
STATIONLIFE

1
00:00:17,830 --> 00:00:16,310
it's all about the earth and what we can

2
00:00:20,390 --> 00:00:17,840
learn about it from the international

3
00:00:35,750 --> 00:00:20,400
space station hi i'm nasa astronaut

4
00:00:39,270 --> 00:00:38,229
welcome back this month on station life

5
00:00:40,869 --> 00:00:39,280
we're going to highlight the

6
00:00:43,270 --> 00:00:40,879
international space station as a

7
00:00:44,709 --> 00:00:43,280
platform for observing the earth and

8
00:00:46,630 --> 00:00:44,719
take a behind the scenes look at what

9
00:00:49,190 --> 00:00:46,640
it's like to live and work on board the

10
00:00:50,790 --> 00:00:49,200
international space station

11
00:00:52,950 --> 00:00:50,800
they say a picture's worth a thousand

12
00:00:55,350 --> 00:00:52,960
words it's no surprise that the first

13
00:00:56,869 --> 00:00:55,360

pictures taken by humans from space

14
00:01:00,150 --> 00:00:56,879
forever change the way that we view

15
00:01:01,910 --> 00:01:00,160
ourselves and our world

16
00:01:03,189 --> 00:01:01,920
now if you've ever flown on an airplane

17
00:01:05,109 --> 00:01:03,199
and been lucky enough to sit at the

18
00:01:07,670 --> 00:01:05,119
window seat you know that there's a

19
00:01:10,230 --> 00:01:07,680
natural desire to look out the window

20
00:01:12,230 --> 00:01:10,240
well on orbit it's no different

21
00:01:13,830 --> 00:01:12,240
on our off-duty time we astronauts like

22
00:01:16,310 --> 00:01:13,840
to nestle ourselves up next to the

23
00:03:40,470 --> 00:01:16,320
window and do simply that gaze at the

24
00:03:40,480 --> 00:03:58,869
so

25
00:03:58,879 --> 00:04:08,949
cutter

26
00:04:11,990 --> 00:04:10,550
absolutely yeah

27
00:04:13,589 --> 00:04:12,000
it's just like in the pool instead of

28
00:04:27,270 --> 00:04:13,599
that

29
00:04:30,950 --> 00:04:29,270
as the international space station flies

30
00:04:33,990 --> 00:04:30,960
257

31
00:04:36,230 --> 00:04:34,000
statute miles over the coast of chile

32
00:04:41,270 --> 00:04:36,240
terry virts in the initial moments of

33
00:04:45,590 --> 00:04:43,430
the earth is unbelievably beautiful when

34
00:04:47,990 --> 00:04:45,600
viewed from the iss but as good as

35
00:04:49,110 --> 00:04:48,000
cameras are today they still don't do it

36
00:04:51,270 --> 00:04:49,120
justice

37
00:04:52,790 --> 00:04:51,280
observing the earth means more than just

38
00:04:54,230 --> 00:04:52,800

looking out the window or taking

39
00:04:55,189 --> 00:04:54,240
pictures from the international space

40
00:04:57,830 --> 00:04:55,199
station

41
00:05:01,110 --> 00:04:57,840
with new sensors mounted to the iss we

42
00:05:04,150 --> 00:05:01,120
can monitor ocean winds measure clouds

43
00:05:06,710 --> 00:05:04,160
airborne particles ozone and more

44
00:05:09,590 --> 00:05:06,720
think of the iss as a human crewed

45
00:05:11,830 --> 00:05:09,600
existing platform ready made

46
00:05:13,430 --> 00:05:11,840
and scanners that can observe all kinds

47
00:05:14,390 --> 00:05:13,440
of things that affect us right here on

48
00:05:17,430 --> 00:05:14,400
earth

49
00:05:19,350 --> 00:05:17,440
so one such instrument is isis rapidscat

50
00:05:21,029 --> 00:05:19,360
which monitors ocean winds for climate

51
00:05:22,790 --> 00:05:21,039
research weather prediction and

52
00:05:24,710 --> 00:05:22,800
hurricane science

53
00:05:26,150 --> 00:05:24,720
which we here on the gulf coast really

54
00:05:27,990 --> 00:05:26,160
like

55
00:05:36,390 --> 00:05:28,000
so let's take a look at nasa's rapid

56
00:05:39,990 --> 00:05:38,230
seeing things like a hurricane develop

57
00:05:41,510 --> 00:05:40,000
in its earliest phases

58
00:05:43,350 --> 00:05:41,520
getting a much better idea of its

59
00:05:45,029 --> 00:05:43,360
strength than we can from flying one or

60
00:05:47,590 --> 00:05:45,039
two planes through it we can map the

61
00:05:59,670 --> 00:05:47,600
entire surface effect of a tropical

62
00:06:04,790 --> 00:06:02,710
the iss rapid scat is a mission to bring

63
00:06:07,510 --> 00:06:04,800

a payload to the international space

64
00:06:09,749 --> 00:06:07,520
station and from there we will observe

65
00:06:11,749 --> 00:06:09,759
the earth's oceans and be able to map

66
00:06:13,029 --> 00:06:11,759
the speed and direction of winds near

67
00:06:15,510 --> 00:06:13,039
the surface rapid scat is a

68
00:06:17,350 --> 00:06:15,520
scatterometer it's a radar it sends out

69
00:06:19,909 --> 00:06:17,360
little bits of energy towards earth's

70
00:06:21,990 --> 00:06:19,919
surface that then get reflected back if

71
00:06:24,309 --> 00:06:22,000
the ocean is flat most of that energy

72
00:06:25,830 --> 00:06:24,319
from the radar just scatters away the

73
00:06:28,070 --> 00:06:25,840
stronger the wind the rougher the

74
00:06:29,909 --> 00:06:28,080
surface will be the more energy will be

75
00:06:32,230 --> 00:06:29,919
returned to the radar and then we can

76
00:06:33,990 --> 00:06:32,240
convert that energy into a measurement

77
00:06:36,390 --> 00:06:34,000
of the wind and that'll help us do

78
00:06:38,550 --> 00:06:36,400
things like track and predict severe

79
00:06:40,469 --> 00:06:38,560
storms and also learn about the ocean

80
00:06:42,230 --> 00:06:40,479
atmospheric interface especially over

81
00:06:44,230 --> 00:06:42,240
the tropical regions which are of great

82
00:06:46,550 --> 00:06:44,240
interest to the united states because

83
00:06:48,070 --> 00:06:46,560
most of the tropical hurricanes that hit

84
00:06:55,670 --> 00:06:48,080
the united states come from those

85
00:07:01,589 --> 00:06:59,430
we're launching uh on a spacex falcon 9

86
00:07:04,070 --> 00:07:01,599
rocket the dragon capsule separates from

87
00:07:05,670 --> 00:07:04,080
the falcon 9 in orbit and after orbiting

88
00:07:07,670 --> 00:07:05,680

earth a couple of times the

89
00:07:09,350 --> 00:07:07,680
international space station robotic arm

90
00:07:12,150 --> 00:07:09,360
reaches out and

91
00:07:14,790 --> 00:07:12,160
gently grabs the dragon as the dragon

92
00:07:17,110 --> 00:07:14,800
you know slowly approaches the iss about

93
00:07:19,670 --> 00:07:17,120
two days later ground controllers bring

94
00:07:21,430 --> 00:07:19,680
the robot arm over the robotic arm then

95
00:07:22,469 --> 00:07:21,440
reaches into the trunk and grabs the

96
00:07:24,469 --> 00:07:22,479
instrument

97
00:07:26,230 --> 00:07:24,479
and plugs that onto the international

98
00:07:27,830 --> 00:07:26,240
space station and everything mates

99
00:07:29,029 --> 00:07:27,840
robotically we hook these pieces

100
00:07:30,309 --> 00:07:29,039
together and then we get to stay on the

101
00:07:36,870 --> 00:07:30,319
outside of the space station for a

102
00:07:40,870 --> 00:07:39,029
the space station came and asked what

103
00:07:42,629 --> 00:07:40,880
relatively inexpensive payloads we could

104
00:07:44,390 --> 00:07:42,639
put up on the space station we had this

105
00:07:46,469 --> 00:07:44,400
hardware sitting there doing nothing

106
00:07:48,070 --> 00:07:46,479
collecting dust for the last 13 years we

107
00:07:50,230 --> 00:07:48,080
might as well try to put it to use what

108
00:07:51,909 --> 00:07:50,240
if we took some of the existing hardware

109
00:07:53,430 --> 00:07:51,919
and tried to fly it in the simplest way

110
00:07:55,589 --> 00:07:53,440
possible we've put them through

111
00:07:57,990 --> 00:07:55,599
extensive testing electrically tested

112
00:08:00,309 --> 00:07:58,000
them vibration tables thermal vacuum

113
00:08:01,830 --> 00:08:00,319

chambers and that leftover hardware

114
00:08:03,510 --> 00:08:01,840
meant that we got to save about 80

115
00:08:04,869 --> 00:08:03,520
percent of the cost in terms of being

116
00:08:06,629 --> 00:08:04,879
able to reuse the hardware instead of

117
00:08:08,869 --> 00:08:06,639
building new and we've added the

118
00:08:11,029 --> 00:08:08,879
necessary adjustments needed for this

119
00:08:12,790 --> 00:08:11,039
new orbiting platform that we'll be on

120
00:08:14,790 --> 00:08:12,800
the space station is built out we know

121
00:08:16,390 --> 00:08:14,800
what the external capabilities are we

122
00:08:17,990 --> 00:08:16,400
know we can put science instruments in

123
00:08:19,749 --> 00:08:18,000
different places we're taking something

124
00:08:21,749 --> 00:08:19,759
with a very small team a very small

125
00:08:23,670 --> 00:08:21,759
budget and a very short schedule and

126
00:08:24,830 --> 00:08:23,680
turning it into something with very real

127
00:08:27,749 --> 00:08:24,840
science

128
00:08:29,990 --> 00:08:27,759
value the global coverage of the earth

129
00:08:31,589 --> 00:08:30,000
is probably right now one of the

130
00:08:33,670 --> 00:08:31,599
greatest priorities that people should

131
00:08:35,509 --> 00:08:33,680
have in mind when they think about the

132
00:08:38,790 --> 00:08:35,519
importance of the space program the

133
00:08:40,550 --> 00:08:38,800
earth is a very dynamic very complex

134
00:08:43,269 --> 00:08:40,560
system and because of the role that

135
00:08:44,710 --> 00:08:43,279
winds play it's a fundamental part of

136
00:08:46,470 --> 00:08:44,720
that whole story

137
00:08:48,470 --> 00:08:46,480
and we need people's awareness and

138
00:08:49,829 --> 00:08:48,480

understanding of the importance of

139
00:08:51,590 --> 00:08:49,839
nasa's mission

140
00:09:16,310 --> 00:08:51,600
to help understand how our climate is

141
00:09:16,320 --> 00:09:48,150
and we'll check on it

142
00:09:52,630 --> 00:09:51,190
wow isis rapid scat is way cool and it's

143
00:09:55,030 --> 00:09:52,640
definitely going to benefit us here on

144
00:09:57,509 --> 00:09:55,040
earth better yet it's not the only earth

145
00:09:59,430 --> 00:09:57,519
observing scanner on board the iss it

146
00:10:02,150 --> 00:09:59,440
has a new neighbor on board it's called

147
00:10:04,150 --> 00:10:02,160
cats it's a laser instrument that

148
00:10:06,949 --> 00:10:04,160
measures clouds and airborne particles

149
00:10:08,550 --> 00:10:06,959
such as pollution mineral dust and smoke

150
00:10:10,470 --> 00:10:08,560
in this next segment we're going to meet

151
00:10:20,790 --> 00:10:10,480
the team behind cats and learn more

152
00:10:25,590 --> 00:10:23,590
hey john finish with your model

153
00:10:27,750 --> 00:10:25,600
thanks

154
00:10:36,230 --> 00:10:27,760
so you're looking forward to the launch

155
00:10:39,509 --> 00:10:38,550
my project is a lidar instrument called

156
00:10:41,829 --> 00:10:39,519
cats

157
00:10:43,750 --> 00:10:41,839
and it measures clouds and pollution in

158
00:10:45,350 --> 00:10:43,760
the earth's atmosphere

159
00:10:48,470 --> 00:10:45,360
these are important because they affect

160
00:10:50,550 --> 00:10:48,480
society in many ways so little johnny

161
00:10:53,190 --> 00:10:50,560
how does this lidar work

162
00:10:55,110 --> 00:10:53,200
lidar is actually quite simple you shine

163
00:10:56,550 --> 00:10:55,120

laser light at the earth's atmosphere

164
00:10:57,990 --> 00:10:56,560
and measure the amount of light

165
00:11:01,430 --> 00:10:58,000
scattered back

166
00:11:03,590 --> 00:11:01,440
my instrument will measure

167
00:11:05,269 --> 00:11:03,600
today a team at nasa goddard is

168
00:11:08,150 --> 00:11:05,279
preparing to demonstrate for the first

169
00:11:10,150 --> 00:11:08,160
time in space a three wavelength laser

170
00:11:12,710 --> 00:11:10,160
remote sensing instrument

171
00:11:14,790 --> 00:11:12,720
the cloud aerosol transport system or

172
00:11:16,790 --> 00:11:14,800
cats will measure clouds and aerosols in

173
00:11:18,949 --> 00:11:16,800
the earth's atmosphere

174
00:11:20,870 --> 00:11:18,959
to obtain this data katz uses a laser

175
00:11:22,550 --> 00:11:20,880
that generates three wavelengths or

176
00:11:24,470 --> 00:11:22,560
colors of light

177
00:11:26,150 --> 00:11:24,480
internal to the laser special optical

178
00:11:28,550 --> 00:11:26,160
crystals are used to generate these

179
00:11:31,430 --> 00:11:28,560
wavelengths by adding the energy of two

180
00:11:33,430 --> 00:11:31,440
photons to make a single new photon

181
00:11:35,509 --> 00:11:33,440
the final output beam is made up of all

182
00:11:37,190 --> 00:11:35,519
three wavelengths and these photons are

183
00:11:39,910 --> 00:11:37,200
transmitted in groups towards the

184
00:11:42,470 --> 00:11:39,920
atmosphere at the speed of light

185
00:11:44,870 --> 00:11:42,480
as photons encounter clouds or particles

186
00:11:46,630 --> 00:11:44,880
scattering of the laser beam occurs very

187
00:11:48,870 --> 00:11:46,640
few of the photons scatter directly back

188
00:11:51,030 --> 00:11:48,880

to the optical telescope but the ones

189
00:11:53,670 --> 00:11:51,040
that return are collected and counted by

190
00:11:55,110 --> 00:11:53,680
sensitive detectors and electronics

191
00:11:57,350 --> 00:11:55,120
by timing the difference between

192
00:11:58,949 --> 00:11:57,360
emission and detection the precise

193
00:12:01,829 --> 00:11:58,959
altitude of the particles can be

194
00:12:05,509 --> 00:12:03,430
while monitoring global hazards from

195
00:12:07,590 --> 00:12:05,519
above cats will determine the height

196
00:12:09,590 --> 00:12:07,600
thickness and extent of smoke dust

197
00:12:10,949 --> 00:12:09,600
particles and volcanic ash in our

198
00:12:12,389 --> 00:12:10,959
atmosphere

199
00:12:13,990 --> 00:12:12,399
improving cloud data will allow

200
00:12:15,990 --> 00:12:14,000
scientists to create more accurate

201
00:12:18,389 --> 00:12:16,000
climate models which in turn will

202
00:12:19,910 --> 00:12:18,399
improve air quality forecasts and health

203
00:12:21,910 --> 00:12:19,920
risk alerts

204
00:12:23,750 --> 00:12:21,920
this cost-effective technology

205
00:12:25,670 --> 00:12:23,760
demonstration will utilize the

206
00:12:27,829 --> 00:12:25,680
international space station as a

207
00:12:29,190 --> 00:12:27,839
scientific platform for up to three

208
00:12:31,509 --> 00:12:29,200
years

209
00:12:33,829 --> 00:12:31,519
once proven the cat's technology can be

210
00:12:36,550 --> 00:12:33,839
used to further a larger free flyer

211
00:12:38,230 --> 00:12:36,560
satellite mission until then cats will

212
00:12:40,389 --> 00:12:38,240
provide information that can help us

213
00:13:03,910 --> 00:12:40,399

better understand earth's complex

214
00:13:03,920 --> 00:13:15,030
start

215
00:13:20,949 --> 00:13:17,430
well we have a treat for you we have

216
00:13:23,269 --> 00:13:20,959
with us today a real live nasa scientist

217
00:13:25,110 --> 00:13:23,279
welcome to melissa higgins to station

218
00:13:26,870 --> 00:13:25,120
life thank you very much tracy this is

219
00:13:28,710 --> 00:13:26,880
fun good it's great to have you here

220
00:13:30,230 --> 00:13:28,720
thank you i wonder if you could share

221
00:13:33,269 --> 00:13:30,240
with us a little bit about what you do

222
00:13:35,670 --> 00:13:33,279
in the crew earth observation office

223
00:13:37,910 --> 00:13:35,680
here at johnson space center sure what

224
00:13:40,710 --> 00:13:37,920
we do primarily we look at astronaut

225
00:13:42,870 --> 00:13:40,720
photography of earth so we study earth

226
00:13:45,750 --> 00:13:42,880
over periods of time

227
00:13:48,150 --> 00:13:45,760
we look at imagery from decades ago to

228
00:13:50,470 --> 00:13:48,160
just today and hopefully in the future

229
00:13:51,829 --> 00:13:50,480
as well so what we get to do is we look

230
00:13:53,990 --> 00:13:51,839
at the crew's

231
00:13:56,629 --> 00:13:54,000
iss orbit tracks on a daily basis and

232
00:13:57,670 --> 00:13:56,639
we'll ask them to take imagery of our

233
00:13:59,990 --> 00:13:57,680
different

234
00:14:02,389 --> 00:14:00,000
objectives and those could range from

235
00:14:03,910 --> 00:14:02,399
different science experiments like from

236
00:14:06,310 --> 00:14:03,920
principal investigators around the world

237
00:14:08,310 --> 00:14:06,320
that we work with or classroom teachers

238
00:14:10,069 --> 00:14:08,320

we also work with them in

239
00:14:12,150 --> 00:14:10,079
specific investigations that the

240
00:14:13,509 --> 00:14:12,160
classrooms are doing and we have the

241
00:14:15,829 --> 00:14:13,519
crew take pictures for them which is

242
00:14:17,670 --> 00:14:15,839
very important i think because it really

243
00:14:19,670 --> 00:14:17,680
introduces the children to kind of the

244
00:14:21,590 --> 00:14:19,680
stem fields of science technology

245
00:14:23,430 --> 00:14:21,600
engineering and mathematics which we

246
00:14:25,030 --> 00:14:23,440
think is very exciting

247
00:14:26,870 --> 00:14:25,040
and we also get to do public affairs

248
00:14:28,949 --> 00:14:26,880
requests sort of like

249
00:14:30,710 --> 00:14:28,959
we worked with national geographic

250
00:14:32,230 --> 00:14:30,720
earlier last year we got to do the live

251
00:14:34,629 --> 00:14:32,240
from space with them

252
00:14:35,990 --> 00:14:34,639
and we also work currently with imax

253
00:14:38,150 --> 00:14:36,000
which they're putting out a new film

254
00:14:40,470 --> 00:14:38,160
next year so we help them with all their

255
00:14:41,350 --> 00:14:40,480
earth scenes for the film that's amazing

256
00:14:43,350 --> 00:14:41,360
yeah

257
00:14:44,790 --> 00:14:43,360
well so you mentioned uh photographs

258
00:14:47,110 --> 00:14:44,800
from space

259
00:14:48,710 --> 00:14:47,120
and i know personally from the

260
00:14:49,590 --> 00:14:48,720
experience that i had living on board

261
00:14:53,430 --> 00:14:49,600
that

262
00:14:54,870 --> 00:14:53,440
kind of a a big project in and of itself

263
00:14:57,910 --> 00:14:54,880

and you listed off a number of things

264
00:14:59,829 --> 00:14:57,920
that your office is responsible for and

265
00:15:01,189 --> 00:14:59,839
i just wondered um what's it like can

266
00:15:03,269 --> 00:15:01,199
you describe a little bit more about

267
00:15:05,110 --> 00:15:03,279
what it's like from your point of view

268
00:15:07,269 --> 00:15:05,120
uh working with the astronauts who are

269
00:15:09,670 --> 00:15:07,279
taking photos of the earth and sending

270
00:15:11,750 --> 00:15:09,680
them down yeah it's great to be able to

271
00:15:13,829 --> 00:15:11,760
work with the crew just because we get

272
00:15:15,590 --> 00:15:13,839
to get that human interaction behind the

273
00:15:17,269 --> 00:15:15,600
camera which we really like to see

274
00:15:18,069 --> 00:15:17,279
because it's one thing to have kind of

275
00:15:19,990 --> 00:15:18,079
um

276
00:15:21,189 --> 00:15:20,000
an orbiting satellite taking imagery

277
00:15:22,629 --> 00:15:21,199
from space but it's a whole other thing

278
00:15:25,110 --> 00:15:22,639
when you get an astronaut behind the

279
00:15:27,350 --> 00:15:25,120
camera taking a picture for us with one

280
00:15:28,069 --> 00:15:27,360
of these very large cameras as you can

281
00:15:29,269 --> 00:15:28,079
see

282
00:15:30,710 --> 00:15:29,279
of course it's a little heavier down

283
00:15:32,629 --> 00:15:30,720
here on earth than it is up there i'm

284
00:15:33,990 --> 00:15:32,639
sure teresa is to tell you that it's so

285
00:15:35,829 --> 00:15:34,000
much better that's why we have

286
00:15:37,910 --> 00:15:35,839
microgravity

287
00:15:39,910 --> 00:15:37,920
i can tell you that from

288
00:15:42,470 --> 00:15:39,920

the perspective of being on orbit and a

289
00:15:45,110 --> 00:15:42,480
crew member responsible for

290
00:15:47,110 --> 00:15:45,120
taking these photos first of all your

291
00:15:49,350 --> 00:15:47,120
office prepares a message

292
00:15:50,069 --> 00:15:49,360
for the astronauts on board that tells

293
00:15:52,230 --> 00:15:50,079
them

294
00:15:54,389 --> 00:15:52,240
when to look where to look and what

295
00:15:56,629 --> 00:15:54,399
settings to use on the camera

296
00:15:58,150 --> 00:15:56,639
and it's up to the astronaut then to be

297
00:15:59,749 --> 00:15:58,160
looking at their timeline which is going

298
00:16:02,470 --> 00:15:59,759
about as fast as the space station's

299
00:16:04,949 --> 00:16:02,480
traveling over the earth 17 500 miles

300
00:16:07,350 --> 00:16:04,959
per hour and you you what the astronaut

301
00:16:10,069 --> 00:16:07,360
does on orbit is uh they receive this

302
00:16:11,269 --> 00:16:10,079
message in the morning of their work day

303
00:16:13,990 --> 00:16:11,279
and they

304
00:16:15,670 --> 00:16:14,000
plan their day accordingly because um

305
00:16:16,949 --> 00:16:15,680
you know the the space station's going

306
00:16:18,629 --> 00:16:16,959
over the earth

307
00:16:21,030 --> 00:16:18,639
and um and when you're over that

308
00:16:22,550 --> 00:16:21,040
particular spot that's when you've got

309
00:16:24,550 --> 00:16:22,560
to have the camera in the window ready

310
00:16:27,189 --> 00:16:24,560
to go it's got a small window it's got a

311
00:16:28,949 --> 00:16:27,199
small window time and you've got a lot

312
00:16:32,310 --> 00:16:28,959
of stuff

313
00:16:35,430 --> 00:16:32,320

to put together and to hang on to and um

314
00:16:38,710 --> 00:16:35,440
it's it really takes a skill

315
00:16:40,790 --> 00:16:38,720
to to translate the message that you all

316
00:16:42,949 --> 00:16:40,800
send to us even though it's it's

317
00:16:45,030 --> 00:16:42,959
perfectly written and very clear

318
00:16:47,829 --> 00:16:45,040
the the work that we have to do on orbit

319
00:16:52,069 --> 00:16:47,839
in order to get ourselves in a window on

320
00:16:55,110 --> 00:16:52,079
time on target is no small feat it takes

321
00:16:57,670 --> 00:16:55,120
some skill but also deep respect for the

322
00:17:00,069 --> 00:16:57,680
amount of skill and work it takes to not

323
00:17:02,389 --> 00:17:00,079
only determine where we want the

324
00:17:04,710 --> 00:17:02,399
astronauts to take a picture but also

325
00:17:08,390 --> 00:17:04,720
once that picture comes back

326
00:17:10,870 --> 00:17:08,400
determining where it is the features

327
00:17:12,549 --> 00:17:10,880
and actually using that photograph for

328
00:17:14,150 --> 00:17:12,559
scientific purposes and that's something

329
00:17:17,189 --> 00:17:14,160
that your office is quite good at i mean

330
00:17:18,949 --> 00:17:17,199
you you probably know this earth

331
00:17:19,990 --> 00:17:18,959
better than most people in the world

332
00:17:21,750 --> 00:17:20,000
would you say

333
00:17:22,789 --> 00:17:21,760
i think i'm getting up there yeah you

334
00:17:24,230 --> 00:17:22,799
know

335
00:17:25,909 --> 00:17:24,240
i've only got a few years under my belt

336
00:17:28,150 --> 00:17:25,919
but i think you know my knowledge of it

337
00:17:47,190 --> 00:17:28,160
now is significantly better than before

338
00:17:51,669 --> 00:17:49,909

i am the associate iss program scientist

339
00:17:54,230 --> 00:17:51,679
for earth observations

340
00:17:55,990 --> 00:17:54,240
and i'm also the nasa technical lead for

341
00:17:57,669 --> 00:17:56,000
the earth sciences remote sensing unit

342
00:17:59,350 --> 00:17:57,679
here in the

343
00:18:01,750 --> 00:17:59,360
astro materials research and exploration

344
00:18:03,750 --> 00:18:01,760
science division of the exploration

345
00:18:08,470 --> 00:18:03,760
integration and science directorate at

346
00:18:15,029 --> 00:18:12,549
so my primary role is to oversee

347
00:18:20,549 --> 00:18:15,039
the development and management of the

348
00:18:25,909 --> 00:18:23,669
well it's the iss is well known for

349
00:18:28,150 --> 00:18:25,919
being accrued platforms accrued

350
00:18:30,150 --> 00:18:28,160
spacecraft orbiting the earth past 30

351
00:18:31,830 --> 00:18:30,160
some odd years or so we've had a number

352
00:18:34,630 --> 00:18:31,840
of satellites opening the earth

353
00:18:36,549 --> 00:18:34,640
examining uh the earth's surface through

354
00:18:39,430 --> 00:18:36,559
various remote sensing instruments

355
00:18:41,750 --> 00:18:39,440
the iss is now becoming a place to put

356
00:18:42,630 --> 00:18:41,760
those instruments similar instruments on

357
00:18:44,230 --> 00:18:42,640
board

358
00:18:46,390 --> 00:18:44,240
in addition to the humans looking out

359
00:18:48,310 --> 00:18:46,400
the window we also have a suite of other

360
00:18:50,310 --> 00:18:48,320
instruments that are commanded from the

361
00:18:52,870 --> 00:18:50,320
ground which can be either installed

362
00:18:54,549 --> 00:18:52,880
inside the iss or outside on various

363
00:18:56,789 --> 00:18:54,559

external mounting points

364
00:18:58,870 --> 00:18:56,799
including the gem exposed facility the

365
00:19:00,710 --> 00:18:58,880
columbus exposed facility and the

366
00:19:02,230 --> 00:19:00,720
external load carrier

367
00:19:04,390 --> 00:19:02,240
areas on the truss

368
00:19:05,590 --> 00:19:04,400
and these instruments are

369
00:19:06,789 --> 00:19:05,600
they're also looking at the earth for

370
00:19:08,950 --> 00:19:06,799
the most part

371
00:19:10,630 --> 00:19:08,960
but they're more sophisticated generally

372
00:19:14,870 --> 00:19:10,640
than the handheld digital cameras that

373
00:19:17,750 --> 00:19:16,470
the science mission directorate has now

374
00:19:18,549 --> 00:19:17,760
approved

375
00:19:19,990 --> 00:19:18,559
a

376
00:19:23,669 --> 00:19:20,000
future mission

377
00:19:25,750 --> 00:19:23,679
called the jedi lidar which will fire a

378
00:19:27,350 --> 00:19:25,760
laser optical system firing down at the

379
00:19:30,150 --> 00:19:27,360
earth's surface to look at vegetation

380
00:19:33,029 --> 00:19:30,160
pattern changes and tie that to changes

381
00:19:34,950 --> 00:19:33,039
in climate we also now have a current

382
00:19:37,029 --> 00:19:34,960
laser system on board the cats the cloud

383
00:19:39,110 --> 00:19:37,039
aerosol transport system and that's

384
00:19:40,950 --> 00:19:39,120
firing a laser into the upper atmosphere

385
00:19:42,789 --> 00:19:40,960
looking primarily at particulate

386
00:19:44,310 --> 00:19:42,799
distributions and seeing how that

387
00:19:49,350 --> 00:19:44,320
affects differences in atmospheric

388
00:19:52,390 --> 00:19:51,190

well there there's there are two things

389
00:19:54,070 --> 00:19:52,400
that we can gain from putting these

390
00:19:56,470 --> 00:19:54,080
instruments on the iss

391
00:19:57,830 --> 00:19:56,480
one is the iss is in a fundamentally

392
00:20:00,150 --> 00:19:57,840
different orbit

393
00:20:02,070 --> 00:20:00,160
uh around the earth than a lot of the

394
00:20:03,590 --> 00:20:02,080
the robotic remote sensing instruments

395
00:20:04,789 --> 00:20:03,600
that we currently have they're in polar

396
00:20:07,430 --> 00:20:04,799
orbits

397
00:20:09,990 --> 00:20:07,440
which means they they're oriented at 90

398
00:20:12,789 --> 00:20:10,000
degrees to the to the poles and they

399
00:20:14,230 --> 00:20:12,799
collect data on a roughly 12 to 14 day

400
00:20:15,909 --> 00:20:14,240
recurrence you have the capacity from

401
00:20:17,909 --> 00:20:15,919
the iss to collect really a

402
00:20:19,350 --> 00:20:17,919
fundamentally different kind of data

403
00:20:20,710 --> 00:20:19,360
than you collect from the other orbiting

404
00:20:22,390 --> 00:20:20,720
satellites so it's it's a very

405
00:20:24,390 --> 00:20:22,400
complementary data set

406
00:20:27,029 --> 00:20:24,400
uh the second item

407
00:20:29,430 --> 00:20:27,039
is that it a lot the iss is a

408
00:20:31,990 --> 00:20:29,440
uh is sort of a cheap tryout

409
00:20:34,710 --> 00:20:32,000
platform for sensors people who are

410
00:20:36,310 --> 00:20:34,720
developing new instruments or

411
00:20:38,549 --> 00:20:36,320
people who have built instruments that

412
00:20:40,230 --> 00:20:38,559
were planned to fly on other satellites

413
00:20:41,830 --> 00:20:40,240

but then from one reason another

414
00:20:43,270 --> 00:20:41,840
the mission got scrubbed funding got cut

415
00:20:45,590 --> 00:20:43,280
what have you

416
00:20:46,870 --> 00:20:45,600
they still have the sensors built and if

417
00:20:48,549 --> 00:20:46,880
they have a complete sensor that's

418
00:20:51,430 --> 00:20:48,559
sitting on a shelf somewhere

419
00:20:53,190 --> 00:20:51,440
the iss provides them a new platform to

420
00:20:55,029 --> 00:20:53,200
put this sensor on

421
00:20:57,270 --> 00:20:55,039
and typically if

422
00:21:00,230 --> 00:20:57,280
nasa will fly the sensor up particularly

423
00:21:02,310 --> 00:21:00,240
if it's already built and so it's a nice

424
00:21:03,590 --> 00:21:02,320
sort of a cheap scenario for people to

425
00:21:06,070 --> 00:21:03,600
get their sensors up there collect the

426
00:21:07,669 --> 00:21:06,080
data they need without having to wait

427
00:21:09,750 --> 00:21:07,679
for a new satellite platform to be

428
00:21:10,870 --> 00:21:09,760
designed or to design that platform

429
00:21:13,909 --> 00:21:10,880
themselves

430
00:21:15,990 --> 00:21:13,919
i'm will stefanov i work for the iso

431
00:21:19,190 --> 00:21:16,000
program science office here at nasa

432
00:21:22,789 --> 00:21:21,270
for any affordable usos crew member

433
00:21:25,990 --> 00:21:22,799
there's no response required but if you

434
00:21:28,310 --> 00:21:26,000
can please close the lab thanks

435
00:21:30,470 --> 00:21:28,320
as you can see our international space

436
00:21:32,950 --> 00:21:30,480
station is an unprecedented research

437
00:21:35,029 --> 00:21:32,960
platform in space allowing researchers

438
00:21:37,830 --> 00:21:35,039

and scientists to conduct experiments

439
00:21:39,830 --> 00:21:37,840
that can't be done anywhere else

440
00:21:41,830 --> 00:21:39,840
so two more experiments we call them

441
00:21:44,789 --> 00:21:41,840
payloads in our world are scheduled to

442
00:21:47,990 --> 00:21:44,799
get on board the iss in 2016.

443
00:21:49,669 --> 00:21:48,000
get ready there's sage 3 and lightning

444
00:21:51,510 --> 00:21:49,679
imaging sensor

445
00:21:53,430 --> 00:21:51,520
sage 3 will measure ozone and other

446
00:21:55,909 --> 00:21:53,440
gases in the upper atmosphere and help

447
00:21:57,430 --> 00:21:55,919
scientists to assess how the ozone layer

448
00:21:59,590 --> 00:21:57,440
is recovering

449
00:22:01,750 --> 00:21:59,600
and lis will monitor global lightning

450
00:22:03,590 --> 00:22:01,760
for earth science studies and support

451
00:22:04,789 --> 00:22:03,600
operational weather forecasting and

452
00:22:06,950 --> 00:22:04,799
warning

453
00:22:10,470 --> 00:22:06,960
looks like utilizing the iss to further

454
00:22:12,390 --> 00:22:10,480
benefit all humankind is right on track

455
00:22:13,990 --> 00:22:12,400
thanks for joining us on station life at

456
00:22:15,590 --> 00:22:14,000
our behind the scenes look at using the

457
00:22:17,909 --> 00:22:15,600
international space station as the

458
00:22:19,750 --> 00:22:17,919
platform for studying the earth be sure

459
00:22:21,510 --> 00:22:19,760
to follow us on facebook and twitter for

460
00:22:23,110 --> 00:22:21,520
the latest research news and don't

461
00:22:25,669 --> 00:22:23,120
forget to download our new app on your