
NASA
NASA
JESSICA WATKINS

1
00:00:15,110 --> 00:00:05,090
ignition sequence starts

2
00:00:17,189 --> 00:00:15,120
[Music]

3
00:00:19,429 --> 00:00:17,199
good morning and welcome to a look

4
00:00:21,670 --> 00:00:19,439
inside the international space station

5
00:00:23,830 --> 00:00:21,680
flight control room at the johnson space

6
00:00:26,310 --> 00:00:23,840
center in houston this is where a team

7
00:00:28,470 --> 00:00:26,320
of specialists is always on duty to keep

8
00:00:31,269 --> 00:00:28,480
an eye on the operation of all station

9
00:00:32,950 --> 00:00:31,279
systems and assist the expedition 67

10
00:00:34,950 --> 00:00:32,960
crew members as they move through their

11
00:00:37,510 --> 00:00:34,960
daily tasks in orbit

12
00:00:39,670 --> 00:00:37,520
we're back but station commander oligar

13
00:00:42,310 --> 00:00:39,680

temiev and his american russian and

14
00:00:44,389 --> 00:00:42,320
italian crewmates never left they've

15
00:00:46,869 --> 00:00:44,399
been busy taking care of the station and

16
00:00:49,350 --> 00:00:46,879
supporting scientific research in dozens

17
00:00:51,910 --> 00:00:49,360
of experiments both inside and outside

18
00:00:54,389 --> 00:00:51,920
the station and there was news this week

19
00:00:58,950 --> 00:00:54,399
about some future station crew members

20
00:01:02,790 --> 00:01:01,029
houston station on space to ground

21
00:01:05,109 --> 00:01:02,800
welcome to space to ground i'm shanique

22
00:01:07,190 --> 00:01:05,119
wolverine this week nasa updated

23
00:01:09,590 --> 00:01:07,200
astronaut assignments demonstrated new

24
00:01:11,270 --> 00:01:09,600
science and technology and got a look at

25
00:01:13,590 --> 00:01:11,280
a heat wave

26
00:01:15,990 --> 00:01:13,600
on thursday june 16th nasa announced

27
00:01:17,749 --> 00:01:16,000
that two nasa astronaut test pilots will

28
00:01:19,590 --> 00:01:17,759
fly aboard the agency's boeing crew

29
00:01:21,429 --> 00:01:19,600
flight test mission to the international

30
00:01:24,070 --> 00:01:21,439
space station where they will live and

31
00:01:26,630 --> 00:01:24,080
work off the earth for about two weeks

32
00:01:28,390 --> 00:01:26,640
cft commander barry butch wilmore whom

33
00:01:30,950 --> 00:01:28,400
nasa assigned to the prime crew in

34
00:01:33,270 --> 00:01:30,960
october 2020 will join nasa astronaut

35
00:01:35,350 --> 00:01:33,280
suni williams who will serve as pilot

36
00:01:37,749 --> 00:01:35,360
williams previously served as the backup

37
00:01:40,069 --> 00:01:37,759
test pilot for cft while assigned as

38
00:01:41,910 --> 00:01:40,079

commander of nasa's boeing starliner 1

39
00:01:44,630 --> 00:01:41,920
mission starliner's first post

40
00:01:46,230 --> 00:01:44,640
certification mission as cft pilot

41
00:01:48,230 --> 00:01:46,240
williams takes the place of nasa

42
00:01:51,190 --> 00:01:48,240
astronaut nicole mann originally

43
00:01:54,069 --> 00:01:51,200
assigned to the mission in 2018 nasa

44
00:01:56,950 --> 00:01:54,079
reassigned man to the hc spacex crew 5

45
00:01:58,789 --> 00:01:56,960
mission in 2021

46
00:02:01,429 --> 00:01:58,799
the hot days of summer are officially

47
00:02:04,389 --> 00:02:01,439
here in the northern hemisphere and nasa

48
00:02:06,550 --> 00:02:04,399
is monitoring the heat from above

49
00:02:08,869 --> 00:02:06,560
nasa's ecosystem spaceborne thermal

50
00:02:10,869 --> 00:02:08,879
radiometer experiment on space station

51
00:02:13,190 --> 00:02:10,879
or ecostress recorded some

52
00:02:14,790 --> 00:02:13,200
record-breaking temperatures this month

53
00:02:16,390 --> 00:02:14,800
built and managed by nasa's jet

54
00:02:18,949 --> 00:02:16,400
propulsion laboratory in southern

55
00:02:20,470 --> 00:02:18,959
california the ecostress measures the

56
00:02:22,070 --> 00:02:20,480
temperature of the ground which is

57
00:02:24,630 --> 00:02:22,080
hotter than the air temperature during

58
00:02:26,949 --> 00:02:24,640
the daytime its primary mission is to

59
00:02:28,949 --> 00:02:26,959
identify plant thresholds for water use

60
00:02:30,869 --> 00:02:28,959
and water stress giving insight into

61
00:02:33,670 --> 00:02:30,879
their ability to adapt to a warming

62
00:02:35,350 --> 00:02:33,680
climate however ecostress is also useful

63
00:02:37,190 --> 00:02:35,360

for documenting other heat related

64
00:02:39,670 --> 00:02:37,200
phenomena like patterns of heat

65
00:02:41,910 --> 00:02:39,680
absorption and retention its high

66
00:02:44,710 --> 00:02:41,920
resolution images with a pixel size of

67
00:02:46,710 --> 00:02:44,720
about 70 meters by 38 meters are a

68
00:02:48,070 --> 00:02:46,720
powerful tool for understanding our

69
00:02:49,910 --> 00:02:48,080
environment

70
00:02:52,790 --> 00:02:49,920
this week we answer the question do

71
00:02:55,350 --> 00:02:52,800
astronauts have wi-fi in space

72
00:02:57,270 --> 00:02:55,360
the expedition 67 crew participated in a

73
00:02:59,190 --> 00:02:57,280
ballisto choreography session while

74
00:03:01,350 --> 00:02:59,200
wearing the smart text 2 shirt

75
00:03:03,190 --> 00:03:01,360
ballistocardiography looks at body

76
00:03:04,470 --> 00:03:03,200
motion related to the pumping of blood

77
00:03:06,229 --> 00:03:04,480
by the heart

78
00:03:08,630 --> 00:03:06,239
the wireless communication network

79
00:03:10,710 --> 00:03:08,640
wireless compost ii investigation is to

80
00:03:12,550 --> 00:03:10,720
provide a flexible and adaptable

81
00:03:15,030 --> 00:03:12,560
wireless network infrastructure to

82
00:03:16,470 --> 00:03:15,040
conduct and execute low power low weight

83
00:03:18,309 --> 00:03:16,480
and wireless experiments on the

84
00:03:20,229 --> 00:03:18,319
international space station for this

85
00:03:22,309 --> 00:03:20,239
demonstration wireless compost 2

86
00:03:24,149 --> 00:03:22,319
operates several experiments including

87
00:03:25,270 --> 00:03:24,159
an experiment to examine the impact of

88
00:03:27,430 --> 00:03:25,280

the space environment on the

89
00:03:28,949 --> 00:03:27,440
cardiovascular system

90
00:03:30,550 --> 00:03:28,959
that's space to ground for this week

91
00:03:32,840 --> 00:03:30,560
thanks for watching we'll see you next

92
00:03:42,949 --> 00:03:32,850
week

93
00:03:45,030 --> 00:03:42,959
[Music]

94
00:03:47,750 --> 00:03:45,040
since the last time we were with you

95
00:03:49,190 --> 00:03:47,760
nasa's spacex crew 4 mission delivered

96
00:03:51,430 --> 00:03:49,200
four new crew members to the

97
00:03:53,670 --> 00:03:51,440
international space station to advance

98
00:03:56,149 --> 00:03:53,680
the scientific mission there and learn

99
00:03:58,309 --> 00:03:56,159
more of what we need to know to explore

100
00:03:59,270 --> 00:03:58,319
out beyond low earth orbit in the years

101
00:04:01,830 --> 00:03:59,280
to come

102
00:04:04,550 --> 00:04:01,840
take a look as nasa's chill lindgren bob

103
00:04:06,390 --> 00:04:04,560
hines and jessica watkins and european

104
00:04:08,710 --> 00:04:06,400
space agency astronaut samantha

105
00:04:10,869 --> 00:04:08,720
christopher reddy explain the goals of

106
00:04:12,710 --> 00:04:10,879
their flight and show their excitement

107
00:04:16,180 --> 00:04:12,720
about the prospect of flying on the

108
00:04:28,550 --> 00:04:16,190
dragon vehicle for the first time

109
00:04:35,030 --> 00:04:31,270
crew 4 is the fourth crew rotation

110
00:04:37,510 --> 00:04:35,040
flight for the spacex dragon vehicle

111
00:04:39,270 --> 00:04:37,520
crew 4's goals are to

112
00:04:41,510 --> 00:04:39,280
safely and successfully get to the

113
00:04:43,590 --> 00:04:41,520

international space station and then to

114
00:04:45,110 --> 00:04:43,600
spend the a lot of time living and

115
00:04:47,350 --> 00:04:45,120
working in space

116
00:04:49,749 --> 00:04:47,360
meeting all of the planned research and

117
00:04:51,909 --> 00:04:49,759
science and maintenance goals of the

118
00:04:53,990 --> 00:04:51,919
space station program we are all like

119
00:04:56,950 --> 00:04:54,000
super excited about the opportunity to

120
00:05:00,469 --> 00:04:56,960
fly on a crew dragon spacecraft that

121
00:05:03,510 --> 00:05:00,479
vehicle is a super complex modern

122
00:05:06,390 --> 00:05:03,520
vehicle that enables us to get to space

123
00:05:09,350 --> 00:05:06,400
efficiently and safely

124
00:05:11,749 --> 00:05:09,360
my role as pilot on the dragon vehicle

125
00:05:14,310 --> 00:05:11,759
is primarily to monitor and maintain the

126
00:05:15,670 --> 00:05:14,320
systems of the vehicle itself to get a

127
00:05:18,469 --> 00:05:15,680
chance to pilot one of the newest

128
00:05:19,990 --> 00:05:18,479
vehicles on or off the planet is a true

129
00:05:23,029 --> 00:05:20,000
honor

130
00:05:25,510 --> 00:05:23,039
getting selected for crew 4 was

131
00:05:27,350 --> 00:05:25,520
was amazing because it it's it's an

132
00:05:29,430 --> 00:05:27,360
opportunity to go back to the

133
00:05:33,029 --> 00:05:29,440
international space station and

134
00:05:35,510 --> 00:05:33,039
experience again that transformation

135
00:05:37,350 --> 00:05:35,520
from being an earthbound creature to

136
00:05:39,110 --> 00:05:37,360
being this

137
00:05:40,710 --> 00:05:39,120
living creature

138
00:05:43,270 --> 00:05:40,720

when you get to space station the yeah

139
00:05:45,590 --> 00:05:43,280
the first thing that really strikes is

140
00:05:47,749 --> 00:05:45,600
this feeling of weightlessness i'm so

141
00:05:48,790 --> 00:05:47,759
excited to revisit the space station it

142
00:05:51,350 --> 00:05:48,800
was home

143
00:05:53,670 --> 00:05:51,360
for five months back in 2015.

144
00:05:55,670 --> 00:05:53,680
you know we arrived on orbit and really

145
00:05:58,309 --> 00:05:55,680
within a couple of days my brain

146
00:06:00,309 --> 00:05:58,319
adjusted to the idea of floating not

147
00:06:02,950 --> 00:06:00,319
that i was good at it but the novelty of

148
00:06:05,350 --> 00:06:02,960
it i think that the fact that our brains

149
00:06:06,790 --> 00:06:05,360
can adapt to something that is so novel

150
00:06:08,790 --> 00:06:06,800
so different something that we're

151
00:06:10,790 --> 00:06:08,800
completely and accustomed to for all of

152
00:06:13,510 --> 00:06:10,800
our lives and that it can just just

153
00:06:15,909 --> 00:06:13,520
adapt like that is absolutely amazing

154
00:06:19,350 --> 00:06:15,919
the international space station is a

155
00:06:21,670 --> 00:06:19,360
national laboratory built to do science

156
00:06:23,510 --> 00:06:21,680
the connecting element between all the

157
00:06:25,430 --> 00:06:23,520
experiments that we do up there is the

158
00:06:27,350 --> 00:06:25,440
space environment and specifically

159
00:06:29,110 --> 00:06:27,360
weightlessness microgravity as the

160
00:06:31,350 --> 00:06:29,120
scientists like to say

161
00:06:33,270 --> 00:06:31,360
when you're dealing with complex systems

162
00:06:35,510 --> 00:06:33,280
one way to learn how they work is to

163
00:06:37,510 --> 00:06:35,520

start removing variables we're able to

164
00:06:38,950 --> 00:06:37,520
do a lot of that down here on earth but

165
00:06:40,790 --> 00:06:38,960
one of the things that we have a

166
00:06:43,270 --> 00:06:40,800
challenge doing and we can't do is

167
00:06:44,790 --> 00:06:43,280
remove the effects of gravity and so by

168
00:06:46,629 --> 00:06:44,800
taking things to the international space

169
00:06:49,350 --> 00:06:46,639
station we can remove that and we can

170
00:06:51,189 --> 00:06:49,360
see how these complex systems work how

171
00:06:53,189 --> 00:06:51,199
things grow how they develop we do so

172
00:06:55,990 --> 00:06:53,199
much research up there that not only

173
00:06:58,390 --> 00:06:56,000
helps technologies and development down

174
00:07:00,390 --> 00:06:58,400
here on earth but it is also aiding

175
00:07:01,589 --> 00:07:00,400
nasa's pivot back into deep space

176
00:07:03,430 --> 00:07:01,599
exploration

177
00:07:05,830 --> 00:07:03,440
the work that we do every day helps us

178
00:07:08,070 --> 00:07:05,840
to better understand how the human body

179
00:07:09,830 --> 00:07:08,080
changes in weightlessness and to

180
00:07:12,070 --> 00:07:09,840
understand how to do the operations like

181
00:07:13,589 --> 00:07:12,080
space walks and robotic arm activities

182
00:07:16,309 --> 00:07:13,599
that are necessary

183
00:07:18,230 --> 00:07:16,319
for us to be successful in lunar orbit

184
00:07:21,110 --> 00:07:18,240
on the lunar surface and on our way to

185
00:07:24,150 --> 00:07:21,120
mars we get this awesome opportunity to

186
00:07:26,790 --> 00:07:24,160
be representatives of humanity of all of

187
00:07:28,150 --> 00:07:26,800
you and we don't take that lightly we're

188
00:07:30,710 --> 00:07:28,160

super honored to have that

189
00:07:35,260 --> 00:07:30,720
responsibility and are excited about

190
00:07:45,990 --> 00:07:35,270
sharing the journey with with all of you

191
00:07:50,230 --> 00:07:48,390
along with work on science experiments

192
00:07:52,150 --> 00:07:50,240
and station maintenance most

193
00:07:54,230 --> 00:07:52,160
international space station astronauts

194
00:07:56,790 --> 00:07:54,240
spend some of their time sharing the

195
00:07:59,589 --> 00:07:56,800
experience of being in space and talking

196
00:08:01,990 --> 00:07:59,599
to students about scientific concepts

197
00:08:04,070 --> 00:08:02,000
in this news demonstrations episode

198
00:08:07,110 --> 00:08:04,080
astronauts megan macarthur and aki

199
00:08:09,350 --> 00:08:07,120
hoshide explained the geometric concepts

200
00:08:12,309 --> 00:08:09,360
behind the strategic choices that were

201
00:08:15,029 --> 00:08:12,319
made in space station design choices

202
00:08:21,540 --> 00:08:15,039
that help make sure every cubic inch of

203
00:08:21,550 --> 00:08:42,230
[Music]

204
00:08:48,150 --> 00:08:43,750
welcome to the international space

205
00:08:52,070 --> 00:08:50,470
i'm astronaut megan macarthur today

206
00:08:53,910 --> 00:08:52,080
we're going to discuss how engineers

207
00:08:58,150 --> 00:08:53,920
design space station modules so we can

208
00:09:02,400 --> 00:09:00,870
what is volume glad you asked let's go

209
00:09:05,670 --> 00:09:02,410
check it out

210
00:09:07,990 --> 00:09:05,680
[Music]

211
00:09:10,230 --> 00:09:08,000
area is defined as the two-dimensional

212
00:09:13,110 --> 00:09:10,240
space occupied by a flat shape or

213
00:09:15,710 --> 00:09:13,120

surface of an object whereas volume is

214
00:09:18,310 --> 00:09:15,720
the amount of space occupied inside a

215
00:09:20,470 --> 00:09:18,320
three-dimensional object

216
00:09:23,110 --> 00:09:20,480
length times width will give you the

217
00:09:25,269 --> 00:09:23,120
area of a square take the area of a

218
00:09:27,590 --> 00:09:25,279
square and multiply that by its height

219
00:09:30,150 --> 00:09:27,600
to get the volume of a cube

220
00:09:33,190 --> 00:09:30,160
for example here's a cube that is 2

221
00:09:34,150 --> 00:09:33,200
meters long by 2 meters wide by 2 meters

222
00:09:36,150 --> 00:09:34,160
high

223
00:09:38,310 --> 00:09:36,160
multiply those dimensions and you get

224
00:09:40,150 --> 00:09:38,320
eight cubic meters of volume

225
00:09:41,110 --> 00:09:40,160
but that's only one way to calculate

226
00:09:43,829 --> 00:09:41,120
volume

227
00:09:45,670 --> 00:09:43,839
cones cylinders and spheres all have

228
00:09:46,790 --> 00:09:45,680
different formulas to calculate their

229
00:09:49,190 --> 00:09:46,800
volumes

230
00:09:51,350 --> 00:09:49,200
to calculate the volume of a cylinder we

231
00:09:54,230 --> 00:09:51,360
take the area of the circle

232
00:09:56,310 --> 00:09:54,240
pi times the radius squared and multiply

233
00:09:58,070 --> 00:09:56,320
that by the length of the cylinder

234
00:10:01,110 --> 00:09:58,080
in the destiny module we have a

235
00:10:04,949 --> 00:10:01,120
pressurized volume of approximately 106

236
00:10:06,790 --> 00:10:04,959
cubic meters or 3700 cubic feet

237
00:10:08,310 --> 00:10:06,800
that's a lot of space for us to live and

238
00:10:10,630 --> 00:10:08,320

work

239
00:10:13,350 --> 00:10:10,640
destiny is the primary research lab for

240
00:10:16,230 --> 00:10:13,360
us payloads supporting a wide range of

241
00:10:19,110 --> 00:10:16,240
experiments and studies contributing to

242
00:10:21,430 --> 00:10:19,120
health safety and quality of life for

243
00:10:23,750 --> 00:10:21,440
people all over the world engineers

244
00:10:25,990 --> 00:10:23,760
designed these cylindrical modules for

245
00:10:27,950 --> 00:10:26,000
astronauts to utilize the entire

246
00:10:29,110 --> 00:10:27,960
three-dimensional space

247
00:10:31,030 --> 00:10:29,120
[Music]

248
00:10:33,269 --> 00:10:31,040
so you've learned that destiny is a

249
00:10:34,949 --> 00:10:33,279
cylindrical shaped pressurized module

250
00:10:36,949 --> 00:10:34,959
but inside the space you can see that

251
00:10:39,110 --> 00:10:36,959
our interior space is a little bit more

252
00:10:42,230 --> 00:10:39,120
like a square so these racks are

253
00:10:44,790 --> 00:10:42,240
designed to fit against the walls of the

254
00:10:47,269 --> 00:10:44,800
circular cylindrical module and so the

255
00:10:49,430 --> 00:10:47,279
back of the rack is curved and the front

256
00:10:51,110 --> 00:10:49,440
of the rack is straight and so we can

257
00:10:52,870 --> 00:10:51,120
keep a variety of different kinds of

258
00:10:55,110 --> 00:10:52,880
experiments in different racks and we

259
00:10:58,470 --> 00:10:55,120
can also use the ceiling and the floor

260
00:10:59,990 --> 00:10:58,480
just as easily as if it were a wall so

261
00:11:05,910 --> 00:11:00,000
one of the places that we store some of

262
00:11:09,670 --> 00:11:07,590
you see we have these different kinds of

263
00:11:10,949 --> 00:11:09,680

bags that we store things in in these

264
00:11:13,030 --> 00:11:10,959
different

265
00:11:15,590 --> 00:11:13,040
kinds of cupboards

266
00:11:17,829 --> 00:11:15,600
we also can keep our medical kit up here

267
00:11:19,509 --> 00:11:17,839
out of the way so if anybody um gets a

268
00:11:21,190 --> 00:11:19,519
cut or a scraper needs some medicine we

269
00:11:22,470 --> 00:11:21,200
have different packs in here that have

270
00:11:25,829 --> 00:11:22,480
all the different things that we might

271
00:11:30,630 --> 00:11:28,470
i can also use space in the floor we

272
00:11:32,550 --> 00:11:30,640
actually have a window that's in our

273
00:11:48,949 --> 00:11:32,560
floor that looks straight down onto the

274
00:11:51,750 --> 00:11:50,389
i hope you learned a little bit about

275
00:11:53,430 --> 00:11:51,760
the importance of engineering and

276
00:11:54,629 --> 00:11:53,440
utilizing volume aboard the space

277
00:11:56,069 --> 00:11:54,639
station today

278
00:11:58,069 --> 00:11:56,079
use the corresponding classroom

279
00:11:59,670 --> 00:11:58,079
connection to learn more about area and

280
00:12:01,590 --> 00:11:59,680
volume and challenge yourself to

281
00:12:04,710 --> 00:12:01,600
redesign your own home and classroom for

282
00:12:07,269 --> 00:12:04,720
life and microgravity

283
00:12:10,230 --> 00:12:07,279
maybe one day you will be an engineer

284
00:12:13,180 --> 00:12:10,240
designing rooms for us up here in space

285
00:12:27,110 --> 00:12:13,190
see you next time

286
00:12:31,910 --> 00:12:29,670
although nasa is getting ready to return

287
00:12:34,150 --> 00:12:31,920
astronauts to the moon on upcoming

288
00:12:36,230 --> 00:12:34,160

missions of the artemis program

289
00:12:38,870 --> 00:12:36,240
geologists are still learning about the

290
00:12:41,190 --> 00:12:38,880
moon from soil samples collected there

291
00:12:43,590 --> 00:12:41,200
almost 50 years ago

292
00:12:45,750 --> 00:12:43,600
a team of lunar sample processors and

293
00:12:49,269 --> 00:12:45,760
curators at the johnson space center in

294
00:12:52,150 --> 00:12:49,279
houston along with apollo 17 astronaut

295
00:12:54,470 --> 00:12:52,160
and geologist harrison schmidt have been

296
00:12:57,430 --> 00:12:54,480
opening lunar samples collected on

297
00:13:03,240 --> 00:12:57,440
apollo 17 to be studied using the

298
00:13:20,870 --> 00:13:19,269
[Music]

299
00:13:22,949 --> 00:13:20,880
the first thing we do is we put it in

300
00:13:24,949 --> 00:13:22,959
this catapult looking device that you

301
00:13:26,629 --> 00:13:24,959
see here we call it the rocket launcher

302
00:13:28,310 --> 00:13:26,639
the end caps are taken off of the drive

303
00:13:29,990 --> 00:13:28,320
tube and then

304
00:13:31,990 --> 00:13:30,000
threaded metal rods with plates on the

305
00:13:33,670 --> 00:13:32,000
end were actually inserted into either

306
00:13:35,430 --> 00:13:33,680
end then the sample is picked up from

307
00:13:37,990 --> 00:13:35,440
the rocket launcher and it's put into

308
00:13:40,790 --> 00:13:38,000
this device over here with the wheel on

309
00:13:43,350 --> 00:13:40,800
it as that wheel gets turned very slowly

310
00:13:47,269 --> 00:13:43,360
the threads engage and the rod starts to

311
00:13:51,829 --> 00:13:48,470
that core

312
00:13:54,870 --> 00:13:51,839
uh was collected by gene cernan

313
00:13:56,870 --> 00:13:54,880

as i was working on the edge of a of a

314
00:13:58,629 --> 00:13:56,880
crater nearby

315
00:14:00,150 --> 00:13:58,639
one of the most important tools that we

316
00:14:03,430 --> 00:14:00,160
had was this

317
00:14:05,269 --> 00:14:03,440
core tube a double drive tube and

318
00:14:07,750 --> 00:14:05,279
you could drive these into the surface

319
00:14:09,350 --> 00:14:07,760
now still very difficult

320
00:14:13,030 --> 00:14:09,360
it was the best we had and we got a

321
00:14:15,829 --> 00:14:13,040
quite a number of very good cores that

322
00:14:18,069 --> 00:14:15,839
are giving us new information not only

323
00:14:20,629 --> 00:14:18,079
about the nature of this debris layer

324
00:14:23,910 --> 00:14:20,639
but also within those cores is a history

325
00:14:27,269 --> 00:14:25,829
it was anticipated early on in the

326
00:14:28,310 --> 00:14:27,279
apollo program

327
00:14:31,430 --> 00:14:28,320
that

328
00:14:33,910 --> 00:14:31,440
analytical technology would mature would

329
00:14:35,910 --> 00:14:33,920
become much more sophisticated with time

330
00:14:38,310 --> 00:14:35,920
that we could gain new information from

331
00:14:40,550 --> 00:14:38,320
the same old samples it makes it

332
00:14:42,629 --> 00:14:40,560
very very exciting for everybody in fact

333
00:14:44,470 --> 00:14:42,639
apollo never ended for lunar scientists

334
00:14:46,150 --> 00:14:44,480
our analytical techniques have gotten to

335
00:14:48,230 --> 00:14:46,160
the point where we can actually detect

336
00:14:50,230 --> 00:14:48,240
the water that is in some of these

337
00:14:51,910 --> 00:14:50,240
ancient ludar rocks we've actually been

338
00:14:53,670 --> 00:14:51,920

able to constrain

339
00:14:55,350 --> 00:14:53,680
that there is a common history and a

340
00:14:57,110 --> 00:14:55,360
common source between the earthman

341
00:14:59,110 --> 00:14:57,120
system which is what we have learned

342
00:15:01,430 --> 00:14:59,120
previously by other studies of the

343
00:15:04,230 --> 00:15:01,440
apollo lunar samples that we have

344
00:15:07,030 --> 00:15:04,240
x-ray computed tomography or xct now

345
00:15:08,790 --> 00:15:07,040
this is a way for us to actually look at

346
00:15:14,470 --> 00:15:08,800
the three-dimensional structure of a

347
00:15:18,470 --> 00:15:16,310
there's a whole industry of engineers

348
00:15:20,550 --> 00:15:18,480
who are studying how to extract

349
00:15:21,910 --> 00:15:20,560
resources from the moon and so one of

350
00:15:23,590 --> 00:15:21,920
the things that we want to do during

351
00:15:25,670 --> 00:15:23,600
artemis is actually test out some of

352
00:15:27,430 --> 00:15:25,680
these new technologies and see how

353
00:15:29,350 --> 00:15:27,440
effective they are at extracting the

354
00:15:31,350 --> 00:15:29,360
water in these other materials thinking

355
00:15:34,069 --> 00:15:31,360
forward to mars we've only ever sent

356
00:15:35,910 --> 00:15:34,079
robotic missions to mars and so when we

357
00:15:37,749 --> 00:15:35,920
send people to mars these are things

358
00:15:40,550 --> 00:15:37,759
we're going to have to consider so this

359
00:15:42,629 --> 00:15:40,560
corps has a multitude of the information

360
00:15:44,629 --> 00:15:42,639
to give us and we're as you can tell i

361
00:15:46,550 --> 00:15:44,639
think all of us are very excited about

362
00:15:48,710 --> 00:15:46,560
getting a chance to work on it there's a

363
00:15:50,790 --> 00:15:48,720

lot we don't know about the rest of the

364
00:15:52,629 --> 00:15:50,800
moon and there's a lot we don't know

365
00:15:55,350 --> 00:15:52,639
about in between these various sites

366
00:15:57,430 --> 00:15:55,360
that apollo landed at and so gathering

367
00:15:58,949 --> 00:15:57,440
new information particularly from the

368
00:16:01,269 --> 00:15:58,959
south pole but there are many other

369
00:16:03,670 --> 00:16:01,279
areas on the far side that will start to

370
00:16:05,829 --> 00:16:03,680
define much more

371
00:16:07,829 --> 00:16:05,839
give us much more information about

372
00:16:10,230 --> 00:16:07,839
lunar science you have to remember that

373
00:16:12,470 --> 00:16:10,240
everything we're learning about the moon

374
00:16:14,550 --> 00:16:12,480
relates to the very early history of the

375
00:16:18,110 --> 00:16:14,560
solar system and particularly to the

376
00:16:31,829 --> 00:16:18,120
very early history of the earth

377
00:16:37,189 --> 00:16:33,910
astronauts have been taking pictures of

378
00:16:40,069 --> 00:16:37,199
earth from space for over 60 years now

379
00:16:42,389 --> 00:16:40,079
more than four million still photos and

380
00:16:44,870 --> 00:16:42,399
many thousands of hours of film and

381
00:16:47,670 --> 00:16:44,880
video have been taken for reasons both

382
00:16:50,389 --> 00:16:47,680
artistic and scientific and to

383
00:16:52,870 --> 00:16:50,399
demonstrate to us the changes that the

384
00:16:55,350 --> 00:16:52,880
earth has experienced over the years

385
00:16:57,590 --> 00:16:55,360
take a look

386
00:16:59,030 --> 00:16:57,600
these pictures depict the magnificent

387
00:17:00,870 --> 00:16:59,040
wonders of our planet

388
00:17:05,669 --> 00:17:00,880

[Music]

389
00:17:08,069 --> 00:17:05,679
yet they weren't taken anywhere on earth

390
00:17:10,309 --> 00:17:08,079
instead they were captured by astronauts

391
00:17:12,230 --> 00:17:10,319
aboard the international space station

392
00:17:14,150 --> 00:17:12,240
to chronicle the fragile beauty and

393
00:17:16,470 --> 00:17:14,160
ever-changing landscape of our

394
00:17:21,909 --> 00:17:16,480
collective home

395
00:17:24,870 --> 00:17:21,919
[Music]

396
00:17:27,189 --> 00:17:24,880
to date over 4 million photos taken by

397
00:17:29,350 --> 00:17:27,199
humans from space have been collected

398
00:17:31,750 --> 00:17:29,360
from the earliest days of the mercury

399
00:17:34,150 --> 00:17:31,760
and gemini missions to the ones taken

400
00:17:36,310 --> 00:17:34,160
aboard the space station and all are

401
00:17:39,270 --> 00:17:36,320
freely available to researchers

402
00:17:41,110 --> 00:17:39,280
scientists and the public worldwide

403
00:17:44,549 --> 00:17:41,120
these photographs are taken for many

404
00:17:46,710 --> 00:17:44,559
purposes from artistic to the scientific

405
00:17:48,070 --> 00:17:46,720
and have proven to have a wide range of

406
00:17:50,549 --> 00:17:48,080
uses

407
00:17:52,789 --> 00:17:50,559
a powerful use of crew photography is to

408
00:17:54,630 --> 00:17:52,799
study changes to our planet over long

409
00:17:56,710 --> 00:17:54,640
periods of time

410
00:17:58,950 --> 00:17:56,720
the tashka lakes and lake nasser in

411
00:18:01,110 --> 00:17:58,960
egypt for example have been photographed

412
00:18:03,590 --> 00:18:01,120
on a regular basis from the station over

413
00:18:05,350 --> 00:18:03,600

the past 20 years

414
00:18:06,950 --> 00:18:05,360
this is partially because the water

415
00:18:09,909 --> 00:18:06,960
levels in these lakes change

416
00:18:11,909 --> 00:18:09,919
dramatically on a month-to-month basis

417
00:18:12,950 --> 00:18:11,919
constantly affecting agriculture in the

418
00:18:15,430 --> 00:18:12,960
region

419
00:18:17,590 --> 00:18:15,440
researchers able to observe these bodies

420
00:18:20,470 --> 00:18:17,600
of water over a long period of time

421
00:18:23,590 --> 00:18:20,480
using crew photography can ask is their

422
00:18:26,710 --> 00:18:23,600
volume more or less stable over time

423
00:18:28,950 --> 00:18:26,720
or are they slowly losing their water

424
00:18:31,270 --> 00:18:28,960
andrea wenzel is a geoscientist for the

425
00:18:34,549 --> 00:18:31,280
earth science and remote sensing unit

426
00:18:36,390 --> 00:18:34,559
who manage requests for crew photography

427
00:18:38,470 --> 00:18:36,400
she notes the flexibility that a crew

428
00:18:39,830 --> 00:18:38,480
member offers when taking a picture of

429
00:18:41,750 --> 00:18:39,840
earth

430
00:18:44,150 --> 00:18:41,760
a satellite generally takes the same

431
00:18:47,029 --> 00:18:44,160
photos over the same locations in the

432
00:18:49,029 --> 00:18:47,039
same orientation over and over

433
00:18:51,110 --> 00:18:49,039
astronauts on the other hand can use

434
00:18:52,710 --> 00:18:51,120
different lenses to take photos with

435
00:18:55,270 --> 00:18:52,720
different fields of view

436
00:18:57,029 --> 00:18:55,280
from close up to wide shots

437
00:18:59,190 --> 00:18:57,039
the cupola on the bottom of the space

438
00:19:00,390 --> 00:18:59,200

station allows for a panoramic view

439
00:19:01,909 --> 00:19:00,400
straight down

440
00:19:03,750 --> 00:19:01,919
or the crew members can elect to

441
00:19:05,350 --> 00:19:03,760
photograph an image that includes the

442
00:19:07,350 --> 00:19:05,360
horizon

443
00:19:09,909 --> 00:19:07,360
and because the space station flies an

444
00:19:12,390 --> 00:19:09,919
asynchronous orbit around earth it can

445
00:19:13,830 --> 00:19:12,400
capture images at any time of day or

446
00:19:15,830 --> 00:19:13,840
night

447
00:19:17,830 --> 00:19:15,840
wenzo notes that the vienema glacier at

448
00:19:19,990 --> 00:19:17,840
the southern end of south america is a

449
00:19:22,830 --> 00:19:20,000
good example of a moving earth feature

450
00:19:25,669 --> 00:19:22,840
being observed by crew photography over

451
00:19:27,909 --> 00:19:25,679
time there's been a significant decrease

452
00:19:29,990 --> 00:19:27,919
in the glacier's length over the years

453
00:19:32,789 --> 00:19:30,000
and the photos allow researchers to

454
00:19:34,470 --> 00:19:32,799
observe the path the glacier is taking

455
00:19:36,150 --> 00:19:34,480
and correlate that to climate change

456
00:19:38,549 --> 00:19:36,160
data

457
00:19:40,950 --> 00:19:38,559
the crew can also be asked to capture an

458
00:19:44,870 --> 00:19:40,960
event like a hurricane

459
00:19:47,669 --> 00:19:44,880
wildfire flood or volcanic eruption

460
00:19:49,750 --> 00:19:47,679
this image shows flooding in colombia

461
00:19:51,750 --> 00:19:49,760
wenzel says it was one of a series of

462
00:19:53,830 --> 00:19:51,760
photos that was used by international

463
00:19:55,270 --> 00:19:53,840

first responders to update their flood

464
00:19:57,430 --> 00:19:55,280
maps

465
00:19:59,190 --> 00:19:57,440
as a result they launched an operation

466
00:20:01,669 --> 00:19:59,200
to rescue the inhabitants of local

467
00:20:03,590 --> 00:20:01,679
villages who were stuck in place due to

468
00:20:06,390 --> 00:20:03,600
rising water

469
00:20:08,230 --> 00:20:06,400
astronauts often say the most remarkable

470
00:20:10,549 --> 00:20:08,240
thing about seeing earth from the space

471
00:20:12,870 --> 00:20:10,559
station is viewing our planet across

472
00:20:15,270 --> 00:20:12,880
climate zones and continents without

473
00:20:17,270 --> 00:20:15,280
borders drawn on a map

474
00:20:19,750 --> 00:20:17,280
fortunately for those of us still on the

475
00:20:21,669 --> 00:20:19,760
ground their photographic skills allow

476
00:20:24,950 --> 00:20:21,679
us to see what they see

477
00:20:35,909 --> 00:20:24,960
now and over decades of time

478
00:20:41,350 --> 00:20:38,549
and a special treat today the first

479
00:20:43,750 --> 00:20:41,360
episode of a new season of the down to

480
00:20:46,230 --> 00:20:43,760
earth series it's not just a chance to

481
00:20:47,750 --> 00:20:46,240
hear astronauts sharing their experience

482
00:20:49,750 --> 00:20:47,760
of looking down at earth from the

483
00:20:50,870 --> 00:20:49,760
international space station although it

484
00:20:53,590 --> 00:20:50,880
is that

485
00:20:55,669 --> 00:20:53,600
but this season kicks off with two-time

486
00:20:58,710 --> 00:20:55,679
station crew member sunny williams

487
00:21:01,590 --> 00:20:58,720
interviewed by a student who knows how

488
00:21:03,590 --> 00:21:01,600

to ask the right questions

489
00:21:05,350 --> 00:21:03,600
hi my name is adrian crotty and i am

490
00:21:07,110 --> 00:21:05,360
studying environmental studies today

491
00:21:08,870 --> 00:21:07,120
i'll be sitting down with astronaut suni

492
00:21:11,270 --> 00:21:08,880
williams i was curious to know how

493
00:21:13,029 --> 00:21:11,280
seeing the earth from space changed her

494
00:21:15,430 --> 00:21:13,039
perspective on the work that she did

495
00:21:17,110 --> 00:21:15,440
from space and the life that she lives

496
00:21:18,630 --> 00:21:17,120
now when she's back on the planet thank

497
00:21:20,710 --> 00:21:18,640
you for watching the premiere of season

498
00:21:25,970 --> 00:21:20,720
two down to earth follow along for more

499
00:21:33,909 --> 00:21:32,950
[Music]

500
00:21:35,190 --> 00:21:33,919
so

501
00:21:37,990 --> 00:21:35,200
i have a few questions as you might

502
00:21:40,549 --> 00:21:38,000
guess um and to start with i'd like to

503
00:21:42,950 --> 00:21:40,559
know what is one thing about living and

504
00:21:44,710 --> 00:21:42,960
working in space that most people

505
00:21:46,870 --> 00:21:44,720
who have never been to space might not

506
00:21:48,870 --> 00:21:46,880
know about or understand well that's a

507
00:21:50,870 --> 00:21:48,880
good question and i'm not just saying

508
00:21:52,950 --> 00:21:50,880
that to fill time

509
00:21:55,110 --> 00:21:52,960
there's just there's a whole bunch of

510
00:21:57,669 --> 00:21:55,120
interesting things to talk about i think

511
00:21:59,510 --> 00:21:57,679
probably people think it's pretty nice

512
00:22:00,870 --> 00:21:59,520
that you can go and float around up

513
00:22:03,510 --> 00:22:00,880

there

514
00:22:05,909 --> 00:22:03,520
but that has some consequences to it you

515
00:22:08,710 --> 00:22:05,919
know of course i think our bodies need

516
00:22:10,630 --> 00:22:08,720
to adapt to going to space

517
00:22:13,350 --> 00:22:10,640
the initial getting the space like whoa

518
00:22:15,430 --> 00:22:13,360
you know it's a big adaptation but you

519
00:22:17,190 --> 00:22:15,440
feel like you like we're there okay so

520
00:22:19,350 --> 00:22:17,200
now i can float around okay maybe i'm a

521
00:22:21,029 --> 00:22:19,360
little clumsy but i think what people

522
00:22:23,510 --> 00:22:21,039
don't recognize is

523
00:22:25,990 --> 00:22:23,520
your whole being starts to adapt and it

524
00:22:28,070 --> 00:22:26,000
does take time folks had said in the

525
00:22:29,669 --> 00:22:28,080
past that maybe a month i didn't believe

526
00:22:32,390 --> 00:22:29,679
it i think most people don't believe it

527
00:22:35,590 --> 00:22:32,400
but you can really see how people become

528
00:22:38,310 --> 00:22:35,600
so natural up in space after about a

529
00:22:40,310 --> 00:22:38,320
month and how smoothly they fly and

530
00:22:43,190 --> 00:22:40,320
actually how that translated to me as a

531
00:22:44,950 --> 00:22:43,200
reality it was like i was like i don't

532
00:22:46,390 --> 00:22:44,960
know what it would be like to walk when

533
00:22:47,909 --> 00:22:46,400
i was up there there was through the

534
00:22:50,149 --> 00:22:47,919
center of the stack there was a module

535
00:22:52,470 --> 00:22:50,159
that went down and that was essentially

536
00:22:54,789 --> 00:22:52,480
our closet but it was pretty deep it's

537
00:22:57,110 --> 00:22:54,799
probably like 30 feet down

538
00:22:58,630 --> 00:22:57,120

and i'd float right over it and i was

539
00:23:01,110 --> 00:22:58,640
thinking to myself

540
00:23:03,510 --> 00:23:01,120
i don't even think twice about this like

541
00:23:05,510 --> 00:23:03,520
if i was walking i'd be like oh you know

542
00:23:07,590 --> 00:23:05,520
like what do i have to do here and i i

543
00:23:10,950 --> 00:23:07,600
actually sort of forgot what it was like

544
00:23:13,190 --> 00:23:10,960
to walk around that your body your brain

545
00:23:14,950 --> 00:23:13,200
your body can all just sort of

546
00:23:16,149 --> 00:23:14,960
live or change to the environment that

547
00:23:17,830 --> 00:23:16,159
you're in i thought that was pretty

548
00:23:19,590 --> 00:23:17,840
fascinating that doesn't it reminds me

549
00:23:20,710 --> 00:23:19,600
of the videos that you can see of

550
00:23:22,149 --> 00:23:20,720
astronauts when they come back and

551
00:23:23,510 --> 00:23:22,159
they're holding something and let go and

552
00:23:25,270 --> 00:23:23,520
then it just falls

553
00:23:26,710 --> 00:23:25,280
yep that's all one time and then you go

554
00:23:28,630 --> 00:23:26,720
okay i got it

555
00:23:29,990 --> 00:23:28,640
gravity is back

556
00:23:31,270 --> 00:23:30,000
it also reminds me of if you're ever

557
00:23:32,310 --> 00:23:31,280
like on a boat for an extended period

558
00:23:34,950 --> 00:23:32,320
and you get back on land and then you

559
00:23:37,110 --> 00:23:34,960
have the sea legs exactly

560
00:23:38,549 --> 00:23:37,120
would you say that that or was there

561
00:23:40,549 --> 00:23:38,559
something else what that was the biggest

562
00:23:42,470 --> 00:23:40,559
adjustment for you in space i think that

563
00:23:44,870 --> 00:23:42,480

was the biggest i think a close second

564
00:23:46,710 --> 00:23:44,880
is uh losing things i think one of the

565
00:23:48,390 --> 00:23:46,720
most annoying things is like when you

566
00:23:49,750 --> 00:23:48,400
think just for a second you're like you

567
00:23:51,110 --> 00:23:49,760
just let something go it's just gonna be

568
00:23:53,269 --> 00:23:51,120
there for just a second and you turn

569
00:23:54,870 --> 00:23:53,279
around and some air current takes it and

570
00:23:57,190 --> 00:23:54,880
you'll see a lot of video of people

571
00:23:58,310 --> 00:23:57,200
doing this

572
00:23:59,909 --> 00:23:58,320
and that's because they're looking for

573
00:24:01,510 --> 00:23:59,919
something and that's i think one of the

574
00:24:03,669 --> 00:24:01,520
most annoying things about being in

575
00:24:05,029 --> 00:24:03,679
space and so good pants a good flight

576
00:24:06,549 --> 00:24:05,039
suit like this with lots of pockets is

577
00:24:08,710 --> 00:24:06,559
really beneficial

578
00:24:10,789 --> 00:24:08,720
what is it like being once you're in

579
00:24:12,310 --> 00:24:10,799
orbit seeing earth from the first time

580
00:24:13,430 --> 00:24:12,320
from so far away

581
00:24:15,350 --> 00:24:13,440
ridiculous

582
00:24:17,110 --> 00:24:15,360
it's awesome i was actually on the mid

583
00:24:18,870 --> 00:24:17,120
deck of the space shuttle discovery that

584
00:24:20,470 --> 00:24:18,880
took me up there and i was working and

585
00:24:21,830 --> 00:24:20,480
you know we got to space and you know

586
00:24:23,510 --> 00:24:21,840
things start floating and that was fun

587
00:24:25,430 --> 00:24:23,520
and i'm chuckling about that and the

588
00:24:27,029 --> 00:24:25,440

commander in the pilot up in the front

589
00:24:29,269 --> 00:24:27,039
seats of the shuttle commander said

590
00:24:31,909 --> 00:24:29,279
sonny come on up and so he i flew up

591
00:24:33,669 --> 00:24:31,919
there and he gave me my little wings and

592
00:24:35,830 --> 00:24:33,679
what was more impressive i was like oh

593
00:24:37,830 --> 00:24:35,840
that's nice but i looked out the window

594
00:24:40,070 --> 00:24:37,840
i was like oh my god there's earth and

595
00:24:41,909 --> 00:24:40,080
it's round it's like they were right you

596
00:24:44,149 --> 00:24:41,919
know it's super cool and it's just

597
00:24:46,870 --> 00:24:44,159
seeing that planet you know in that view

598
00:24:48,870 --> 00:24:46,880
is just amazing and you just can't get

599
00:24:49,990 --> 00:24:48,880
sick of it every opportunity i think

600
00:24:51,350 --> 00:24:50,000
everybody has who lives on the

601
00:24:53,830 --> 00:24:51,360
international space station we have this

602
00:24:55,669 --> 00:24:53,840
amazing cupola window now we have two

603
00:24:57,110 --> 00:24:55,679
windows that look out by the gem so you

604
00:24:59,590 --> 00:24:57,120
could see the curvature of the earth

605
00:25:02,070 --> 00:24:59,600
from those two venues and it's just

606
00:25:04,630 --> 00:25:02,080
compelling i mean you can spend all day

607
00:25:06,230 --> 00:25:04,640
sitting there watching our planet

608
00:25:08,070 --> 00:25:06,240
another transition you know sort of like

609
00:25:09,750 --> 00:25:08,080
your body adapting initially i was

610
00:25:11,750 --> 00:25:09,760
always trying to find places that i knew

611
00:25:13,590 --> 00:25:11,760
like of course like houston or where i

612
00:25:15,909 --> 00:25:13,600
grew up in massachusetts or where my dad

613
00:25:18,070 --> 00:25:15,919

was from in india highlighting little

614
00:25:20,390 --> 00:25:18,080
pieces and parts of the earth for the

615
00:25:22,390 --> 00:25:20,400
people which is of course very important

616
00:25:25,029 --> 00:25:22,400
but after time

617
00:25:27,269 --> 00:25:25,039
i think i started getting more joy out

618
00:25:29,190 --> 00:25:27,279
of looking at our planet as a planet

619
00:25:30,789 --> 00:25:29,200
like watching algae blooms and all

620
00:25:34,630 --> 00:25:30,799
sudden in the ocean someplace there's

621
00:25:36,950 --> 00:25:34,640
this huge amazing blue spot or how the

622
00:25:39,590 --> 00:25:36,960
ice forms and flows

623
00:25:41,669 --> 00:25:39,600
up in the north atlantic with swirls or

624
00:25:42,870 --> 00:25:41,679
how the clouds are moving

625
00:25:44,870 --> 00:25:42,880
that was

626
00:25:47,110 --> 00:25:44,880
another transition you look at it like

627
00:25:49,269 --> 00:25:47,120
it's a living system the environment is

628
00:25:50,789 --> 00:25:49,279
absolutely living the oceans are living

629
00:25:52,070 --> 00:25:50,799
it's all changing

630
00:25:53,990 --> 00:25:52,080
right below you

631
00:25:55,590 --> 00:25:54,000
it seems like you know as we sit here on

632
00:25:57,190 --> 00:25:55,600
earth we don't see all that happening

633
00:25:59,669 --> 00:25:57,200
but when you look at it from that you

634
00:26:01,590 --> 00:25:59,679
know macro perspective finally it took a

635
00:26:03,350 --> 00:26:01,600
little while but that's how i viewed

636
00:26:05,510 --> 00:26:03,360
earth it's a pretty cool

637
00:26:06,870 --> 00:26:05,520
planet and i'm sure it's even more

638
00:26:08,390 --> 00:26:06,880

because it's not just the still picture

639
00:26:09,750 --> 00:26:08,400
you're watching it just like grow and

640
00:26:12,230 --> 00:26:09,760
transform right in front of you right in

641
00:26:13,990 --> 00:26:12,240
front of you yeah before you saw it from

642
00:26:16,070 --> 00:26:14,000
that perspective uh did you have any

643
00:26:19,190 --> 00:26:16,080
expectations about what you were going

644
00:26:20,390 --> 00:26:19,200
to see uh yeah of course i mean i was uh

645
00:26:21,990 --> 00:26:20,400
you know whenever i would get a little

646
00:26:23,990 --> 00:26:22,000
bit bummed out here for some whatever

647
00:26:25,590 --> 00:26:24,000
reason missing missing my family or

648
00:26:27,510 --> 00:26:25,600
whatever i would take a little trek over

649
00:26:29,990 --> 00:26:27,520
to space center houston and watch an

650
00:26:32,390 --> 00:26:30,000
imax movie and go wow you know there's

651
00:26:36,310 --> 00:26:32,400
some pretty cool views but it doesn't

652
00:26:38,310 --> 00:26:36,320
even do it justice i mean it gave you a

653
00:26:39,830 --> 00:26:38,320
foundation a baseline of what you might

654
00:26:41,990 --> 00:26:39,840
see but when you actually see it for

655
00:26:43,990 --> 00:26:42,000
your own two eyes one of the reasons i

656
00:26:46,230 --> 00:26:44,000
feel like everybody on this planet needs

657
00:26:47,990 --> 00:26:46,240
to take a lap around our planet go to

658
00:26:48,870 --> 00:26:48,000
space take a lap and just look out the

659
00:26:50,789 --> 00:26:48,880
window

660
00:26:56,390 --> 00:26:50,799
come back it'll change your your view of

661
00:26:56,400 --> 00:27:01,909
[Music]

662
00:27:05,669 --> 00:27:03,750
if you want another look at any of these

663
00:27:07,830 --> 00:27:05,679

stories we showed you today go to

664
00:27:10,149 --> 00:27:07,840
youtube and facebook at the addresses

665
00:27:12,470 --> 00:27:10,159
right there you'll find them all along

666
00:27:14,950 --> 00:27:12,480
with lots of other great features on a

667
00:27:16,630 --> 00:27:14,960
whole variety of nasa topics if you're

668
00:27:19,110 --> 00:27:16,640
looking for good conversation about

669
00:27:20,470 --> 00:27:19,120
human space like check out houston we

670
00:27:23,029 --> 00:27:20,480
have a podcast

671
00:27:25,269 --> 00:27:23,039
it's our weekly show about all aspects

672
00:27:27,830 --> 00:27:25,279
of human space flight and nasa's

673
00:27:29,750 --> 00:27:27,840
missions of exploration today gary

674
00:27:32,310 --> 00:27:29,760
jordan checks in with johnson space

675
00:27:34,789 --> 00:27:32,320
center director vanessa weich as she

676
00:27:37,669 --> 00:27:34,799
finishes her first year in charge of

677
00:27:39,430 --> 00:27:37,679
america's home of human space flight

678
00:27:41,990 --> 00:27:39,440
go to nasa.gov

679
00:27:44,070 --> 00:27:42,000
podcasts for this week's episode and all

680
00:27:47,269 --> 00:27:44,080
our previous episodes plus the full

681
00:27:49,510 --> 00:27:47,279
library of all the nasa podcasts which

682
00:27:52,310 --> 00:27:49,520
you can also find on apple podcasts

683
00:27:54,310 --> 00:27:52,320
google podcasts and soundcloud

684
00:27:57,510 --> 00:27:54,320
you can get the latest from all over

685
00:27:59,190 --> 00:27:57,520
nasa delivered to you every week go to

686
00:28:01,430 --> 00:27:59,200
nasa.gov

687
00:28:02,710 --> 00:28:01,440
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