269
out there and early next month in the

423
00:22:27,720 --> 00:22:23,919
middle of the night when when you guys

424
00:22:29,159 --> 00:22:27,730
get home good shot look forward to

425
00:22:31,109 --> 00:22:29,169
seeing you I still remember you being

426
00:22:33,629 --> 00:22:31,119
there when I returned from expedition 15

427
00:22:37,649 --> 00:22:33,639
I appreciated it alright take it easy

428
00:22:39,930 --> 00:22:37,659
sorry to bother your lunch thanks for

429
00:22:50,360 --> 00:22:39,940
following us we enjoyed the talking to

430
00:22:54,440 --> 00:22:52,430
that again was Scott Kelly earlier this

431
00:22:56,390 --> 00:22:54,450
morning congratulating Jeff Williams on

432
00:22:59,030 --> 00:22:56,400
breaking the record that Kelly sent for

433
00:23:01,820 --> 00:22:59,040
longest stay in space by u.s. astronaut

434
00:23:04,760 --> 00:23:01,830
today Williams will continue racking up

435
00:23:06,920 --> 00:23:04,770
the new record and leave it set at 534

436
00:23:09,710 --> 00:23:06,930
cumulative days in space when he returns

437
00:23:11,690 --> 00:23:09,720
home on sep tember sixth that time was

438
00:23:13,910 --> 00:23:11,700

accrued by Williams over three

439
00:23:15,980 --> 00:23:13,920
long-duration Space Station stays

440
00:23:19,580 --> 00:23:15,990
expedition 13 and two thousand six

441
00:23:23,030 --> 00:23:19,590
expeditions 21 and 22 in 2009 through

442
00:23:25,160 --> 00:23:23,040
2010 and this current expedition as well

443
00:23:29,720 --> 00:23:25,170
as one space shuttle mission he was on

444
00:23:32,240 --> 00:23:29,730
sts 101 and 2000 as well the 534 day

445
00:23:35,900 --> 00:23:32,250
mark will put him in 14th place on the

446
00:23:37,220 --> 00:23:35,910
all-time endurance list scott kelly

447
00:23:39,710 --> 00:23:37,230
meanwhile will hold on to the record for

448
00:23:42,919 --> 00:23:39,720
consecutive days in space by u.s.

449
00:23:44,150 --> 00:23:42,929
astronaut he spent 340 days in space as

450
00:23:48,049 --> 00:23:44,160
part of his one-year mission which

451
00:23:50,210 --> 00:23:48,059
wrapped up in March he also heard Kelly

452
00:23:53,660 --> 00:23:50,220
refer to himself and Williams as

453
00:23:55,280 --> 00:23:53,670
sardines they were both part of the 1996

454
00:24:02,330 --> 00:23:55,290
astronaut class and that was that

455
00:24:04,100 --> 00:24:02,340
class's nickname for the rest of the

456
00:24:06,200 --> 00:24:04,110
crew members currently on board Reubens

457
00:24:07,730 --> 00:24:06,210
Onision diminution still have a couple

458
00:24:10,070 --> 00:24:07,740
of months to go in their current state

459
00:24:11,660 --> 00:24:10,080
they launched the station on july six

460
00:24:14,720 --> 00:24:11,670
and are scheduled to stay in space until

461
00:24:16,880 --> 00:24:14,730
the end of october ones williams of

462
00:24:18,500 --> 00:24:16,890
jenin and skripochka have departed

463
00:24:20,540 --> 00:24:18,510

they'll be joined by NASA astronaut

464
00:24:26,180 --> 00:24:20,550
Shane Kimbrough and Russian cosmonauts

465
00:24:28,030 --> 00:24:26,190
andrey borisenko and sergey risk rice

466
00:24:35,330 --> 00:24:28,040
cup will be launching guy from

467
00:24:36,620 --> 00:24:35,340
kazakhstan on sep tember 23rd but there

468
00:24:38,780 --> 00:24:36,630
is a lot of work to get through before

469
00:24:41,510 --> 00:24:38,790
then including the departure of the

470
00:24:44,030 --> 00:24:41,520
spacex dragon cargo craft this friday at

471
00:24:46,190 --> 00:24:44,040
five ten a.m. central time and another

472
00:24:48,799 --> 00:24:46,200
spacewalk next thursday on September

473
00:24:50,900 --> 00:24:48,809
first during which Rubens and Williams

474
00:24:52,880 --> 00:24:50,910
will be retracting the trailing thermal

475
00:24:55,130 --> 00:24:52,890
controller radiator and installing HD

476
00:24:56,360 --> 00:24:55,140
cameras on the space station you're

477
00:25:00,500 --> 00:24:56,370
going to get a chance to learn more

478
00:25:03,290 --> 00:25:00,510
about that at 1pm today here on NASA TV

479
00:25:03,539 --> 00:25:03,300
in our spacewalk preview briefing and

480
00:25:06,720 --> 00:25:03,549
then

481
00:25:10,470 --> 00:25:06,730
be coming up on NASA TV at one p.m.

482
00:25:12,060 --> 00:25:10,480
central time today preparations for both

483
00:25:14,460 --> 00:25:12,070
of those activities are in the crews

484
00:25:16,320 --> 00:25:14,470
agenda for today Williams and Rubens are

485
00:25:18,479 --> 00:25:16,330
reviewing procedures for the upcoming

486
00:25:20,970 --> 00:25:18,489
spacewalk and it's been a good amount of

487
00:25:23,999 --> 00:25:20,980
time in the quest airlock getting their

488
00:25:26,070 --> 00:25:24,009

spacesuits ready for the various but and

489
00:25:28,200 --> 00:25:26,080
also recharging the various batteries

490
00:25:31,379 --> 00:25:28,210
that they'll need and see a view here of

491
00:25:34,440 --> 00:25:31,389
Rubens and Williams inside the quest

492
00:25:38,539 --> 00:25:34,450
earlier this morning with their

493
00:25:40,710 --> 00:25:38,549
spacesuits behind them again that

494
00:25:45,509 --> 00:25:40,720
spacewalk is scheduled for a week from

495
00:25:47,099 --> 00:25:45,519
Thursday on sep tember first Reubens

496
00:25:49,049 --> 00:25:47,109
Indonesia meanwhile we may be will be

497
00:25:50,879 --> 00:25:49,059
moving into the robotic work station on

498
00:25:53,249 --> 00:25:50,889
the cupola before the end of the day to

499
00:25:55,889 --> 00:25:53,259
brush up on their robotics training in

500
00:26:01,529 --> 00:25:55,899
preparation for Friday's robotic release

501
00:26:02,970 --> 00:26:01,539
of the SpaceX Dragon in addition there

502
00:26:04,529 --> 00:26:02,980
was a good deal of transfer work going

503
00:26:07,049 --> 00:26:04,539
on in preparation for the Dragons hatch

504
00:26:09,239 --> 00:26:07,059
closure tomorrow Williams was replacing

505
00:26:11,580 --> 00:26:09,249
a Leo filter on board while Reubens

506
00:26:13,560 --> 00:26:11,590
moved over one of the polar freezers

507
00:26:15,629 --> 00:26:13,570
that will make sure science experiments

508
00:26:18,869 --> 00:26:15,639
make it to the ground in good condition

509
00:26:20,489 --> 00:26:18,879
and only she moved the habitat being

510
00:26:22,499 --> 00:26:20,499
used for the mouse epigenetics

511
00:26:25,310 --> 00:26:22,509
experiment back over to the dragon for

512
00:26:27,419 --> 00:26:25,320
return to scientists on the ground

513
00:26:29,700 --> 00:26:27,429

Williams also found some time for

514
00:26:31,409 --> 00:26:29,710
scientific work he mixed up a number of

515
00:26:32,849 --> 00:26:31,419
NanoRacks experiments that look at a

516
00:26:35,489 --> 00:26:32,859
range of questions including

517
00:26:38,129 --> 00:26:35,499
microgravity affects on e coli bacteria

518
00:26:39,869 --> 00:26:38,139
and maiko gravity's effect on the

519
00:26:44,259 --> 00:26:39,879
ability of detergent and polymer beans

520
00:26:48,609 --> 00:26:46,509
and finally the station also received a

521
00:26:51,459 --> 00:26:48,619
reboost and altitude early this morning

522
00:26:53,589 --> 00:26:51,469
using the progress 63 s engines which

523
00:26:56,199 --> 00:26:53,599
fired for a total of twelve minutes and

524
00:26:57,609 --> 00:26:56,209
nine seconds the station's apogee or the

525
00:26:59,859 --> 00:26:57,619
high point of its warp it was increased

526
00:27:02,259 --> 00:26:59,869
by a tenth of a mile and its perigee the

527
00:27:05,019 --> 00:27:02,269
low point of the orbit moved 2.9 miles

528
00:27:11,049 --> 00:27:05,029
higher stations now circling the earth

529
00:27:22,389 --> 00:27:11,059
and a 250 3.5 x 240 8 mile orbit and

530
00:27:25,019 --> 00:27:22,399
just at the moment it's about 255 miles

531
00:27:56,050 --> 00:27:25,029
above the Indian Ocean heading southeast

532
00:28:00,220 --> 00:27:58,120
flight engineer Kate Rubin spent some

533
00:28:02,230 --> 00:28:00,230
time this morning working to replace a

534
00:28:05,260 --> 00:28:02,240
rotor in the European modular

535
00:28:07,360 --> 00:28:05,270
cultivation system req you can see her

536
00:28:09,130 --> 00:28:07,370
and Jeff Williams in this video recorded

537
00:28:12,850 --> 00:28:09,140
from earlier today working on that

538
00:28:15,670 --> 00:28:12,860

project the EMC s as that's called is

539
00:28:18,130 --> 00:28:15,680
dedicated to studying plant biology in a

540
00:28:20,710 --> 00:28:18,140
reduced gravity environment and support

541
00:28:22,450 --> 00:28:20,720
the cultivation stimulation and crew

542
00:28:23,800 --> 00:28:22,460
assisted operation of biological

543
00:28:27,190 --> 00:28:23,810
experiments under controlled

544
00:28:30,010 --> 00:28:27,200
temperatures water supplies illumination

545
00:28:32,770 --> 00:28:30,020
levels gravity levels and atmospheric

546
00:28:34,390 --> 00:28:32,780
composition it's been used to perform

547
00:28:36,670 --> 00:28:34,400
multi-generation experiments that

548
00:28:38,440 --> 00:28:36,680
cultivate plants for seeds and then grow

549
00:28:41,320 --> 00:28:38,450
the seeds as well looking at the effects

550
00:28:47,110 --> 00:28:41,330
of gravity in light on the early

551
00:28:49,150 --> 00:28:47,120
development of growth in plants can also

552
00:28:51,310 --> 00:28:49,160
house experiments with insects

553
00:28:53,530 --> 00:28:51,320
amphibians and invertebrates in the

554
00:28:59,110 --> 00:28:53,540
future as well as cell and tissue

555
00:29:01,780 --> 00:28:59,120
cultures so the facility uses an

556
00:29:04,000 --> 00:29:01,790
incubator with two slowly rotating

557
00:29:05,830 --> 00:29:04,010
rotors which is what today's maintenance

558
00:29:07,870 --> 00:29:05,840
was focusing on each rotor can

559
00:29:11,020 --> 00:29:07,880
accommodate up to four experiment

560
00:29:56,620 --> 00:29:11,030
containers each of which house dedicated

561
00:29:56,630 --> 00:30:19,240
you

562
00:30:32,779 --> 00:30:22,600
what that data to continue their