



1  
00:00:03,750 --> 00:00:00,789  
lim

2  
00:00:05,430 --> 00:00:03,760  
afld afld

3  
00:00:06,869 --> 00:00:05,440  
please proceed lw

4  
00:00:09,030 --> 00:00:06,879  
you should be looking at your satellite

5  
00:00:11,509 --> 00:00:09,040  
image really barely any clouds nothing

6  
00:00:13,190 --> 00:00:11,519  
of concern

7  
00:00:14,870 --> 00:00:13,200  
nothing on radar not expecting any

8  
00:00:17,029 --> 00:00:14,880  
precipitation

9  
00:00:19,590 --> 00:00:17,039  
our wind speeds have really maxed out at

10  
00:00:22,230 --> 00:00:19,600  
peaks to 22 knot over the past four four

11  
00:00:26,150 --> 00:00:22,240  
hours and expected to remain so our wind

12  
00:00:28,150 --> 00:00:26,160  
direction is from one zero zero

13  
00:00:29,990 --> 00:00:28,160

we're going all lccs and expected to

14

00:00:32,310 --> 00:00:30,000

remain so through the count our t-zero

15

00:00:35,830 --> 00:00:32,320

forecast winds 20 not sustained with

16

00:00:38,310 --> 00:00:35,840

peak to 25 knots less than 10 pov for

17

00:00:39,910 --> 00:00:38,320

ground winds temperatures 68 degrees

18

00:00:42,150 --> 00:00:39,920

fahrenheit and expected to remain so

19

00:00:43,590 --> 00:00:42,160

through the counts

20

00:00:45,350 --> 00:00:43,600

solar weather is at normal background

21

00:00:47,029 --> 00:00:45,360

levels and expected to remain so through

22

00:00:49,750 --> 00:00:47,039

the count this concludes the weather

23

00:00:53,110 --> 00:00:51,270

and there you heard it that was uh

24

00:00:54,950 --> 00:00:53,120

jessica williams the launch weather

25

00:00:57,110 --> 00:00:54,960

officer with the 45th space wing giving

26  
00:00:59,830 --> 00:00:57,120  
a great report you heard her mention the

27  
00:01:02,790 --> 00:00:59,840  
ten percent uh concern about ground

28  
00:01:04,229 --> 00:01:02,800  
winds she also mentioned there was a 22

29  
00:01:07,590 --> 00:01:04,239  
knot wind that they've observed

30  
00:01:09,190 --> 00:01:07,600  
sustained that can have an impact on the

31  
00:01:11,270 --> 00:01:09,200  
rocket we'll get to that in a second but

32  
00:01:12,950 --> 00:01:11,280  
there's your forecast up on your screen

33  
00:01:14,710 --> 00:01:12,960  
now you can see those winds as she

34  
00:01:17,510 --> 00:01:14,720  
mentioned 20 knots

35  
00:01:20,310 --> 00:01:17,520  
observed to 22 knots just a few moments

36  
00:01:22,390 --> 00:01:20,320  
ago the temperature 68 degrees and only

37  
00:01:24,630 --> 00:01:22,400  
a 10 percent violation but mick those

38  
00:01:25,910 --> 00:01:24,640

wins could be a factor yes absolutely

39

00:01:28,550 --> 00:01:25,920

the launch team's looking at those the

40

00:01:29,590 --> 00:01:28,560

ground winds here on at slick 41. they

41

00:01:31,270 --> 00:01:29,600

want to make sure they're under a

42

00:01:32,870 --> 00:01:31,280

certain level before we get ready to go

43

00:01:34,469 --> 00:01:32,880

tonight to make sure the vehicle is in

44

00:01:36,069 --> 00:01:34,479

good shape and environments on all

45

00:01:38,310 --> 00:01:36,079

components are good so

46

00:01:39,670 --> 00:01:38,320

really happy to hear a less than 10 pov

47

00:01:41,590 --> 00:01:39,680

tonight i'm happy with that weather

48

00:01:44,389 --> 00:01:41,600

forecast great news moving forward in

49

00:01:45,590 --> 00:01:44,399

the count we want to go back in time

50

00:01:47,510 --> 00:01:45,600

just a little bit to show you how the

51  
00:01:50,069 --> 00:01:47,520  
rocket got to the pad here

52  
00:01:52,630 --> 00:01:50,079  
there it is the atlas 5 in its vertical

53  
00:01:54,310 --> 00:01:52,640  
integration facility not far from the

54  
00:01:56,069 --> 00:01:54,320  
pad but this is the day it moved out it

55  
00:01:58,389 --> 00:01:56,079  
was saturday mick you and i were there

56  
00:02:03,030 --> 00:01:58,399  
standing just alongside the path there

57  
00:02:06,310 --> 00:02:03,040  
as the atlas 5 190 foot tall rocket went

58  
00:02:08,389 --> 00:02:06,320  
right by us 58 meters 58 58 meters for

59  
00:02:10,309 --> 00:02:08,399  
our european friends mick has been doing

60  
00:02:11,830 --> 00:02:10,319  
our calculations uh to metric all

61  
00:02:13,670 --> 00:02:11,840  
evening and in fact that's actually been

62  
00:02:15,589 --> 00:02:13,680  
an important part of the collaboration

63  
00:02:17,190 --> 00:02:15,599

with international partners absolutely

64

00:02:18,470 --> 00:02:17,200

who use the metric system but when that

65

00:02:20,150 --> 00:02:18,480

rocket went by mick that was an

66

00:02:21,830 --> 00:02:20,160

impressive sight to see it get out to

67

00:02:23,510 --> 00:02:21,840

the pad oh yeah gerald i had a great

68

00:02:25,750 --> 00:02:23,520

time with you on the nasa edge show

69

00:02:28,229 --> 00:02:25,760

rollout show yesterday it was great to

70

00:02:30,390 --> 00:02:28,239

see the atlas 5 head to the pad and get

71

00:02:31,990 --> 00:02:30,400

ready for solar orbiter launch tonight

72

00:02:34,710 --> 00:02:32,000

it was a beautiful day for a rollout

73

00:02:36,949 --> 00:02:34,720

yesterday and exciting to watch that 411

74

00:02:38,869 --> 00:02:36,959

go there so it sure was and uh we'll

75

00:02:40,710 --> 00:02:38,879

find out more about this rocket and its

76

00:02:41,830 --> 00:02:40,720

unique configuration in just a bit but

77

00:02:43,910 --> 00:02:41,840

there you can see it on the pad

78

00:02:46,070 --> 00:02:43,920

everything is looking good we will

79

00:02:47,670 --> 00:02:46,080

continue to monitor the

80

00:02:49,430 --> 00:02:47,680

communication channels between the

81

00:02:51,830 --> 00:02:49,440

launch teams but for now joshua we're

82

00:02:53,110 --> 00:02:51,840

going to send it back to you in the asoc

83

00:02:54,229 --> 00:02:53,120

thanks daryl and i appreciate that we

84

00:02:55,910 --> 00:02:54,239

want to bring you another update

85

00:02:58,149 --> 00:02:55,920

actually that came to us this afternoon

86

00:02:59,670 --> 00:02:58,159

uh for those that are space enthusiasts

87

00:03:01,350 --> 00:02:59,680

you will know that we we plan to launch

88

00:03:03,430 --> 00:03:01,360

uh antares rocket but northrop grumman

89

00:03:04,869 --> 00:03:03,440

scrub tonight and terry's launch after

90

00:03:07,190 --> 00:03:04,879

off nominal readings from a ground

91

00:03:09,350 --> 00:03:07,200

support sensor northrop grumman and nasa

92

00:03:12,470 --> 00:03:09,360

have set the next launch attempt to know

93

00:03:14,790 --> 00:03:12,480

earlier than february 13th at 406 pm

94

00:03:16,949 --> 00:03:14,800

eastern time due to an unfavorable

95

00:03:18,309 --> 00:03:16,959

weather forecast over the next two days

96

00:03:20,390 --> 00:03:18,319

time required to address the ground

97

00:03:22,470 --> 00:03:20,400

support issue and time required to

98

00:03:24,710 --> 00:03:22,480

update the late load science so be sure

99

00:03:26,070 --> 00:03:24,720

to tune in in just a few days we are

100

00:03:28,949 --> 00:03:26,080

actually going to send you over now to

101  
00:03:29,990 --> 00:03:28,959  
understand more about the incredible

102  
00:03:32,070 --> 00:03:30,000  
international collaboration that's

103  
00:03:33,670 --> 00:03:32,080  
happening between esa and nasa nasa's

104  
00:03:35,670 --> 00:03:33,680  
laura aguiar is live with members of

105  
00:03:38,390 --> 00:03:35,680  
both agencies leadership leadership

106  
00:03:40,949 --> 00:03:38,400  
teams to find out more thank you joshua

107  
00:03:43,110 --> 00:03:40,959  
i am joined by dr thomas zurbukin who

108  
00:03:45,350 --> 00:03:43,120  
heads up nasa's science mission

109  
00:03:47,589 --> 00:03:45,360  
directorate and professor gunter

110  
00:03:50,470 --> 00:03:47,599  
hassingier who's with the european space

111  
00:03:52,070 --> 00:03:50,480  
agency his director of science so

112  
00:03:54,149 --> 00:03:52,080  
gentlemen tell us more about the

113  
00:03:55,589 --> 00:03:54,159

collaboration

114

00:03:58,149 --> 00:03:55,599

okay um

115

00:04:00,710 --> 00:03:58,159

both agencies have an impressive

116

00:04:03,190 --> 00:04:00,720

suite of missions out there in the solar

117

00:04:04,869 --> 00:04:03,200

system and for astrophysics but many of

118

00:04:06,550 --> 00:04:04,879

these missions are done in international

119

00:04:09,750 --> 00:04:06,560

collaboration and when we think about

120

00:04:12,070 --> 00:04:09,760

the sun there have been two missions

121

00:04:13,589 --> 00:04:12,080

ulysses soho which we have already done

122

00:04:16,150 --> 00:04:13,599

25 years ago

123

00:04:17,590 --> 00:04:16,160

in strong partnership and solar orbiter

124

00:04:19,509 --> 00:04:17,600

is just a beautiful example of

125

00:04:21,830 --> 00:04:19,519

international collaboration

126

00:04:23,749 --> 00:04:21,840

and nasa two-thirds of our missions are

127

00:04:26,550 --> 00:04:23,759

done in international collaboration so

128

00:04:28,230 --> 00:04:26,560

we're really much used to it and

129

00:04:30,629 --> 00:04:28,240

what happens is the science community

130

00:04:32,870 --> 00:04:30,639

works together as one and so when we

131

00:04:35,749 --> 00:04:32,880

work together it's a very natural

132

00:04:37,510 --> 00:04:35,759

you know locking of arms it's not easy

133

00:04:39,670 --> 00:04:37,520

because we have different cultures we do

134

00:04:41,510 --> 00:04:39,680

things differently and so we learn to

135

00:04:43,270 --> 00:04:41,520

trust each other and go forward so this

136

00:04:45,030 --> 00:04:43,280

one is a really unique collaboration

137

00:04:47,990 --> 00:04:45,040

with this spacecraft and most

138

00:04:50,230 --> 00:04:48,000

instruments are done in europe

139

00:04:52,070 --> 00:04:50,240

you know a couple sensor heads one full

140

00:04:54,550 --> 00:04:52,080

instrument done here in the us and of

141

00:04:57,590 --> 00:04:54,560

course we're so excited to launch it

142

00:04:59,430 --> 00:04:57,600

here in the united states and gunter

143

00:05:00,950 --> 00:04:59,440

solar orbiter is going to study the sun

144

00:05:03,990 --> 00:05:00,960

now why is that important to the

145

00:05:06,230 --> 00:05:04,000

agency's overall space exploration plans

146

00:05:08,469 --> 00:05:06,240

so you know the sun is what gives us

147

00:05:09,670 --> 00:05:08,479

life and supports us but it also poses

148

00:05:12,950 --> 00:05:09,680

dangers

149

00:05:15,590 --> 00:05:12,960

it is governed by a strong

150

00:05:17,029 --> 00:05:15,600

unhidden i mean unknown hidden force the

151  
00:05:21,189 --> 00:05:17,039  
magnetic field

152  
00:05:23,749 --> 00:05:21,199  
explosions that

153  
00:05:24,870 --> 00:05:23,759  
create magnetic storms that can affect

154  
00:05:29,029 --> 00:05:24,880  
the

155  
00:05:31,590 --> 00:05:29,039  
life of astronauts and so to understand

156  
00:05:33,830 --> 00:05:31,600  
the sun is actually of vital importance

157  
00:05:35,749 --> 00:05:33,840  
for all of us and therefore also for the

158  
00:05:37,990 --> 00:05:35,759  
space agencies

159  
00:05:40,310 --> 00:05:38,000  
so we're going to learn a lot now thomas

160  
00:05:41,909 --> 00:05:40,320  
you had an early touch on this project

161  
00:05:44,390 --> 00:05:41,919  
can you tell us a little bit about that

162  
00:05:46,629 --> 00:05:44,400  
yeah it's of all the missions that we're

163  
00:05:48,150 --> 00:05:46,639

working with here over 100 a nasa

164

00:05:51,430 --> 00:05:48,160

science mission directorate this is the

165

00:05:54,469 --> 00:05:51,440

one that i used to work on when i was a

166

00:05:55,990 --> 00:05:54,479

lot younger i was uh you know over a

167

00:05:57,830 --> 00:05:56,000

dozen years ago i was part of the

168

00:05:59,990 --> 00:05:57,840

science and technology definition team

169

00:06:02,390 --> 00:06:00,000

an international team that came up with

170

00:06:04,950 --> 00:06:02,400

the overall design of this and actually

171

00:06:07,189 --> 00:06:04,960

was part of the mission team too because

172

00:06:09,430 --> 00:06:07,199

i together with the team came up with a

173

00:06:11,510 --> 00:06:09,440

sensor that is now sitting on top of

174

00:06:14,629 --> 00:06:11,520

this rocket how exciting is that right

175

00:06:16,629 --> 00:06:14,639

super excited yeah well joshua the

176  
00:06:20,150 --> 00:06:16,639  
collaborators have gotten solar orbiter

177  
00:06:21,430 --> 00:06:20,160  
ready um ready so let's get to launch

178  
00:06:23,189 --> 00:06:21,440  
yeah absolutely we're all excited for

179  
00:06:25,270 --> 00:06:23,199  
that we're now just about 23 minutes

180  
00:06:26,870 --> 00:06:25,280  
away from our plan liftoff at 1103 pm

181  
00:06:28,790 --> 00:06:26,880  
eastern time and we're going to head out

182  
00:06:31,430 --> 00:06:28,800  
now to the kennedy space center press

183  
00:06:33,909 --> 00:06:31,440  
site where nasa edge's blair allen has

184  
00:06:35,189 --> 00:06:33,919  
more on nasa's heliophysics efforts

185  
00:06:37,909 --> 00:06:35,199  
blair

186  
00:06:39,909 --> 00:06:37,919  
thanks so much joshua joining us now is

187  
00:06:42,309 --> 00:06:39,919  
nikki fox and nikki i'm so glad to have

188  
00:06:45,110 --> 00:06:42,319

you on the show this i mean as you know

189

00:06:47,909 --> 00:06:45,120

nasa edge were big fans of heliophysics

190

00:06:49,510 --> 00:06:47,919

and as we just heard it's very important

191

00:06:51,350 --> 00:06:49,520

as we work on these partnerships work

192

00:06:53,430 --> 00:06:51,360

with our international partners to study

193

00:06:56,230 --> 00:06:53,440

the sun i'm wondering from a solar

194

00:06:59,110 --> 00:06:56,240

orbiter standpoint how can both agencies

195

00:07:01,029 --> 00:06:59,120

benefit scientifically with this mission

196

00:07:03,029 --> 00:07:01,039

well it's a wonderful partnership i mean

197

00:07:04,710 --> 00:07:03,039

obviously i'm i come from from from

198

00:07:07,029 --> 00:07:04,720

europe and so i'm particularly happy to

199

00:07:08,710 --> 00:07:07,039

see an eastern nasa partnership um

200

00:07:11,270 --> 00:07:08,720

and uh you know the easter egg mission

201  
00:07:14,070 --> 00:07:11,280  
nasa launching it is just a wonderful

202  
00:07:16,309 --> 00:07:14,080  
time and we cannot wait to welcome solar

203  
00:07:18,629 --> 00:07:16,319  
orbiter up into the fleet um

204  
00:07:20,390 --> 00:07:18,639  
particularly i'm excited of course

205  
00:07:22,710 --> 00:07:20,400  
because of the wonderful partnership

206  
00:07:23,909 --> 00:07:22,720  
between parker solar probe and solar

207  
00:07:26,629 --> 00:07:23,919  
orbiter

208  
00:07:28,309 --> 00:07:26,639  
and just really them

209  
00:07:30,629 --> 00:07:28,319  
so much more science that we can achieve

210  
00:07:32,390 --> 00:07:30,639  
with these two missions parker exploring

211  
00:07:34,629 --> 00:07:32,400  
a region we've never been to before

212  
00:07:37,189 --> 00:07:34,639  
solar orbiter imaging for the very first

213  
00:07:38,950 --> 00:07:37,199

time the poles of a star and that is

214

00:07:40,790 --> 00:07:38,960

incredible that's right and it's

215

00:07:43,430 --> 00:07:40,800

incredible and i was just thinking that

216

00:07:45,270 --> 00:07:43,440

um there's that crossover side where

217

00:07:47,189 --> 00:07:45,280

they're actually we'll look at the same

218

00:07:49,029 --> 00:07:47,199

area at one point talk talk a little bit

219

00:07:50,710 --> 00:07:49,039

about that there are actually many times

220

00:07:53,029 --> 00:07:50,720

that we'll look at the same area and to

221

00:07:54,950 --> 00:07:53,039

be honest they are doing great science

222

00:07:56,629 --> 00:07:54,960

you know sometimes we're not in the same

223

00:07:58,150 --> 00:07:56,639

line but we're in quadrature and so

224

00:08:00,550 --> 00:07:58,160

we're looking at different areas of the

225

00:08:02,710 --> 00:08:00,560

sun and that's just as exciting the

226

00:08:04,469 --> 00:08:02,720

beginning of the solar orbiter mission

227

00:08:06,390 --> 00:08:04,479

she will still be in the ecliptic plains

228

00:08:08,150 --> 00:08:06,400

so she'll be in that sort of around the

229

00:08:10,309 --> 00:08:08,160

sun's equator where all the planets are

230

00:08:12,150 --> 00:08:10,319

orbiting so is parker solar probe and so

231

00:08:15,510 --> 00:08:12,160

we have so many conjunctions that are

232

00:08:17,990 --> 00:08:15,520

interesting magnetically radially it

233

00:08:20,150 --> 00:08:18,000

really it's fabulous and then as she

234

00:08:23,189 --> 00:08:20,160

moves out of the ecliptic the science

235

00:08:25,029 --> 00:08:23,199

changes but yes um solar orbiter giving

236

00:08:26,390 --> 00:08:25,039

wonderful views parker solar probe

237

00:08:28,710 --> 00:08:26,400

flying right through that field of view

238

00:08:30,469 --> 00:08:28,720

it's just fabulous i'll tell you what my

239

00:08:32,550 --> 00:08:30,479

mind is blown i know we're going to get

240

00:08:34,550 --> 00:08:32,560

a lot of science but right now we got to

241

00:08:36,949 --> 00:08:34,560

send it back to our friend joshua who's

242

00:08:38,949 --> 00:08:36,959

at the asoc joshua let us know what's

243

00:08:40,870 --> 00:08:38,959

going on hey thanks blair we'll catch up

244

00:08:42,469 --> 00:08:40,880

with you more after liftoff today the

245

00:08:44,310 --> 00:08:42,479

work of solar orbiter is a pioneering

246

00:08:46,150 --> 00:08:44,320

effort but it's not the first time that

247

00:08:49,030 --> 00:08:46,160

we've sent robotic explorers to take a

248

00:08:50,070 --> 00:08:49,040

closer look at the sun

249

00:08:51,110 --> 00:08:50,080

three

250

00:08:52,070 --> 00:08:51,120

two

251  
00:08:53,430 --> 00:08:52,080  
one

252  
00:08:55,829 --> 00:08:53,440  
zero

253  
00:08:59,750 --> 00:08:55,839  
liftoff of the mighty delta iv heavy

254  
00:09:01,110 --> 00:08:59,760  
rocket with nasa's parker solar probe

255  
00:09:02,470 --> 00:09:01,120  
you may remember that nasa launched

256  
00:09:04,310 --> 00:09:02,480  
parker solar probe on its journey to

257  
00:09:06,150 --> 00:09:04,320  
touch the sun so to speak

258  
00:09:08,710 --> 00:09:06,160  
seen here in the early morning hours

259  
00:09:09,829 --> 00:09:08,720  
august 12 2018 the solar orbiter and

260  
00:09:11,670 --> 00:09:09,839  
parker solar probe missions are

261  
00:09:13,590 --> 00:09:11,680  
complementary focused on studying

262  
00:09:15,430 --> 00:09:13,600  
different elements of the sun they'll be

263  
00:09:20,790 --> 00:09:15,440

sharing data building a larger context

264

00:09:23,670 --> 00:09:22,310

just as with parker the solar orbiter

265

00:09:25,590 --> 00:09:23,680

mission there we see poised to fly

266

00:09:28,150 --> 00:09:25,600

tonight has been managed by nasa's

267

00:09:29,910 --> 00:09:28,160

launch services program or lsp based

268

00:09:32,070 --> 00:09:29,920

here at the kennedy space center

269

00:09:33,509 --> 00:09:32,080

for more than two decades lsp has been

270

00:09:35,190 --> 00:09:33,519

hard at work supporting a global

271

00:09:37,269 --> 00:09:35,200

scientific community by ensuring

272

00:09:38,470 --> 00:09:37,279

missions successfully get off the ground

273

00:09:40,790 --> 00:09:38,480

and on their way to the correct

274

00:09:42,550 --> 00:09:40,800

celestial destination

275

00:09:44,630 --> 00:09:42,560

whether that be close to home for earth

276  
00:09:47,269 --> 00:09:44,640  
ocean observation destined for the sun

277  
00:09:50,310 --> 00:09:47,279  
to capture debut images of its poles or

278  
00:09:52,150 --> 00:09:50,320  
a cutting edge rover and helicopter to

279  
00:09:54,389 --> 00:09:52,160  
further explore mars

280  
00:09:55,910 --> 00:09:54,399  
and that's just the year 2020. let's

281  
00:10:33,150 --> 00:09:55,920  
take a closer look at this year's flight

282  
00:10:33,160 --> 00:10:38,550  
[Music]

283  
00:10:49,190 --> 00:10:40,510  
so

284  
00:10:49,200 --> 00:10:52,949  
[Music]

285  
00:10:56,150 --> 00:10:54,949  
lots of great signs ahead for lsp this

286  
00:10:57,750 --> 00:10:56,160  
year kicking off tonight with this

287  
00:10:59,509 --> 00:10:57,760  
launch darling make over to you for a

288  
00:11:01,509 --> 00:10:59,519

launch countdown update yeah that's

289

00:11:04,069 --> 00:11:01,519

right josh well we just entered a few

290

00:11:06,710 --> 00:11:04,079

moments ago the planned

291

00:11:07,990 --> 00:11:06,720

four-minute hold this is a 15-minute

292

00:11:08,790 --> 00:11:08,000

period of time

293

00:11:10,790 --> 00:11:08,800

where

294

00:11:12,949 --> 00:11:10,800

they hold up everything and and make

295

00:11:14,710 --> 00:11:12,959

some evaluations at this point in time

296

00:11:15,910 --> 00:11:14,720

that's correct the team will use this 15

297

00:11:17,910 --> 00:11:15,920

minutes to

298

00:11:19,350 --> 00:11:17,920

take a last look at all their systems

299

00:11:21,430 --> 00:11:19,360

make sure everything's good make sure

300

00:11:22,790 --> 00:11:21,440

everything's ready to go verify they've

301

00:11:24,230 --> 00:11:22,800

all their red line limits and

302

00:11:26,150 --> 00:11:24,240

operational limits and that they're

303

00:11:27,670 --> 00:11:26,160

ready to proceed with the count so this

304

00:11:29,829 --> 00:11:27,680

is their last time to do that while

305

00:11:31,590 --> 00:11:29,839

we're in this hold and so far we're not

306

00:11:33,990 --> 00:11:31,600

working any issues and and things are

307

00:11:35,590 --> 00:11:34,000

going well and uh chief engineer for

308

00:11:37,350 --> 00:11:35,600

nasa's launch services program dave

309

00:11:39,430 --> 00:11:37,360

sober pulled his team and they're ready

310

00:11:41,030 --> 00:11:39,440

to enter the terminal count after

311

00:11:42,870 --> 00:11:41,040

getting out of this hold so things are

312

00:11:44,710 --> 00:11:42,880

looking good a very smooth count up

313

00:11:46,150 --> 00:11:44,720

until this point and as you look at the

314

00:11:49,110 --> 00:11:46,160

camera views that we're showing you you

315

00:11:51,190 --> 00:11:49,120

can see that condensation coming off the

316

00:11:53,430 --> 00:11:51,200

rocket as the wind blows by in fact the

317

00:11:55,990 --> 00:11:53,440

middle portion of the rocket is white it

318

00:11:58,710 --> 00:11:56,000

was tan before just where it lines up

319

00:12:00,310 --> 00:11:58,720

with the ul and a that is all ice

320

00:12:03,110 --> 00:12:00,320

covering that portion of the rocket

321

00:12:06,629 --> 00:12:03,120

which has been chilled down to minus 300

322

00:12:09,269 --> 00:12:06,639

degrees fahrenheit minus 184 degrees

323

00:12:11,190 --> 00:12:09,279

celsius roughly that's right mick's got

324

00:12:12,470 --> 00:12:11,200

his little professor calculator here and

325

00:12:14,949 --> 00:12:12,480

he's doing on-the-fly metric

326

00:12:16,470 --> 00:12:14,959

calculations appreciate that hey you

327

00:12:18,389 --> 00:12:16,480

know this uh this is an interesting

328

00:12:19,750 --> 00:12:18,399

rocket because it is configured in a

329

00:12:21,990 --> 00:12:19,760

very unique way tell us a little bit

330

00:12:23,590 --> 00:12:22,000

more about that yeah the atlas 5 411

331

00:12:24,949 --> 00:12:23,600

vehicle we're flying this evening is a

332

00:12:26,230 --> 00:12:24,959

unique configuration and the fact that

333

00:12:28,949 --> 00:12:26,240

it has one

334

00:12:31,190 --> 00:12:28,959

solid rocket booster on the vehicle

335

00:12:34,550 --> 00:12:31,200

that's a unique configuration for ula

336

00:12:37,670 --> 00:12:34,560

and this vehicle this configuration has

337

00:12:39,670 --> 00:12:37,680

flown uh five times including nasa's

338

00:12:40,389 --> 00:12:39,680

osiris-rex mission so tonight will be

339

00:12:41,829 --> 00:12:40,399

the

340

00:12:44,470 --> 00:12:41,839

sixth mission

341

00:12:45,990 --> 00:12:44,480

our first stage or our booster

342

00:12:47,990 --> 00:12:46,000

is powered by

343

00:12:51,590 --> 00:12:48,000

rd-180 engine

344

00:12:54,069 --> 00:12:51,600

this engine burns rp1 and liquid oxygen

345

00:12:55,430 --> 00:12:54,079

as it's fueled or rp1 is a highly

346

00:12:57,190 --> 00:12:55,440

purified

347

00:12:59,030 --> 00:12:57,200

kerosene so that

348

00:13:00,629 --> 00:12:59,040

helps deliver the thrust we need and

349

00:13:03,990 --> 00:13:00,639

delivering that thrust tonight above

350

00:13:06,710 --> 00:13:04,000

about 860 000 pounds or

351  
00:13:09,990 --> 00:13:06,720  
1.2 million pounds with the solid rocket

352  
00:13:11,910 --> 00:13:10,000  
booster that's 5.2 million newtons just

353  
00:13:13,829 --> 00:13:11,920  
in case you're wondering okay

354  
00:13:15,829 --> 00:13:13,839  
but we would do move on up the stage to

355  
00:13:19,190 --> 00:13:15,839  
the second stage which is centaur using

356  
00:13:21,990 --> 00:13:19,200  
an rl10a engine this will be the last

357  
00:13:24,870 --> 00:13:22,000  
single rl10a flown on this configuration

358  
00:13:26,629 --> 00:13:24,880  
from here on out they'll use two engines

359  
00:13:28,710 --> 00:13:26,639  
to fly on an atlas vehicle so we're very

360  
00:13:31,509 --> 00:13:28,720  
proud of that this evening the rl10

361  
00:13:34,069 --> 00:13:31,519  
engine is a cryogenic engine so it uses

362  
00:13:37,269 --> 00:13:34,079  
liquid oxygen and liquid hydrogen as its

363  
00:13:41,590 --> 00:13:37,279

fuel in the upper stage producing about

364

00:13:43,750 --> 00:13:41,600

22 000 pounds of thrust or 99.2

365

00:13:46,230 --> 00:13:43,760

kilonewtons i was hoping you had that

366

00:13:47,829 --> 00:13:46,240

electric conversion well unique unique

367

00:13:49,910 --> 00:13:47,839

configuration that we're happy to fly

368

00:13:52,230 --> 00:13:49,920

tonight all right very good thank you

369

00:13:54,310 --> 00:13:52,240

mick and you know to this point the

370

00:13:56,470 --> 00:13:54,320

count has gone very smooth we've heard

371

00:13:58,230 --> 00:13:56,480

nothing but good reports so we'll turn

372

00:14:00,629 --> 00:13:58,240

it back over to joshua in the studio and

373

00:14:02,470 --> 00:14:00,639

we'll continue the monitor account here

374

00:14:03,590 --> 00:14:02,480

joshua thank you gentlemen appreciate

375

00:14:05,189 --> 00:14:03,600

that look forward to hearing more from

376

00:14:07,030 --> 00:14:05,199

you soon hopefully still lots of good

377

00:14:08,470 --> 00:14:07,040

news ahead let's take a look at what to

378

00:14:10,389 --> 00:14:08,480

expect going forward obviously that

379

00:14:11,670 --> 00:14:10,399

rocket is poised on the pad uh but

380

00:14:16,069 --> 00:14:11,680

here's what's going to happen after

381

00:14:20,069 --> 00:14:17,750

and

382

00:14:22,230 --> 00:14:20,079

liftoff of the united launch alliance

383

00:14:25,110 --> 00:14:22,240

atlas v rocket

384

00:14:27,189 --> 00:14:25,120

the atlas v rd 180 main engine and one

385

00:14:29,910 --> 00:14:27,199

solid rocket booster ignite to generate

386

00:14:31,670 --> 00:14:29,920

more than 5.3 million newtons of thrust

387

00:14:34,389 --> 00:14:31,680

to lift the rocket on its way towards a

388

00:14:36,550 --> 00:14:34,399

hyperbolic escape trajectory

389

00:14:38,470 --> 00:14:36,560

shortly after liftoff atlas begins a

390

00:14:40,389 --> 00:14:38,480

pitchover to attain the proper flight

391

00:14:42,150 --> 00:14:40,399

path while minimizing the dynamic

392

00:14:44,389 --> 00:14:42,160

pressure the vehicle experiences during

393

00:14:47,030 --> 00:14:44,399

flight

394

00:14:50,389 --> 00:14:47,040

the atlas v reaches mach 1 the speed of

395

00:14:52,790 --> 00:14:50,399

sound at 58 seconds

396

00:14:54,470 --> 00:14:52,800

the single srb is jettisoned at 2

397

00:14:56,790 --> 00:14:54,480

minutes 20 seconds

398

00:14:58,710 --> 00:14:56,800

at 4 minutes 3 seconds the propellant

399

00:15:00,629 --> 00:14:58,720

levels deplete and the booster engine

400

00:15:02,710 --> 00:15:00,639

shuts down

401  
00:15:04,949 --> 00:15:02,720  
six seconds later the atlas centaur

402  
00:15:07,350 --> 00:15:04,959  
separation system activates to release

403  
00:15:09,590 --> 00:15:07,360  
the booster stage the vehicle now weighs

404  
00:15:11,350 --> 00:15:09,600  
less than 14 percent of what it did at

405  
00:15:13,350 --> 00:15:11,360  
liftoff

406  
00:15:15,910 --> 00:15:13,360  
ten seconds later the first burn of the

407  
00:15:18,230 --> 00:15:15,920  
centaur main engine begins this burn

408  
00:15:19,590 --> 00:15:18,240  
guides the centaur into a near circular

409  
00:15:21,509 --> 00:15:19,600  
parking orbit

410  
00:15:23,189 --> 00:15:21,519  
approaching payload fairing jettison the

411  
00:15:25,670 --> 00:15:23,199  
centaur is burning propellant at a rate

412  
00:15:27,430 --> 00:15:25,680  
of 23 kilograms per second traveling at

413  
00:15:29,509 --> 00:15:27,440

more than seventeen thousand seven

414

00:15:32,230 --> 00:15:29,519

hundred kilometers per hour and located

415

00:15:34,870 --> 00:15:32,240

nearly 134 kilometers in altitude and

416

00:15:37,590 --> 00:15:34,880

470 kilometers downrange

417

00:15:39,590 --> 00:15:37,600

at four minutes 27 seconds the payload

418

00:15:41,670 --> 00:15:39,600

fairing is jettisoned the vehicle now

419

00:15:43,509 --> 00:15:41,680

weighs less than seven percent of what

420

00:15:44,949 --> 00:15:43,519

it did at liftoff four and a half

421

00:15:46,790 --> 00:15:44,959

minutes earlier

422

00:15:49,189 --> 00:15:46,800

twelve minutes fourteen seconds into

423

00:15:51,829 --> 00:15:49,199

flight cutoff of the centaur main engine

424

00:15:53,990 --> 00:15:51,839

or miko one occurs the mission now

425

00:15:55,350 --> 00:15:54,000

enters a coast phase in preparation for

426  
00:15:57,189 --> 00:15:55,360  
the second burn

427  
00:15:59,430 --> 00:15:57,199  
because this targeted earth escape

428  
00:16:01,590 --> 00:15:59,440  
trajectory varies from day to day the

429  
00:16:03,030 --> 00:16:01,600  
coast and the second burn will vary to

430  
00:16:05,269 --> 00:16:03,040  
accommodate this

431  
00:16:08,230 --> 00:16:05,279  
the centaur main engine is restarted at

432  
00:16:11,110 --> 00:16:08,240  
42 minutes 58 seconds for the second and

433  
00:16:13,590 --> 00:16:11,120  
final engine burn

434  
00:16:17,189 --> 00:16:13,600  
nearly seven minutes later final cut off

435  
00:16:19,829 --> 00:16:17,199  
of the centaur main engine occurs

436  
00:16:21,990 --> 00:16:19,839  
at 52 minutes 40 seconds centaur

437  
00:16:24,150 --> 00:16:22,000  
releases solar orbiter for the european

438  
00:16:26,550 --> 00:16:24,160

space agency and nasa to begin its

439

00:16:28,629 --> 00:16:26,560

nearly two year journey to the sun

440

00:16:30,870 --> 00:16:28,639

after using gravity assist maneuvers at

441

00:16:33,189 --> 00:16:30,880

earth and venus solar orbiter will help

442

00:16:35,910 --> 00:16:33,199

us understand how our star creates and

443

00:16:38,150 --> 00:16:35,920

controls the heliosphere a giant bubble

444

00:16:40,069 --> 00:16:38,160

of charged particles blown by the solar

445

00:16:42,389 --> 00:16:40,079

wind that permeates the whole solar

446

00:16:48,150 --> 00:16:42,399

system and influences the planets within

447

00:16:51,350 --> 00:16:49,590

for those of you just joining us welcome

448

00:16:53,350 --> 00:16:51,360

to team coverage of the launch of the

449

00:16:55,509 --> 00:16:53,360

solar orbiter mission destined for

450

00:16:57,189 --> 00:16:55,519

unprecedented views of the poles of our

451  
00:16:58,790 --> 00:16:57,199  
star the sun

452  
00:17:00,710 --> 00:16:58,800  
we're now just about 12 and a half

453  
00:17:01,910 --> 00:17:00,720  
minutes away from launch here are a few

454  
00:17:03,750 --> 00:17:01,920  
things that you need to know about this

455  
00:17:05,669 --> 00:17:03,760  
groundbreaking mission

456  
00:17:07,669 --> 00:17:05,679  
[Music]

457  
00:17:10,069 --> 00:17:07,679  
the atlas v rocket for this mission is

458  
00:17:12,549 --> 00:17:10,079  
in a 4-1-1 configuration

459  
00:17:13,429 --> 00:17:12,559  
sending solar orbiter to a high latitude

460  
00:17:15,429 --> 00:17:13,439  
orbit

461  
00:17:17,669 --> 00:17:15,439  
enabling the first ever images of the

462  
00:17:19,510 --> 00:17:17,679  
sun's poles

463  
00:17:21,189 --> 00:17:19,520

this single launch will deliver 10

464

00:17:24,150 --> 00:17:21,199

state-of-the-art instruments to study

465

00:17:26,230 --> 00:17:24,160

our star gravity assist flybys of both

466

00:17:27,669 --> 00:17:26,240

venus and earth will enable the highly

467

00:17:29,669 --> 00:17:27,679

elliptical orbit

468

00:17:31,830 --> 00:17:29,679

after liftoff it will take just under 2

469

00:17:35,750 --> 00:17:31,840

years to reach its operational orbit for

470

00:17:38,950 --> 00:17:37,190

we do have a two-hour launch window

471

00:17:41,510 --> 00:17:38,960

tonight but launch is still on track for

472

00:17:43,190 --> 00:17:41,520

liftoff at 1103 pm eastern time from

473

00:17:44,870 --> 00:17:43,200

space launch complex 41 at the cape

474

00:17:47,270 --> 00:17:44,880

canaveral air force station there you

475

00:17:49,110 --> 00:17:47,280

see on screen solar orbiter will take

476

00:17:51,110 --> 00:17:49,120

off on a united launch alliance atlas v

477

00:17:53,350 --> 00:17:51,120

rocket again they're poised and nearly

478

00:17:55,110 --> 00:17:53,360

fueled ready for flight

479

00:17:56,630 --> 00:17:55,120

this is an international collaborative

480

00:17:59,029 --> 00:17:56,640

mission between the european space

481

00:18:01,990 --> 00:17:59,039

agency and nasa the spacecraft has been

482

00:18:03,430 --> 00:18:02,000

developed by airbus defense and space

483

00:18:05,350 --> 00:18:03,440

is engineering and test center in the

484

00:18:08,070 --> 00:18:05,360

netherlands is managing the development

485

00:18:11,669 --> 00:18:09,830

and the european space operation center

486

00:18:13,350 --> 00:18:11,679

in germany will operate solar orbiter

487

00:18:14,950 --> 00:18:13,360

after launch

488

00:18:17,590 --> 00:18:14,960

solar orbiter's flight will take it to

489

00:18:20,150 --> 00:18:17,600

roughly 26 million miles from the sun or

490

00:18:21,830 --> 00:18:20,160

about 42 million kilometers that's just

491

00:18:23,590 --> 00:18:21,840

over one quarter of the distance from

492

00:18:25,669 --> 00:18:23,600

the sun to the earth

493

00:18:27,669 --> 00:18:25,679

and we'll experience sunlight 13 times

494

00:18:29,909 --> 00:18:27,679

more intense than we feel here on earth

495

00:18:31,669 --> 00:18:29,919

and to survive it is equipped with a

496

00:18:34,549 --> 00:18:31,679

heat shield capable of withstanding

497

00:18:37,510 --> 00:18:34,559

temperatures over 900 degrees fahrenheit

498

00:18:38,870 --> 00:18:37,520

or about 500 degrees celsius

499

00:18:40,549 --> 00:18:38,880

the signs to be conducted will range

500

00:18:42,630 --> 00:18:40,559

from analyzing solar winds and solar

501  
00:18:44,150 --> 00:18:42,640  
magnetic fields to remote sensing and

502  
00:18:46,390 --> 00:18:44,160  
high resolution imaging of the sun's

503  
00:18:48,789 --> 00:18:46,400  
atmosphere the corona and even solar

504  
00:18:52,390 --> 00:18:50,310  
one phenomenon to be explored is that

505  
00:18:54,470 --> 00:18:52,400  
the sun goes through an 11-year cycle

506  
00:18:56,710 --> 00:18:54,480  
that evolve involves emerging and

507  
00:18:58,789 --> 00:18:56,720  
vanishing sunspots as well as a flipping

508  
00:19:00,789 --> 00:18:58,799  
of its entire magnetic field

509  
00:19:02,390 --> 00:19:00,799  
why does all of this happen well we're

510  
00:19:03,510 --> 00:19:02,400  
hoping solar orbiter will shed some

511  
00:19:04,870 --> 00:19:03,520  
light on that

512  
00:19:06,390 --> 00:19:04,880  
the mission intends to answer some

513  
00:19:08,710 --> 00:19:06,400

fundamental cause and effect questions

514

00:19:11,029 --> 00:19:08,720

like how do how do flares and coronal

515

00:19:12,710 --> 00:19:11,039

mass ejections impact our solar system

516

00:19:14,470 --> 00:19:12,720

and how do the energetic particles

517

00:19:15,990 --> 00:19:14,480

originate that lead to extreme space

518

00:19:18,070 --> 00:19:16,000

weather

519

00:19:19,990 --> 00:19:18,080

the answers to these questions can not

520

00:19:22,150 --> 00:19:20,000

only have a direct impact on our daily

521

00:19:24,310 --> 00:19:22,160

life and electronics you rely on but

522

00:19:28,789 --> 00:19:24,320

also impact future exploration as we

523

00:19:30,470 --> 00:19:28,799

pioneer to the moon mars and beyond

524

00:19:31,669 --> 00:19:30,480

let's head back now over to daryl and

525

00:19:34,630 --> 00:19:31,679

mick to take us through the rest of the

526

00:19:36,870 --> 00:19:34,640

count gentlemen count us down thank you

527

00:19:38,710 --> 00:19:36,880

very much joshua we look forward to

528

00:19:40,549 --> 00:19:38,720

getting on with the count in just a few

529

00:19:42,950 --> 00:19:40,559

minutes we are of course in a hold at

530

00:19:44,870 --> 00:19:42,960

this very moment t minus four minutes

531

00:19:46,950 --> 00:19:44,880

and holding but we've got a little bit

532

00:19:49,669 --> 00:19:46,960

of business to do as we go through here

533

00:19:51,510 --> 00:19:49,679

so far nothing to report in terms of the

534

00:19:53,830 --> 00:19:51,520

count itself and the teams everything

535

00:19:56,070 --> 00:19:53,840

working pretty smooth to this point mick

536

00:19:59,029 --> 00:19:56,080

yeah everything is good uh ula launch

537

00:20:00,630 --> 00:19:59,039

conductor scott barney is uh giving his

538

00:20:01,909 --> 00:20:00,640

briefing right now to his team of what's

539

00:20:03,669 --> 00:20:01,919

going to happen as they get ready to

540

00:20:05,909 --> 00:20:03,679

pick up the uh

541

00:20:08,630 --> 00:20:05,919

poll at t minus four and counting but uh

542

00:20:10,310 --> 00:20:08,640

while we see the teams here in all

543

00:20:12,230 --> 00:20:10,320

different places daryl we have them all

544

00:20:13,830 --> 00:20:12,240

over the world what we see on the screen

545

00:20:15,430 --> 00:20:13,840

here is the team in the mission director

546

00:20:18,230 --> 00:20:15,440

center here at ae

547

00:20:19,990 --> 00:20:18,240

which has our esa folks up front

548

00:20:22,070 --> 00:20:20,000

and then just across the way just a few

549

00:20:25,110 --> 00:20:22,080

miles away is the atlas space flight

550

00:20:27,430 --> 00:20:25,120

operation center that is where the ula

551

00:20:30,870 --> 00:20:27,440

launch team is uh going through their

552

00:20:33,110 --> 00:20:30,880

count and then of course uh in denver uh

553

00:20:35,110 --> 00:20:33,120

we have a team out there as well

554

00:20:38,950 --> 00:20:35,120

the denver operations support center in

555

00:20:40,870 --> 00:20:38,960

denver colorado where ula is based in

556

00:20:42,549 --> 00:20:40,880

addition to that we have a european

557

00:20:44,950 --> 00:20:42,559

space operation

558

00:20:47,510 --> 00:20:44,960

germany absolutely we have issa teams

559

00:20:48,390 --> 00:20:47,520

supporting as you heard earlier from

560

00:20:49,990 --> 00:20:48,400

germany

561

00:20:51,830 --> 00:20:50,000

where they will operate and control the

562

00:20:52,950 --> 00:20:51,840

spacecraft after it separates this

563

00:20:55,029 --> 00:20:52,960

evening so

564

00:20:56,630 --> 00:20:55,039

big collaboration of teams that have put

565

00:20:58,310 --> 00:20:56,640

this mission together and get ready for

566

00:20:59,990 --> 00:20:58,320

launch this evening and we've had some

567

00:21:02,230 --> 00:21:00,000

fun talking about the conversions

568

00:21:04,710 --> 00:21:02,240

between standard and metric but we were

569

00:21:07,350 --> 00:21:04,720

talking earlier mick um there's actually

570

00:21:10,070 --> 00:21:07,360

that played a role in working with this

571

00:21:12,070 --> 00:21:10,080

uh international collaboration because

572

00:21:14,630 --> 00:21:12,080

much of what our teams here in america

573

00:21:17,190 --> 00:21:14,640

do is on standard and overseas they're

574

00:21:19,029 --> 00:21:17,200

on metrics so there was a bit of a you

575

00:21:20,630 --> 00:21:19,039

know conversion that had to go between

576

00:21:22,230 --> 00:21:20,640

yeah absolutely it's been really fun

577

00:21:24,149 --> 00:21:22,240

working with our international partners

578

00:21:26,549 --> 00:21:24,159

on this mission and there have been some

579

00:21:29,190 --> 00:21:26,559

challenges uh with the with the unit

580

00:21:31,270 --> 00:21:29,200

conversions and some communications but

581

00:21:33,590 --> 00:21:31,280

that has been key is communication

582

00:21:35,750 --> 00:21:33,600

between the teams all of us

583

00:21:37,830 --> 00:21:35,760

has been done very well and

584

00:21:40,149 --> 00:21:37,840

as tim dunn put it our launch manager

585

00:21:42,070 --> 00:21:40,159

from nasa at our readiness review last

586

00:21:43,430 --> 00:21:42,080

week we all speak the universal language

587

00:21:45,430 --> 00:21:43,440

of mission success and that's what's

588

00:21:46,870 --> 00:21:45,440

gotten us here uh this evening so

589

00:21:49,350 --> 00:21:46,880

working with our industrial partners has

590

00:21:50,310 --> 00:21:49,360

been fun we're very excited to see seoul

591

00:21:52,310 --> 00:21:50,320

orbiter

592

00:21:53,270 --> 00:21:52,320

get off the earth tonight and head on

593

00:21:55,430 --> 00:21:53,280

its way

594

00:21:57,669 --> 00:21:55,440

to the sun to start its science and it's

595

00:21:59,590 --> 00:21:57,679

going to do some big science once once

596

00:22:01,669 --> 00:21:59,600

it's there and in orbit for now we are

597

00:22:02,870 --> 00:22:01,679

looking at a shot of the rocket on the

598

00:22:05,029 --> 00:22:02,880

ground as

599

00:22:08,710 --> 00:22:05,039

the water vapor condenses around the

600

00:22:10,950 --> 00:22:08,720

super cooled liquid oxygen in just a few

601  
00:22:14,230 --> 00:22:10,960  
seconds we are going to get

602  
00:22:17,029 --> 00:22:14,240  
a status poll from launch director scott

603  
00:22:20,549 --> 00:22:17,039  
barney of ula and he's going to give

604  
00:22:23,190 --> 00:22:20,559  
that and a final check before we begin

605  
00:22:26,549 --> 00:22:23,200  
to resume the count let's listen in now

606  
00:22:28,789 --> 00:22:26,559  
as scott conducts that poll over at

607  
00:22:30,549 --> 00:22:28,799  
united launch alliance

608  
00:22:33,270 --> 00:22:30,559  
status check to proceed with terminal

609  
00:22:37,430 --> 00:22:33,280  
count atlas systems propulsion go

610  
00:22:39,029 --> 00:22:37,440  
hydraulic go pneumatics go lo2

611  
00:22:41,990 --> 00:22:39,039  
go water

612  
00:22:43,669 --> 00:22:42,000  
go centaur systems propulsion

613  
00:22:48,630 --> 00:22:43,679

pneumatic

614

00:22:52,789 --> 00:22:48,640

lo2 go lh2 go has gas go electrical

615

00:22:54,789 --> 00:22:52,799

systems airborne go ground go facility

616

00:22:56,870 --> 00:22:54,799

go rffts

617

00:22:58,149 --> 00:22:56,880

go flight control

618

00:22:58,870 --> 00:22:58,159

gcq

619

00:23:17,750 --> 00:22:58,880

go

620

00:23:20,630 --> 00:23:17,760

anomaly

621

00:23:21,909 --> 00:23:20,640

go range coordinator clear to proceed

622

00:23:24,070 --> 00:23:21,919

launch direct

623

00:23:25,830 --> 00:23:24,080

you have permission to launch

624

00:23:30,230 --> 00:23:25,840

proceeding with account

625

00:23:33,830 --> 00:23:32,310

verified

626

00:23:34,950 --> 00:23:33,840

and so we are

627

00:23:41,350 --> 00:23:34,960

on

628

00:23:43,750 --> 00:23:41,360

1103 eastern time there you just got the

629

00:23:45,590 --> 00:23:43,760

confirmed account from scott barney

630

00:23:48,070 --> 00:23:45,600

that's good news oh absolutely i tell

631

00:23:50,470 --> 00:23:48,080

you my heart's beating really good

632

00:23:52,070 --> 00:23:50,480

it's awesome to hear the team give a go

633

00:23:53,590 --> 00:23:52,080

and everything's clear that means

634

00:23:55,669 --> 00:23:53,600

they've been working all their stuff and

635

00:23:59,110 --> 00:23:55,679

everything looks good on the vehicle

636

00:24:01,590 --> 00:23:59,120

targeting an 1103 pm eastern time

637

00:24:04,070 --> 00:24:01,600

liftoff um i can't tell you how excited

638

00:24:05,990 --> 00:24:04,080

i am to hear that poll that's right and

639

00:24:08,789 --> 00:24:06,000

now they're configuring the spacecraft

640

00:24:10,950 --> 00:24:08,799

to go on to internal power off of its

641

00:24:12,390 --> 00:24:10,960

shore power it's land power talk about

642

00:24:13,510 --> 00:24:12,400

that yeah in parallel with the launch

643

00:24:15,269 --> 00:24:13,520

team getting the launch vehicle right

644

00:24:17,909 --> 00:24:15,279

the spacecraft team is preparing the

645

00:24:20,230 --> 00:24:17,919

solar orbiter satellite to get ready and

646

00:24:21,830 --> 00:24:20,240

we just heard over our nets that the

647

00:24:23,590 --> 00:24:21,840

spacecraft is on internal power

648

00:24:25,029 --> 00:24:23,600

configured for launch everything looks

649

00:24:26,950 --> 00:24:25,039

green and go

650

00:24:28,630 --> 00:24:26,960

so we've heard from the spacecraft and

651  
00:24:30,149 --> 00:24:28,640  
from the launch vehicle that things look

652  
00:24:32,149 --> 00:24:30,159  
really good tonight

653  
00:24:33,990 --> 00:24:32,159  
to get solar orbiter off the ground

654  
00:24:35,590 --> 00:24:34,000  
that's a that's a beautiful thing to

655  
00:24:37,830 --> 00:24:35,600  
hear on the net that we're moving

656  
00:24:40,710 --> 00:24:37,840  
forward and working no issues and now

657  
00:24:43,990 --> 00:24:40,720  
tim duns nasa's launch director

658  
00:24:46,630 --> 00:24:44,000  
will begin to to look at his team and uh

659  
00:24:48,549 --> 00:24:46,640  
conduct uh his portion of the business

660  
00:24:50,710 --> 00:24:48,559  
yes he'll he'll check in with his nasa

661  
00:24:53,590 --> 00:24:50,720  
chief engineer dave solberger and

662  
00:24:56,310 --> 00:24:53,600  
lsp chuck duvall and make sure the nasa

663  
00:24:58,230 --> 00:24:56,320

team is ready to support and

664

00:24:58,950 --> 00:24:58,240

proceed forward so we'll hear how things

665

00:25:01,350 --> 00:24:58,960

go

666

00:25:03,110 --> 00:25:01,360

it's a beautiful evening outside if you

667

00:25:04,870 --> 00:25:03,120

are in the area and

668

00:25:06,470 --> 00:25:04,880

ready to watch this rocket launch it's

669

00:25:08,789 --> 00:25:06,480

going to be a beauty we've got a full

670

00:25:10,950 --> 00:25:08,799

moon tonight here in florida and

671

00:25:12,149 --> 00:25:10,960

across the area and as well we're going

672

00:25:15,269 --> 00:25:12,159

to see this

673

00:25:17,510 --> 00:25:15,279

beautiful launch um this spot right here

674

00:25:20,710 --> 00:25:17,520

is our banana creek viewing area we can

675

00:25:23,510 --> 00:25:20,720

see um we've got several hundred people

676  
00:25:25,430 --> 00:25:23,520  
out there in total probably about a

677  
00:25:27,190 --> 00:25:25,440  
thousand four thousand

678  
00:25:29,590 --> 00:25:27,200  
across the entirety area let's count it

679  
00:25:30,470 --> 00:25:29,600  
in to the terminal count three two and

680  
00:25:32,470 --> 00:25:30,480  
one

681  
00:25:34,390 --> 00:25:32,480  
and we have begun

682  
00:25:37,269 --> 00:25:34,400  
our account and resumed it

683  
00:25:39,190 --> 00:25:37,279  
we are now three minutes and 53 seconds

684  
00:25:41,750 --> 00:25:39,200  
away from liftoff that's correct and we

685  
00:25:43,830 --> 00:25:41,760  
did hear uh our nasa launch manager tim

686  
00:25:45,430 --> 00:25:43,840  
dunn say that the nasa team is go he

687  
00:25:46,470 --> 00:25:45,440  
reported that out to ula's launch

688  
00:25:49,269 --> 00:25:46,480

director

689

00:25:51,110 --> 00:25:49,279

lou mangeri and so that's a good good

690

00:25:52,870 --> 00:25:51,120

call out for us too to hear that the

691

00:25:54,470 --> 00:25:52,880

vehicle is ready to proceed tonight and

692

00:25:56,950 --> 00:25:54,480

as you said it was a beautiful sight of

693

00:25:59,029 --> 00:25:56,960

the atlas out there on the pad and

694

00:26:00,630 --> 00:25:59,039

things are looking really well for 1103

695

00:26:01,990 --> 00:26:00,640

lift off this evening

696

00:26:04,070 --> 00:26:02,000

and this is you mentioned this earlier

697

00:26:05,669 --> 00:26:04,080

about the configuration with that one

698

00:26:07,750 --> 00:26:05,679

solid rocket booster on this side

699

00:26:09,669 --> 00:26:07,760

sometimes people have asked you know how

700

00:26:11,669 --> 00:26:09,679

does that work with having one booster

701  
00:26:13,350 --> 00:26:11,679  
on the side of the rocket doesn't it

702  
00:26:15,430 --> 00:26:13,360  
kind of push the rocket over yeah it

703  
00:26:17,190 --> 00:26:15,440  
does actually uh but i will say we

704  
00:26:21,190 --> 00:26:17,200  
talked about the first stage booster

705  
00:26:23,350 --> 00:26:21,200  
engine the rd180 the rd180 has a lot of

706  
00:26:26,310 --> 00:26:23,360  
control margin left that it can offset

707  
00:26:29,590 --> 00:26:26,320  
that asymmetrical setup of the one solid

708  
00:26:31,909 --> 00:26:29,600  
on the 411 vehicle the 411 vehicle is a

709  
00:26:33,669 --> 00:26:31,919  
unique configuration that will provide a

710  
00:26:36,149 --> 00:26:33,679  
great ride for solar orbit this evening

711  
00:26:38,789 --> 00:26:36,159  
as it has done for five other missions

712  
00:26:40,789 --> 00:26:38,799  
in this configuration so yeah rd180

713  
00:26:42,789 --> 00:26:40,799

takes over and works really well to make

714

00:26:45,110 --> 00:26:42,799

sure the vehicle gets off the pad and

715

00:26:47,669 --> 00:26:45,120

heads the space we're supposed to two

716

00:26:49,750 --> 00:26:47,679

minutes and 45 seconds until liftoff

717

00:26:51,750 --> 00:26:49,760

here as we get down to the final minutes

718

00:26:54,549 --> 00:26:51,760

of the count the launch teams and a

719

00:26:56,630 --> 00:26:54,559

flurry of activity right now as they are

720

00:26:58,630 --> 00:26:56,640

listening in and talking to their

721

00:26:59,669 --> 00:26:58,640

various team members before this launch

722

00:27:01,990 --> 00:26:59,679

takes off

723

00:27:04,710 --> 00:27:02,000

it's an exciting moment as we get down

724

00:27:06,870 --> 00:27:04,720

now here to the final few minutes talk

725

00:27:08,710 --> 00:27:06,880

about the teams and the activity that's

726

00:27:10,310 --> 00:27:08,720

going on right now yeah it takes a lot

727

00:27:11,990 --> 00:27:10,320

of uh con

728

00:27:13,750 --> 00:27:12,000

control between the teams make sure

729

00:27:15,350 --> 00:27:13,760

they're all talking together they're

730

00:27:17,110 --> 00:27:15,360

actually preparing their final preps of

731

00:27:18,950 --> 00:27:17,120

getting the tanks to fly pressures

732

00:27:20,789 --> 00:27:18,960

getting all the valves in the right

733

00:27:23,750 --> 00:27:20,799

position making sure avionics is ready

734

00:27:25,350 --> 00:27:23,760

to go and the vehicle is is all green as

735

00:27:27,269 --> 00:27:25,360

it continues to

736

00:27:29,909 --> 00:27:27,279

be topped off and basically putting that

737

00:27:33,190 --> 00:27:29,919

last little bit of fuel into the tanks

738

00:27:35,750 --> 00:27:33,200

for a centaur and booster and uh things

739

00:27:38,630 --> 00:27:35,760

are going well vehicle has to go on

740

00:27:40,789 --> 00:27:38,640

internal power just prior to liftoff and

741

00:27:43,430 --> 00:27:40,799

so the team is continuing to work all of

742

00:27:45,350 --> 00:27:43,440

that uh as they get ready for liftoff at

743

00:27:47,990 --> 00:27:45,360

1103.

744

00:27:51,029 --> 00:27:48,000

very good and the count now going uh

745

00:27:53,909 --> 00:27:51,039

under one minute and 40 seconds

746

00:28:02,389 --> 00:27:53,919

let's listen in as the activity uh

747

00:28:06,630 --> 00:28:04,389

we just heard that fts was armed flight

748

00:28:09,269 --> 00:28:06,640

termination system which uh our friends

749

00:28:11,590 --> 00:28:09,279

at the united states force uh will

750

00:28:13,190 --> 00:28:11,600

follow the launch from receiving

751

00:28:17,830 --> 00:28:13,200

fcs

752

00:28:23,830 --> 00:28:20,149

110

753

00:28:27,190 --> 00:28:25,430

locking the vent valves will bring the

754

00:28:29,430 --> 00:28:27,200

uh booster tank

755

00:28:31,029 --> 00:28:29,440

tanks up to flight pressure getting

756

00:28:32,710 --> 00:28:31,039

everything ready for

757

00:28:34,149 --> 00:28:32,720

launch this evening

758

00:28:36,549 --> 00:28:34,159

we just heard from the range officer

759

00:28:37,990 --> 00:28:36,559

that the range is green and ready to

760

00:28:39,990 --> 00:28:38,000

move forward

761

00:28:41,590 --> 00:28:40,000

the range is green that is a big step

762

00:28:43,430 --> 00:28:41,600

moving forward

763

00:28:45,029 --> 00:28:43,440

everything's clear basically mean there

764

00:28:46,870 --> 00:28:45,039

there is no

765

00:28:48,070 --> 00:28:46,880

nothing to impede launch nothing out

766

00:28:55,269 --> 00:28:48,080

there in the water

767

00:28:59,430 --> 00:28:56,389

t minus

768

00:29:02,950 --> 00:28:59,440

30 seconds as we count down to the

769

00:29:03,990 --> 00:29:02,960

liftoff of an atlas v rocket

770

00:29:07,830 --> 00:29:04,000

25

771

00:29:11,990 --> 00:29:07,840

status check go atlas gopro

772

00:29:15,510 --> 00:29:13,510

you heard the final status check for

773

00:29:18,789 --> 00:29:15,520

booster centaur and spacecraft

774

00:29:22,230 --> 00:29:18,799

everything is go and so here we go

775

00:29:23,269 --> 00:29:22,240

t minus 10 seconds nine eight

776  
00:29:24,310 --> 00:29:23,279  
seven

777  
00:29:25,269 --> 00:29:24,320  
six

778  
00:29:27,110 --> 00:29:25,279  
five

779  
00:29:28,070 --> 00:29:27,120  
four three

780  
00:29:28,950 --> 00:29:28,080  
two

781  
00:29:30,950 --> 00:29:28,960  
one

782  
00:29:32,710 --> 00:29:30,960  
zero

783  
00:29:35,190 --> 00:29:32,720  
and liftoff

784  
00:29:37,750 --> 00:29:35,200  
of our solar orbiting and international

785  
00:29:39,350 --> 00:29:37,760  
collaboration to give us new images and

786  
00:29:52,090 --> 00:29:39,360  
a better understanding of our

787  
00:29:57,350 --> 00:29:53,990  
[Music]

788  
00:29:59,190 --> 00:29:57,360

now 25 seconds into flight

789

00:30:00,389 --> 00:29:59,200

chamber pressure on the srv looks good

790

00:30:02,470 --> 00:30:00,399

that's not bringing parameters in the

791

00:30:05,590 --> 00:30:02,480

already also good

792

00:30:07,510 --> 00:30:05,600

good report so far atlas 5.

793

00:30:10,389 --> 00:30:07,520

vehicle is completing the pitch over

794

00:30:15,029 --> 00:30:13,190

now 41 seconds into flight

795

00:30:17,830 --> 00:30:15,039

45 seconds into flight everything is

796

00:30:37,590 --> 00:30:19,750

we heard that the rd-180 engine was

797

00:30:41,750 --> 00:30:39,190

vehicles now passing through max q

798

00:30:45,350 --> 00:30:41,760

maximum dynamic pressure

799

00:30:47,190 --> 00:30:45,360

of maximum mechanical stress on the

800

00:30:49,350 --> 00:30:47,200

rocket because it's reached its highest

801  
00:30:54,230 --> 00:30:49,360  
velocity and resistance created by the

802  
00:31:03,269 --> 00:30:55,590  
made it through and they're throttling

803  
00:31:07,350 --> 00:31:04,870  
and we have burnout on the solid rocket

804  
00:31:09,350 --> 00:31:07,360  
booster atlas will hold on to the srb

805  
00:31:10,549 --> 00:31:09,360  
for an additional 47 seconds prior to

806  
00:31:11,750 --> 00:31:10,559  
jettison

807  
00:31:13,909 --> 00:31:11,760  
they're going to let that thing go at

808  
00:31:16,149 --> 00:31:13,919  
two minutes and 19 seconds

809  
00:31:18,230 --> 00:31:16,159  
45 seconds into flight

810  
00:31:19,909 --> 00:31:18,240  
rd180 continues to perform well at full

811  
00:31:23,269 --> 00:31:19,919  
thrust pump speeds and injector

812  
00:31:26,470 --> 00:31:25,029  
all right stand by now for booster

813  
00:31:28,070 --> 00:31:26,480

jettison

814

00:31:29,590 --> 00:31:28,080

and now coming up on two minutes into

815

00:31:35,669 --> 00:31:29,600

flight the atlas v vehicle now weighs

816

00:31:38,789 --> 00:31:36,870

already

817

00:31:44,950 --> 00:31:38,799

down slightly as expected

818

00:31:44,960 --> 00:31:49,509

and standing by for srp jettison shortly

819

00:31:54,950 --> 00:31:51,750

now look to your screen indication

820

00:31:56,789 --> 00:31:54,960

of the solid rocket booster

821

00:31:58,870 --> 00:31:56,799

atlas 5 has gone to q alpha limited

822

00:32:01,669 --> 00:31:58,880

closed loop steering vehicle body rates

823

00:32:03,909 --> 00:32:01,679

look good

824

00:32:05,830 --> 00:32:03,919

now the next major milestone is now two

825

00:32:17,669 --> 00:32:05,840

minutes 35 seconds into flight three

826  
00:32:21,269 --> 00:32:19,590  
and the second stage rcs system press

827  
00:32:22,630 --> 00:32:21,279  
valve is opened

828  
00:32:25,669 --> 00:32:22,640  
system now pressurizing the flight

829  
00:32:30,310 --> 00:32:29,110  
flying it over 5000 miles per hour

830  
00:32:31,990 --> 00:32:30,320  
now three minutes into flight

831  
00:32:33,669 --> 00:32:32,000  
approximately one minute remaining until

832  
00:32:35,750 --> 00:32:33,679  
vico

833  
00:32:38,070 --> 00:32:35,760  
he's talking about main engine cutoff

834  
00:32:39,190 --> 00:32:38,080  
one minute rd-180 continues to look good

835  
00:32:40,870 --> 00:32:39,200  
at

836  
00:32:44,310 --> 00:32:40,880  
uh pump speeds and injector pressures

837  
00:32:49,750 --> 00:32:47,509  
three minutes 15 seconds in

838  
00:32:59,830 --> 00:32:49,760

right about to cut that booster vehicle

839

00:33:04,230 --> 00:33:02,470

now three minutes 30 seconds in

840

00:33:06,470 --> 00:33:04,240

rd180 now throttling to maintain a

841

00:33:13,830 --> 00:33:06,480

constant 5g acceleration limit engine

842

00:33:13,840 --> 00:33:20,470

and we've begun boost chill down

843

00:33:25,269 --> 00:33:22,870

now throttling to a 4.6 g acceleration

844

00:33:31,830 --> 00:33:25,279

limit boost phase till down has ended

845

00:33:38,149 --> 00:33:33,430

and we have b booster and cutoff

846

00:33:42,230 --> 00:33:39,590

and we have good indication of atlas

847

00:33:44,149 --> 00:33:42,240

centaur separation

848

00:33:45,830 --> 00:33:44,159

we have pre-start on the rl10 standing

849

00:33:48,149 --> 00:33:45,840

by for ignition

850

00:33:50,230 --> 00:33:48,159

next major milestone is the payload

851  
00:33:52,070 --> 00:33:50,240  
fairing when that comes off ignition and

852  
00:33:56,710 --> 00:33:52,080  
full thrust on the rl10 chamber pressure

853  
00:34:00,630 --> 00:33:58,310  
that payload and we have good indication

854  
00:34:03,350 --> 00:34:00,640  
of payload fairing jettison

855  
00:34:14,389 --> 00:34:04,870  
this first burn of today's mission will

856  
00:34:18,230 --> 00:34:16,149  
and the rcs system is now performing

857  
00:34:27,829 --> 00:34:18,240  
initial firings to warm up the rcs motor

858  
00:34:33,190 --> 00:34:30,470  
and the centaur is now 100 miles in

859  
00:34:34,389 --> 00:34:33,200  
altitude 450 miles downrange distance

860  
00:34:35,990 --> 00:34:34,399  
traveling at

861  
00:34:38,869 --> 00:34:36,000  
eleven thousand eight hundred miles per

862  
00:34:42,550 --> 00:34:41,430  
five minutes ten seconds into flight

863  
00:34:44,470 --> 00:34:42,560

and you're listening to the voice of

864

00:34:45,669 --> 00:34:44,480

patrick moore you always

865

00:34:53,909 --> 00:34:45,679

launch

866

00:35:01,109 --> 00:34:55,589

since our propellant utilization system

867

00:35:06,230 --> 00:35:03,030

flight is looking

868

00:35:09,910 --> 00:35:08,470

an rcs system now performing periodic

869

00:35:21,829 --> 00:35:09,920

firing for thermal conditioning of the

870

00:35:26,069 --> 00:35:23,510

and initial review of booster

871

00:35:27,190 --> 00:35:26,079

performance shows the booster performed

872

00:35:36,470 --> 00:35:27,200

close to

873

00:35:41,990 --> 00:35:39,190

so the next major milestone will be the

874

00:35:43,349 --> 00:35:42,000

centaur first main engine cutoff and

875

00:35:46,150 --> 00:35:43,359

we've got about

876

00:35:48,470 --> 00:35:46,160

uh let's say five to six minutes before

877

00:35:50,710 --> 00:35:48,480

that let's bring nick woltman back in um

878

00:35:52,550 --> 00:35:50,720

what did you think about uh the liftoff

879

00:35:53,670 --> 00:35:52,560

and and the flight and separation looked

880

00:35:58,550 --> 00:35:53,680

pretty good from here as we were

881

00:36:02,310 --> 00:36:00,069

here all the mark events that were hit

882

00:36:04,390 --> 00:36:02,320

and it seems like first stage performed

883

00:36:06,710 --> 00:36:04,400

very nominal and rd1e performed very

884

00:36:07,990 --> 00:36:06,720

well to get the first stage and centaur

885

00:36:09,349 --> 00:36:08,000

on its way so

886

00:36:10,790 --> 00:36:09,359

things are looking really well on this

887

00:36:13,910 --> 00:36:10,800

flight

888

00:36:17,030 --> 00:36:13,920

at centaur uh performing uh uh thrusts

889

00:36:18,390 --> 00:36:17,040

of about 22 000 pounds

890

00:36:20,870 --> 00:36:18,400

and flying

891

00:36:24,069 --> 00:36:20,880

and what mick has been described to me

892

00:36:25,430 --> 00:36:24,079

is a very exact entry into orbit it's

893

00:36:26,710 --> 00:36:25,440

not going all the way around the earth

894

00:36:28,230 --> 00:36:26,720

but it does have to have a certain

895

00:36:29,270 --> 00:36:28,240

amount of precision because it's a

896

00:36:31,430 --> 00:36:29,280

partial

897

00:36:34,150 --> 00:36:31,440

orbit around earth yeah this first burn

898

00:36:37,349 --> 00:36:34,160

will get centaur and solar orbiter into

899

00:36:39,030 --> 00:36:37,359

a semi-circular orbit as we

900

00:36:40,790 --> 00:36:39,040

come around the earth and then we will

901  
00:36:43,270 --> 00:36:40,800  
get ready for our

902  
00:36:45,670 --> 00:36:43,280  
main engine start number two

903  
00:36:47,910 --> 00:36:45,680  
and that will get us onto our transfer

904  
00:36:50,310 --> 00:36:47,920  
trajectory orbit so our transfer

905  
00:36:52,470 --> 00:36:50,320  
trajectory to head off toward the sun so

906  
00:36:53,670 --> 00:36:52,480  
yeah centaur has to perform very well on

907  
00:36:55,990 --> 00:36:53,680  
this first

908  
00:36:57,190 --> 00:36:56,000  
burn to get into that semi-circular park

909  
00:36:59,349 --> 00:36:57,200  
orbit

910  
00:37:01,030 --> 00:36:59,359  
and it's a lot of power that's needed

911  
00:37:01,910 --> 00:37:01,040  
in order to get this thing going because

912  
00:37:04,390 --> 00:37:01,920  
uh

913  
00:37:10,870 --> 00:37:04,400

she's going off into the deeper part of

914

00:37:13,829 --> 00:37:11,990

we're getting a report of good

915

00:37:17,829 --> 00:37:13,839

performance so far and that's uh

916

00:37:22,310 --> 00:37:20,470

the team here mick talk about

917

00:37:24,310 --> 00:37:22,320

the reaction at this point for the

918

00:37:26,390 --> 00:37:24,320

launch team we heard a little bit of a

919

00:37:28,470 --> 00:37:26,400

celebration behind us yeah the team

920

00:37:30,470 --> 00:37:28,480

doesn't really get too excited here but

921

00:37:32,870 --> 00:37:30,480

it is a mark event of first stage

922

00:37:34,950 --> 00:37:32,880

separation is important getting mains

923

00:37:37,030 --> 00:37:34,960

engine start uh is a very important too

924

00:37:39,030 --> 00:37:37,040

as you said getting centaur on its way

925

00:37:42,230 --> 00:37:39,040

the aerojet rocketdyne rl10 performing

926  
00:37:43,990 --> 00:37:42,240  
very well right now on this first burn

927  
00:37:45,370 --> 00:37:44,000  
but the team is starting to look at

928  
00:37:46,630 --> 00:37:45,380  
their data continuing to

929  
00:37:48,470 --> 00:37:46,640  
[Music]

930  
00:37:50,790 --> 00:37:48,480  
follow the centaur in flight on

931  
00:37:52,710 --> 00:37:50,800  
real-time data the booster team is

932  
00:37:54,150 --> 00:37:52,720  
looking at their data after a first

933  
00:37:55,510 --> 00:37:54,160  
stage separated to make sure everything

934  
00:37:57,109 --> 00:37:55,520  
performed well

935  
00:37:58,470 --> 00:37:57,119  
doing a quick look of everything to make

936  
00:37:59,829 --> 00:37:58,480  
sure there's no anomalies in the flight

937  
00:38:01,430 --> 00:37:59,839  
so far and so far we haven't seen

938  
00:38:03,589 --> 00:38:01,440

anything or heard so things are

939

00:38:05,589 --> 00:38:03,599

performing very well for this flight for

940

00:38:08,470 --> 00:38:05,599

solar orbiter on its way and that's good

941

00:38:11,030 --> 00:38:08,480

news certainly for our european partners

942

00:38:12,470 --> 00:38:11,040

who are collaborating in this effort the

943

00:38:14,870 --> 00:38:12,480

solar orbiter

944

00:38:17,030 --> 00:38:14,880

plans to unlock quite a few mysteries of

945

00:38:18,870 --> 00:38:17,040

the sun as we have learned in the weeks

946

00:38:21,270 --> 00:38:18,880

rolling up to this there's been a lot of

947

00:38:22,310 --> 00:38:21,280

time and effort that the teams have put

948

00:38:23,910 --> 00:38:22,320

into

949

00:38:24,790 --> 00:38:23,920

building the spacecraft and then of

950

00:38:27,510 --> 00:38:24,800

course

951  
00:38:29,430 --> 00:38:27,520  
preparing for launch many years

952  
00:38:31,589 --> 00:38:29,440  
in the making

953  
00:38:34,550 --> 00:38:31,599  
as we listen in now we are

954  
00:38:35,990 --> 00:38:34,560  
we're getting a little more of an update

955  
00:38:39,510 --> 00:38:36,000  
so far

956  
00:38:40,950 --> 00:38:39,520  
continues to have good flight

957  
00:38:42,710 --> 00:38:40,960  
this orbit

958  
00:38:45,829 --> 00:38:42,720  
you were talking a little bit about this

959  
00:38:47,190 --> 00:38:45,839  
transfer orbit it's using a planetary

960  
00:38:49,910 --> 00:38:47,200  
assist

961  
00:38:51,670 --> 00:38:49,920  
to get to its location ultimately right

962  
00:38:53,430 --> 00:38:51,680  
ultimately once we get into our transfer

963  
00:38:55,270 --> 00:38:53,440

orbit and solar orbiters on its way to

964

00:38:57,349 --> 00:38:55,280

the sun eventually they'll use the

965

00:39:00,390 --> 00:38:57,359

gravitational assist from venus

966

00:39:02,630 --> 00:39:00,400

and uh to get uh into their

967

00:39:04,150 --> 00:39:02,640

orbit and trajectory heading for sun so

968

00:39:05,829 --> 00:39:04,160

they can study the poles of the sun and

969

00:39:07,190 --> 00:39:05,839

that as we heard earlier from josh

970

00:39:09,589 --> 00:39:07,200

that'll be a couple years into the

971

00:39:12,069 --> 00:39:09,599

mission as they're doing that to

972

00:39:14,630 --> 00:39:12,079

maintain their trajectory and keep going

973

00:39:16,790 --> 00:39:14,640

um as you had said earlier uh centaur

974

00:39:19,589 --> 00:39:16,800

performing very well here uh on this

975

00:39:21,430 --> 00:39:19,599

first burn and the teams are continuing

976

00:39:24,790 --> 00:39:21,440

to look at data and how how it's uh

977

00:39:27,510 --> 00:39:24,800

performing and uh you know we're happy

978

00:39:29,589 --> 00:39:27,520

to be at this part in the flight but

979

00:39:31,670 --> 00:39:29,599

as you said important to our issa

980

00:39:33,670 --> 00:39:31,680

friends and solar orbiter and nasa we

981

00:39:35,190 --> 00:39:33,680

still have a long way to go for payload

982

00:39:37,430 --> 00:39:35,200

separation so

983

00:39:38,790 --> 00:39:37,440

mission is going well so far and then we

984

00:39:40,630 --> 00:39:38,800

will continue to

985

00:39:42,950 --> 00:39:40,640

follow this and see how centaur performs

986

00:39:44,950 --> 00:39:42,960

to get our payload deployed successfully

987

00:39:47,430 --> 00:39:44,960

the spacecraft teams certainly watching

988

00:39:50,150 --> 00:39:47,440

every moment of this very closely as

989

00:39:51,190 --> 00:39:50,160

this is a as a very tense time for them

990

00:39:53,750 --> 00:39:51,200

but

991

00:39:55,270 --> 00:39:53,760

no need to worry because at this point

992

00:39:57,829 --> 00:39:55,280

centaur is

993

00:39:59,829 --> 00:39:57,839

taken taken her to the spot that she

994

00:40:01,270 --> 00:39:59,839

needs to go and uh

995

00:40:03,589 --> 00:40:01,280

this centaur we were talking a little

996

00:40:04,630 --> 00:40:03,599

bit earlier it uh it's the last of its

997

00:40:07,750 --> 00:40:04,640

kind

998

00:40:10,550 --> 00:40:07,760

that is um in flight now but it's

999

00:40:12,630 --> 00:40:10,560

getting some upgrades um it is

1000

00:40:14,550 --> 00:40:12,640

performing great but um

1001  
00:40:16,309 --> 00:40:14,560  
what kind of improvements yeah is it

1002  
00:40:18,870 --> 00:40:16,319  
getting yeah i would say not centaur

1003  
00:40:21,670 --> 00:40:18,880  
mainly but the rl10 for engine right

1004  
00:40:23,910 --> 00:40:21,680  
yeah it's the last uh single version of

1005  
00:40:25,990 --> 00:40:23,920  
rl10a that will fly

1006  
00:40:28,630 --> 00:40:26,000  
all vehicles in single stick from here

1007  
00:40:32,630 --> 00:40:28,640  
on out will fly an upgraded rl10c

1008  
00:40:35,109 --> 00:40:32,640  
however the rl-104a will be used for

1009  
00:40:37,589 --> 00:40:35,119  
human spaceflight we need dual engine

1010  
00:40:40,069 --> 00:40:37,599  
configurations on centaur for human

1011  
00:40:42,309 --> 00:40:40,079  
space flight to get astronauts back to

1012  
00:40:43,030 --> 00:40:42,319  
the moon and then on to mars

1013  
00:40:46,630 --> 00:40:43,040

so

1014

00:40:48,550 --> 00:40:46,640

rl10 4a will still be flown and and used

1015

00:40:50,829 --> 00:40:48,560

but in a dual configuration set of

1016

00:40:53,510 --> 00:40:50,839

singles so we're very happy to fly this

1017

00:40:55,670 --> 00:40:53,520

last 4a in this single configuration

1018

00:40:57,670 --> 00:40:55,680

with solar orbiter it was very well

1019

00:40:59,750 --> 00:40:57,680

suited for this mission and to perform

1020

00:41:02,150 --> 00:40:59,760

the task that seems to be done and that

1021

00:41:05,270 --> 00:41:02,160

dual engine has to provide a lot of

1022

00:41:07,829 --> 00:41:05,280

power when it comes to as you mentioned

1023

00:41:09,829 --> 00:41:07,839

the astronauts who are going to be going

1024

00:41:12,550 --> 00:41:09,839

back up to the international space

1025

00:41:14,950 --> 00:41:12,560

station from american soil once uh

1026

00:41:17,670 --> 00:41:14,960

boeing gets the go ahead to fly that

1027

00:41:19,750 --> 00:41:17,680

dual engine that's that power is needed

1028

00:41:21,990 --> 00:41:19,760

because it's going to be a lot heavier a

1029

00:41:23,430 --> 00:41:22,000

lot heavier and we want you know more

1030

00:41:24,470 --> 00:41:23,440

energy and controllability from the

1031

00:41:27,030 --> 00:41:24,480

centaur

1032

00:41:29,589 --> 00:41:27,040

we also have that

1033

00:41:32,390 --> 00:41:29,599

you know dual engine setup for

1034

00:41:33,750 --> 00:41:32,400

redundancy and controllability there

1035

00:41:35,430 --> 00:41:33,760

we're going to get an update in just a

1036

00:41:38,150 --> 00:41:35,440

moment from uh

1037

00:41:40,309 --> 00:41:38,160

ula scott messer but until then we are

1038

00:41:42,710 --> 00:41:40,319

tracking this flight and the successful

1039

00:41:45,910 --> 00:41:42,720

flight that it has been so far you're

1040

00:41:47,109 --> 00:41:45,920

looking at a graphical representation of

1041

00:41:49,430 --> 00:41:47,119

exactly

1042

00:41:51,910 --> 00:41:49,440

what we're expecting the flight to look

1043

00:41:53,990 --> 00:41:51,920

like and everything is looking good at

1044

00:41:56,630 --> 00:41:54,000

this point a matter of fact darrell we

1045

00:41:59,190 --> 00:41:56,640

just heard we've got main engine cut off

1046

00:42:01,190 --> 00:41:59,200

so centaur is

1047

00:42:03,349 --> 00:42:01,200

shut down its engine for the first

1048

00:42:05,670 --> 00:42:03,359

firing things look good body rates have

1049

00:42:07,589 --> 00:42:05,680

damped out and everything looks good on

1050

00:42:09,589 --> 00:42:07,599

this mission so far

1051  
00:42:12,470 --> 00:42:09,599  
so as we get ready to go

1052  
00:42:14,390 --> 00:42:12,480  
centaur will continue to its mission by

1053  
00:42:16,790 --> 00:42:14,400  
rolling and turning to the position it

1054  
00:42:19,270 --> 00:42:16,800  
needs to get ready for main engine start

1055  
00:42:20,950 --> 00:42:19,280  
2 that transfer orbit or transfer

1056  
00:42:23,910 --> 00:42:20,960  
trajectory that we talked about

1057  
00:42:26,309 --> 00:42:23,920  
the engine will need to get ready and

1058  
00:42:28,309 --> 00:42:26,319  
chill down and and get ready to fire up

1059  
00:42:31,910 --> 00:42:28,319  
this coast period that we're in

1060  
00:42:35,190 --> 00:42:31,920  
will be about uh 30 minutes uh to get

1061  
00:42:38,150 --> 00:42:35,200  
into position before we have to uh fire

1062  
00:42:41,510 --> 00:42:38,160  
up the centaur engine again uh that'll

1063  
00:42:45,030 --> 00:42:41,520

be about 38 39 minutes into the mission

1064

00:42:47,990 --> 00:42:45,040

that we will do that and it will fire

1065

00:42:50,630 --> 00:42:48,000

for roughly six minutes to get into that

1066

00:42:52,870 --> 00:42:50,640

transfer orbit so uh

1067

00:42:55,270 --> 00:42:52,880

centaur performing very well atlas

1068

00:42:57,270 --> 00:42:55,280

centaur and solar orbit are on its way

1069

00:42:58,710 --> 00:42:57,280

so things are looking really good this

1070

00:43:00,630 --> 00:42:58,720

is a bit of a coast phase you would

1071

00:43:02,390 --> 00:43:00,640

describe coast coast phase yes centaur

1072

00:43:05,430 --> 00:43:02,400

perform well and and doing some

1073

00:43:07,990 --> 00:43:05,440

maneuvers here in this coast phase so

1074

00:43:10,470 --> 00:43:08,000

all right and so while we monitor

1075

00:43:12,870 --> 00:43:10,480

the coasting of the centaur

1076

00:43:14,470 --> 00:43:12,880

stage we will also be monitoring the

1077

00:43:16,150 --> 00:43:14,480

launch team so let you know when they

1078

00:43:18,710 --> 00:43:16,160

fire that engine back up but in the

1079

00:43:20,630 --> 00:43:18,720

meantime we are going to send it back to

1080

00:43:22,790 --> 00:43:20,640

the asoc with joshua santora who is

1081

00:43:24,630 --> 00:43:22,800

joined by scott messer

1082

00:43:25,750 --> 00:43:24,640

take it away joshua hey a lot more ahead

1083

00:43:27,270 --> 00:43:25,760

but we appreciate you both walking us

1084

00:43:29,670 --> 00:43:27,280

through those first few very dynamic

1085

00:43:31,670 --> 00:43:29,680

minutes of flight um again a lot

1086

00:43:33,109 --> 00:43:31,680

happened a lot to go and now with me is

1087

00:43:34,870 --> 00:43:33,119

scott messer you're the united launch

1088

00:43:36,710 --> 00:43:34,880

alliance program manager for nasa

1089

00:43:38,710 --> 00:43:36,720

missions i get that right yes you did

1090

00:43:40,710 --> 00:43:38,720

perfect awesome so scott got to feel

1091

00:43:42,470 --> 00:43:40,720

good like the boosters off the ground

1092

00:43:43,910 --> 00:43:42,480

we're on our way so what's what's all

1093

00:43:47,430 --> 00:43:43,920

happened so far

1094

00:43:49,270 --> 00:43:47,440

yeah so uh it is a beautiful count uh

1095

00:43:51,270 --> 00:43:49,280

one of the most quiet counts i've ever

1096

00:43:53,670 --> 00:43:51,280

been through indeed and

1097

00:43:56,150 --> 00:43:53,680

the liftoff was right on time

1098

00:43:57,589 --> 00:43:56,160

everything has looked good so far all

1099

00:43:58,950 --> 00:43:57,599

the data we're getting back is looking

1100

00:44:00,630 --> 00:43:58,960

really positive

1101

00:44:02,230 --> 00:44:00,640

yeah and so how are you feeling right

1102

00:44:04,230 --> 00:44:02,240

now because obviously like we've stolen

1103

00:44:05,829 --> 00:44:04,240

you away in the middle of like the job

1104

00:44:07,750 --> 00:44:05,839

is still happening um so appreciate

1105

00:44:09,750 --> 00:44:07,760

being here but how are you feeling i'm

1106

00:44:11,750 --> 00:44:09,760

super excited

1107

00:44:14,230 --> 00:44:11,760

it's always great to launch and get get

1108

00:44:16,309 --> 00:44:14,240

off but the beginning of the window and

1109

00:44:17,829 --> 00:44:16,319

uh everything looking great i'm i'm just

1110

00:44:19,910 --> 00:44:17,839

really excited and

1111

00:44:21,990 --> 00:44:19,920

thrilled to be meeting

1112

00:44:23,349 --> 00:44:22,000

customer requirements yeah i mean that's

1113

00:44:25,829 --> 00:44:23,359

the name of the game right yeah it

1114

00:44:28,069 --> 00:44:25,839

certainly is so what's ahead left for us

1115

00:44:29,990 --> 00:44:28,079

because obviously we're the the ula

1116

00:44:31,349 --> 00:44:30,000

portion of the day is not done yet so

1117

00:44:33,910 --> 00:44:31,359

what's still to come

1118

00:44:36,470 --> 00:44:33,920

yeah so we're in the middle uh now about

1119

00:44:38,470 --> 00:44:36,480

a 30 minute coast the second stage

1120

00:44:40,550 --> 00:44:38,480

engine will then start up again

1121

00:44:41,910 --> 00:44:40,560

burn for about another seven minutes a

1122

00:44:43,990 --> 00:44:41,920

short two minute coast and then

1123

00:44:46,069 --> 00:44:44,000

separation at about

1124

00:44:51,030 --> 00:44:46,079

11 55

1125

00:44:53,190 --> 00:44:51,040

another is that a typical timeline

1126  
00:44:55,109 --> 00:44:53,200  
because this is um a lot of times we see

1127  
00:44:56,950 --> 00:44:55,119  
for low earth orbit flights the booster

1128  
00:44:58,630 --> 00:44:56,960  
is only used for eight to twelve minutes

1129  
00:45:00,630 --> 00:44:58,640  
or so but this obviously we're we're

1130  
00:45:03,190 --> 00:45:00,640  
using this rocket for on the order of an

1131  
00:45:05,990 --> 00:45:03,200  
hour or so is that uh typical is that

1132  
00:45:08,870 --> 00:45:06,000  
atypical no it is very typical for nasa

1133  
00:45:11,349 --> 00:45:08,880  
missions uh i think probably

1134  
00:45:12,309 --> 00:45:11,359  
most of them last about an hour uh on

1135  
00:45:14,870 --> 00:45:12,319  
average

1136  
00:45:16,790 --> 00:45:14,880  
okay and so what's next for ula after we

1137  
00:45:18,230 --> 00:45:16,800  
so obviously we want today to go great

1138  
00:45:19,510 --> 00:45:18,240

that's the focus right now but kind of

1139

00:45:22,150 --> 00:45:19,520

look into the future what's what's next

1140

00:45:24,870 --> 00:45:22,160

for ula well so uh

1141

00:45:28,390 --> 00:45:24,880

this is the first launch for ula in in

1142

00:45:30,390 --> 00:45:28,400

2020 yeah congrats the 137th successful

1143

00:45:31,670 --> 00:45:30,400

launch at least so far absolutely

1144

00:45:34,230 --> 00:45:31,680

everything we can expect everything to

1145

00:45:35,589 --> 00:45:34,240

go there so uh we've got several other

1146

00:45:37,270 --> 00:45:35,599

missions uh

1147

00:45:40,550 --> 00:45:37,280

for nasa coming down the line we've got

1148

00:45:43,430 --> 00:45:40,560

a mars mission uh in uh 20

1149

00:45:46,309 --> 00:45:43,440

in july and july march 2020. so that's

1150

00:45:48,790 --> 00:45:46,319

really exciting very exciting yeah it's

1151

00:45:49,829 --> 00:45:48,800

uh it's been a big big year for ula

1152

00:45:51,349 --> 00:45:49,839

awesome

1153

00:45:52,630 --> 00:45:51,359

and can you explain just a tiny bit more

1154

00:45:54,550 --> 00:45:52,640

kind of about your role is it just

1155

00:45:56,150 --> 00:45:54,560

focused on you're taking care of nasa

1156

00:45:58,150 --> 00:45:56,160

missions is that i mean that's kind of

1157

00:46:01,349 --> 00:45:58,160

what your description is is that true

1158

00:46:03,270 --> 00:46:01,359

it is i work with all the nasa science

1159

00:46:06,150 --> 00:46:03,280

missions and so

1160

00:46:07,750 --> 00:46:06,160

solar orbiter mars 2020 coming up here

1161

00:46:10,710 --> 00:46:07,760

and uh it's our job to make sure that

1162

00:46:13,109 --> 00:46:10,720

all the spacecraft requirements are met

1163

00:46:15,190 --> 00:46:13,119

we integrate with the spacecraft closely

1164

00:46:17,589 --> 00:46:15,200

for several years

1165

00:46:19,109 --> 00:46:17,599

and make sure that the rocket provides

1166

00:46:21,270 --> 00:46:19,119

all the necessary requirements the

1167

00:46:22,870 --> 00:46:21,280

spacecraft asks for great well scott we

1168

00:46:24,309 --> 00:46:22,880

appreciate you appreciate the united

1169

00:46:26,150 --> 00:46:24,319

launch alliance and all their work and

1170

00:46:27,910 --> 00:46:26,160

helping us be successful to unlock

1171

00:46:29,670 --> 00:46:27,920

secrets of the sun and everything else

1172

00:46:31,349 --> 00:46:29,680

that goes on so appreciate that we're

1173

00:46:32,950 --> 00:46:31,359

going to let you get back to monitoring

1174

00:46:34,710 --> 00:46:32,960

this rocket and the rest of the flight

1175

00:46:36,230 --> 00:46:34,720

i'm going to send you back out now to

1176

00:46:39,349 --> 00:46:36,240

blair out of the press site who's got

1177

00:46:44,390 --> 00:46:41,670

yeah thanks so much joshua i'm here with

1178

00:46:46,790 --> 00:46:44,400

basically a solar dynamic duo holly

1179

00:46:48,630 --> 00:46:46,800

gilbert and daniel mueller so great to

1180

00:46:50,470 --> 00:46:48,640

have you guys on i'm telling you i'm so

1181

00:46:52,630 --> 00:46:50,480

excited tell me your thoughts about the

1182

00:46:55,670 --> 00:46:52,640

launch we'll start with you holly just

1183

00:46:58,390 --> 00:46:55,680

one word wow i am just floored at how

1184

00:46:59,430 --> 00:46:58,400

exciting and amazing it was and i got to

1185

00:47:01,990 --> 00:46:59,440

share it with my husband and my

1186

00:47:04,150 --> 00:47:02,000

daughters and my partner in crime yeah

1187

00:47:06,150 --> 00:47:04,160

yeah dynamic duo though not on the crime

1188

00:47:07,910 --> 00:47:06,160

side you know part partner in good

1189

00:47:10,150 --> 00:47:07,920

science that's right

1190

00:47:11,990 --> 00:47:10,160

and daniel how about you i think this

1191

00:47:13,430 --> 00:47:12,000

was picture perfect yeah and and

1192

00:47:15,430 --> 00:47:13,440

suddenly you really felt like you

1193

00:47:16,790 --> 00:47:15,440

connected to the entire solar system i

1194

00:47:18,550 --> 00:47:16,800

mean you're here in the earth and you're

1195

00:47:20,950 --> 00:47:18,560

launching something that will go close

1196

00:47:22,549 --> 00:47:20,960

to the sun really out into space yeah

1197

00:47:24,390 --> 00:47:22,559

and and that brings up a good point i

1198

00:47:26,630 --> 00:47:24,400

was thinking to you guys earlier and i

1199

00:47:29,030 --> 00:47:26,640

thought you know when you were starving

1200

00:47:30,710 --> 00:47:29,040

scientists just getting out of school

1201

00:47:32,710 --> 00:47:30,720

did you ever think that you would be

1202

00:47:34,790 --> 00:47:32,720

here at kennedy space center watching

1203

00:47:38,069 --> 00:47:34,800

not just a rocket launch but a rocket

1204

00:47:40,230 --> 00:47:38,079

launch carrying a mission and spacecraft

1205

00:47:41,829 --> 00:47:40,240

that's so near and dear to your hearts

1206

00:47:43,750 --> 00:47:41,839

uh holly how about you

1207

00:47:45,349 --> 00:47:43,760

i couldn't have even imagined this even

1208

00:47:48,069 --> 00:47:45,359

though i've been in solar physics for

1209

00:47:49,589 --> 00:47:48,079

many years i just never thought i would

1210

00:47:52,470 --> 00:47:49,599

actually witness something come to

1211

00:47:53,829 --> 00:47:52,480

fruition like this and actually launched

1212

00:47:57,030 --> 00:47:53,839

it's amazing

1213

00:48:00,230 --> 00:47:57,040

daniel similar for me i mean

1214

00:48:02,870 --> 00:48:00,240

i met holly i think almost 20 years ago

1215

00:48:04,710 --> 00:48:02,880

at a phd school and i mean

1216

00:48:05,750 --> 00:48:04,720

i immediately knew this lady would go

1217

00:48:06,950 --> 00:48:05,760

very far

1218

00:48:09,109 --> 00:48:06,960

i would

1219

00:48:11,270 --> 00:48:09,119

not have expected to go along with her

1220

00:48:13,349 --> 00:48:11,280

to this point and so we're now sort of

1221

00:48:15,750 --> 00:48:13,359

really i mean after after many years of

1222

00:48:18,230 --> 00:48:15,760

hard work and setbacks and

1223

00:48:20,470 --> 00:48:18,240

excitement we've now really made it i

1224

00:48:22,309 --> 00:48:20,480

mean we are on our journey and that's

1225

00:48:24,230 --> 00:48:22,319

that's a big thing for me yeah and and

1226

00:48:26,150 --> 00:48:24,240

that's great too because this whole week

1227

00:48:27,750 --> 00:48:26,160

uh leading up to the launch and all the

1228

00:48:29,349 --> 00:48:27,760

stuff we've done leading up to the

1229

00:48:31,109 --> 00:48:29,359

launch in terms of preparing for the

1230

00:48:33,349 --> 00:48:31,119

show we've been hearing the

1231

00:48:35,670 --> 00:48:33,359

international partnership our friends at

1232

00:48:37,109 --> 00:48:35,680

nasa and esa and how they've all worked

1233

00:48:39,190 --> 00:48:37,119

together and i just

1234

00:48:40,870 --> 00:48:39,200

seeing you guys here talk a little bit

1235

00:48:42,950 --> 00:48:40,880

about the relationship and working

1236

00:48:44,870 --> 00:48:42,960

together on this particular mission yeah

1237

00:48:47,829 --> 00:48:44,880

i mean it's it's fantastic i couldn't

1238

00:48:48,950 --> 00:48:47,839

ask for a better project scientist team

1239

00:48:50,549 --> 00:48:48,960

i mean

1240

00:48:52,790 --> 00:48:50,559

it's a challenging thing having an

1241

00:48:54,790 --> 00:48:52,800

international partnership so we've had

1242

00:48:57,270 --> 00:48:54,800

especially daniel has had to really uh

1243

00:49:00,150 --> 00:48:57,280

work hard at making that all work and

1244

00:49:03,109 --> 00:49:00,160

ten instrument teams and it's just

1245

00:49:04,950 --> 00:49:03,119

it's an amazing partnership yeah yeah

1246

00:49:06,630 --> 00:49:04,960

and i was i was lucky that i had the

1247

00:49:08,950 --> 00:49:06,640

opportunity to work on the soho mission

1248

00:49:10,710 --> 00:49:08,960

before and i joined soho

1249

00:49:12,950 --> 00:49:10,720

in the phase where it was fully

1250

00:49:14,870 --> 00:49:12,960

operational and i was working for isa

1251

00:49:17,270 --> 00:49:14,880

but actually based at nasa so i could

1252

00:49:19,270 --> 00:49:17,280

really form personal bonds with people

1253

00:49:21,190 --> 00:49:19,280

that i still work with today and that's

1254

00:49:23,109 --> 00:49:21,200

been really key well you know i'm glad

1255

00:49:25,030 --> 00:49:23,119

you brought that up because as an

1256

00:49:27,829 --> 00:49:25,040

observer to this because i'm from the

1257

00:49:29,990 --> 00:49:27,839

liberal arts side it's really impressive

1258

00:49:32,470 --> 00:49:30,000

to see that even though you're separated

1259

00:49:35,190 --> 00:49:32,480

by miles and miles or kilometers i guess

1260

00:49:37,190 --> 00:49:35,200

in in some cases um

1261

00:49:39,109 --> 00:49:37,200

in the science community it the

1262

00:49:41,109 --> 00:49:39,119

boundaries sort of disappear you kind of

1263

00:49:43,510 --> 00:49:41,119

have the same objectives and it's got to

1264

00:49:46,150 --> 00:49:43,520

be a really really great feeling to be

1265

00:49:47,349 --> 00:49:46,160

able to know that you can uh trust and

1266

00:49:49,910 --> 00:49:47,359

work with people of different

1267

00:49:51,589 --> 00:49:49,920

backgrounds to get such important data

1268

00:49:53,750 --> 00:49:51,599

yeah that's a really good point i mean

1269

00:49:55,030 --> 00:49:53,760

it's we have one common goal and that is

1270

00:49:56,309 --> 00:49:55,040

to get the good science out of this

1271

00:49:58,390 --> 00:49:56,319

mission and i think we're going to

1272

00:50:01,349 --> 00:49:58,400

succeed yeah and that's exactly the

1273

00:50:03,109 --> 00:50:01,359

point i try to make also to to younger

1274

00:50:04,790 --> 00:50:03,119

people and school children i mean

1275

00:50:06,790 --> 00:50:04,800

science really makes the borders

1276  
00:50:08,630 --> 00:50:06,800  
disappear it doesn't really matter where

1277  
00:50:10,309 --> 00:50:08,640  
you're from and in particular if you

1278  
00:50:12,150 --> 00:50:10,319  
have a real successful collaboration

1279  
00:50:13,589 --> 00:50:12,160  
between different countries on the

1280  
00:50:15,510 --> 00:50:13,599  
institutional level that can really

1281  
00:50:17,109 --> 00:50:15,520  
bring people much further than they

1282  
00:50:18,870 --> 00:50:17,119  
might have dreamt of oh that's

1283  
00:50:20,390 --> 00:50:18,880  
incredible sure thanks so much guys

1284  
00:50:22,549 --> 00:50:20,400  
thanks for being on the show continue to

1285  
00:50:24,230 --> 00:50:22,559  
celebrate and we'll go back to joshua

1286  
00:50:26,230 --> 00:50:24,240  
joshua and the asoc

1287  
00:50:27,829 --> 00:50:26,240  
tell you what congratulations on a good

1288  
00:50:29,109 --> 00:50:27,839

launch and uh

1289

00:50:31,030 --> 00:50:29,119

back to you buddy

1290

00:50:32,309 --> 00:50:31,040

yeah thanks blair same to the folks over

1291

00:50:33,990 --> 00:50:32,319

there daniel and holly a great launch

1292

00:50:36,390 --> 00:50:34,000

everybody's excited um so we're actually

1293

00:50:38,230 --> 00:50:36,400

gonna send you back out now to laura who

1294

00:50:40,069 --> 00:50:38,240

is who has caught up with another one of

1295

00:50:41,510 --> 00:50:40,079

those special people working behind the

1296

00:50:43,750 --> 00:50:41,520

scenes for years leading up to these

1297

00:50:45,910 --> 00:50:43,760

missions uh laura take it away

1298

00:50:48,230 --> 00:50:45,920

thank you joshua i'm joined by anna

1299

00:50:50,470 --> 00:50:48,240

pacrose with the european space agency

1300

00:50:53,030 --> 00:50:50,480

and she is solar orbiter's payload

1301  
00:50:55,190 --> 00:50:53,040  
manager and what did you think of that

1302  
00:50:57,510 --> 00:50:55,200  
launch oh well really it was a roller

1303  
00:50:59,510 --> 00:50:57,520  
coaster of emotions for me it was uh

1304  
00:51:01,670 --> 00:50:59,520  
exciting of course after working eight

1305  
00:51:03,750 --> 00:51:01,680  
years on the project to see it go on its

1306  
00:51:05,190 --> 00:51:03,760  
way but it's also a bit i was a bit

1307  
00:51:07,349 --> 00:51:05,200  
anxious you know to see everything's

1308  
00:51:09,829 --> 00:51:07,359  
going is everything going to go well um

1309  
00:51:12,230 --> 00:51:09,839  
is the signal uh going to be acquired in

1310  
00:51:14,470 --> 00:51:12,240  
a few moments so yeah

1311  
00:51:16,549 --> 00:51:14,480  
wait and see for now okay so ann i know

1312  
00:51:18,309 --> 00:51:16,559  
you're an engineer but tell us a little

1313  
00:51:20,630 --> 00:51:18,319

bit more about what the payload

1314

00:51:23,349 --> 00:51:20,640

manager's responsibilities are so as

1315

00:51:24,950 --> 00:51:23,359

payload manager i'm responsible for the

1316

00:51:27,829 --> 00:51:24,960

well-being of the ten instruments so

1317

00:51:29,670 --> 00:51:27,839

making sure the spacecraft is

1318

00:51:31,829 --> 00:51:29,680

compliant to what uh the instruments

1319

00:51:33,750 --> 00:51:31,839

want to do making sure the instruments

1320

00:51:36,069 --> 00:51:33,760

are also ready to be integrated on the

1321

00:51:38,710 --> 00:51:36,079

spacecraft and sometimes chasing them a

1322

00:51:40,069 --> 00:51:38,720

little bit to deliver on time so it was

1323

00:51:42,230 --> 00:51:40,079

really um

1324

00:51:43,829 --> 00:51:42,240

a big job to uh together with my team to

1325

00:51:45,670 --> 00:51:43,839

to take care of these 10 instruments on

1326

00:51:47,910 --> 00:51:45,680

this mission so with 10 on board that

1327

00:51:49,990 --> 00:51:47,920

must have posed some challenges

1328

00:51:51,589 --> 00:51:50,000

right exactly so the ten instruments are

1329

00:51:52,790 --> 00:51:51,599

all different it's like ten different

1330

00:51:55,270 --> 00:51:52,800

children and all of them are their

1331

00:51:57,349 --> 00:51:55,280

different needs so it was sometimes a

1332

00:51:59,750 --> 00:51:57,359

bit of a compromise we had to find to

1333

00:52:02,309 --> 00:51:59,760

make sure they could all uh fit on board

1334

00:52:04,790 --> 00:52:02,319

and and and yeah live together on board

1335

00:52:06,309 --> 00:52:04,800

this mission um because they the point

1336

00:52:08,069 --> 00:52:06,319

of the orbiter is really to make this

1337

00:52:09,990 --> 00:52:08,079

connection between the institute science

1338

00:52:12,230 --> 00:52:10,000

and the remote sensing observations so

1339

00:52:13,750 --> 00:52:12,240

really we really had to to make them fit

1340

00:52:14,710 --> 00:52:13,760

together to take their measurements

1341

00:52:16,390 --> 00:52:14,720

together

1342

00:52:18,630 --> 00:52:16,400

so they're all on board and solar

1343

00:52:21,349 --> 00:52:18,640

orbiter is on the way what's next for

1344

00:52:22,790 --> 00:52:21,359

you so um as i said so we're going to

1345

00:52:24,549 --> 00:52:22,800

acquire the first signal and we're going

1346

00:52:26,230 --> 00:52:24,559

then to start uh

1347

00:52:28,790 --> 00:52:26,240

deploying all our

1348

00:52:30,790 --> 00:52:28,800

antennas all the the boom

1349

00:52:32,390 --> 00:52:30,800

and after that we have to check that all

1350

00:52:34,230 --> 00:52:32,400

the instruments are working as expected

1351  
00:52:35,829 --> 00:52:34,240  
this is called the commissioning phase

1352  
00:52:37,990 --> 00:52:35,839  
and because we have ten instruments it

1353  
00:52:39,910 --> 00:52:38,000  
lasts two to three months we're going to

1354  
00:52:41,270 --> 00:52:39,920  
take first measurements for some

1355  
00:52:42,950 --> 00:52:41,280  
instruments we're going to take the

1356  
00:52:44,309 --> 00:52:42,960  
first images

1357  
00:52:47,349 --> 00:52:44,319  
already to make sure everything is

1358  
00:52:49,270 --> 00:52:47,359  
working fine and about june time frame

1359  
00:52:51,190 --> 00:52:49,280  
when all this has been done then we

1360  
00:52:53,349 --> 00:52:51,200  
declare the mission commission and they

1361  
00:52:55,430 --> 00:52:53,359  
can go ahead on their way for the cruise

1362  
00:52:56,870 --> 00:52:55,440  
phase and the science phase all right so

1363  
00:52:59,430 --> 00:52:56,880

just a little bit longer a little bit

1364

00:53:02,069 --> 00:52:59,440

more work to do but joshua you could see

1365

00:53:04,150 --> 00:53:02,079

after a lot of years of hard work you

1366

00:53:06,390 --> 00:53:04,160

celebrate by coming all the way to

1367

00:53:08,470 --> 00:53:06,400

florida to kennedy space center to watch

1368

00:53:09,829 --> 00:53:08,480

a launch back to you hey listen that's a

1369

00:53:11,430 --> 00:53:09,839

great way to celebrate anything with

1370

00:53:13,270 --> 00:53:11,440

rocket launches so

1371

00:53:14,790 --> 00:53:13,280

we appreciate that energy and enthusiasm

1372

00:53:17,349 --> 00:53:14,800

and excitement from people like anna

1373

00:53:19,030 --> 00:53:17,359

just because that helps us be just all

1374

00:53:20,630 --> 00:53:19,040

the more excited to see them succeed and

1375

00:53:22,390 --> 00:53:20,640

to succeed alongside of them through

1376

00:53:23,910 --> 00:53:22,400

this international collaboration so

1377

00:53:25,670 --> 00:53:23,920

we're going to send you back over now to

1378

00:53:27,750 --> 00:53:25,680

daryl and mick to check in on the status

1379

00:53:29,750 --> 00:53:27,760

of our vehicle i'm still in flight here

1380

00:53:31,190 --> 00:53:29,760

uh daryl nick how are we looking well

1381

00:53:32,630 --> 00:53:31,200

looking good speaking of energy and

1382

00:53:34,630 --> 00:53:32,640

enthusiasm

1383

00:53:36,069 --> 00:53:34,640

here is a real rocket guy who loves

1384

00:53:37,910 --> 00:53:36,079

watching these things

1385

00:53:39,510 --> 00:53:37,920

every single time you get pretty jazzed

1386

00:53:41,030 --> 00:53:39,520

about it yeah and it's great to hear our

1387

00:53:42,549 --> 00:53:41,040

international partners and how excited

1388

00:53:44,870 --> 00:53:42,559

they are so far for this we still have a

1389

00:53:46,470 --> 00:53:44,880

little ways to go to get separation but

1390

00:53:49,589 --> 00:53:46,480

so far this has been a great launch very

1391

00:53:51,270 --> 00:53:49,599

quiet and very excited for this

1392

00:53:52,870 --> 00:53:51,280

matter of fact it's just been really

1393

00:53:56,309 --> 00:53:52,880

nominal so far that's good it all

1394

00:53:58,470 --> 00:53:56,319

started at 1103 eastern zero zero as a

1395

00:53:59,950 --> 00:53:58,480

matter of fact right on time actually i

1396

00:54:02,549 --> 00:53:59,960

don't have a conversion for that no

1397

00:54:05,510 --> 00:54:02,559

confirmation letting me down nick what

1398

00:54:06,549 --> 00:54:05,520

happened no it was right on time at 1103

1399

00:54:09,109 --> 00:54:06,559

liftoff

1400

00:54:10,549 --> 00:54:09,119

the ula nasa esa teams did a great job

1401  
00:54:12,549 --> 00:54:10,559  
of coordinating and getting this rocket

1402  
00:54:15,270 --> 00:54:12,559  
off the ground today so we continue to

1403  
00:54:17,750 --> 00:54:15,280  
see a graphical representation of

1404  
00:54:19,030 --> 00:54:17,760  
the centaur in coast phase as it goes

1405  
00:54:20,790 --> 00:54:19,040  
along and

1406  
00:54:24,309 --> 00:54:20,800  
trust me the spacecraft team at this

1407  
00:54:26,870 --> 00:54:24,319  
point is still very much very focused on

1408  
00:54:29,270 --> 00:54:26,880  
uh the telemetry that's coming in from

1409  
00:54:30,950 --> 00:54:29,280  
uh this spacecraft yeah absolutely

1410  
00:54:32,309 --> 00:54:30,960  
they're they're looking at that the ula

1411  
00:54:34,230 --> 00:54:32,319  
and nasa teams are looking at the

1412  
00:54:35,910 --> 00:54:34,240  
centaur telemetry making sure that

1413  
00:54:37,670 --> 00:54:35,920

things are going well matter of fact

1414

00:54:39,349 --> 00:54:37,680

we're we've got about 18 minutes still

1415

00:54:41,430 --> 00:54:39,359

left in the coast

1416

00:54:43,190 --> 00:54:41,440

all centaur systems are looking nominal

1417

00:54:45,670 --> 00:54:43,200

with the rcs thrusters firing and

1418

00:54:47,829 --> 00:54:45,680

settling the propellant back into the

1419

00:54:48,950 --> 00:54:47,839

tanks getting ready for that main engine

1420

00:54:51,670 --> 00:54:48,960

start to

1421

00:54:54,150 --> 00:54:51,680

um to get us on to that transfer

1422

00:54:56,150 --> 00:54:54,160

trajectory so talk us through the next

1423

00:54:58,789 --> 00:54:56,160

steps that are coming and we've got a

1424

00:55:01,349 --> 00:54:58,799

little time to kind of talk about that

1425

00:55:03,910 --> 00:55:01,359

the centaur second main engine will

1426

00:55:06,470 --> 00:55:03,920

restart and then it will fire for a

1427

00:55:09,030 --> 00:55:06,480

period of time talk about the purpose of

1428

00:55:11,910 --> 00:55:09,040

that once it's re-lit and then

1429

00:55:13,990 --> 00:55:11,920

and then cut off again yeah so centaur

1430

00:55:16,069 --> 00:55:14,000

is in its coast phase right now in that

1431

00:55:18,230 --> 00:55:16,079

that semi-circular orbit we talked about

1432

00:55:20,309 --> 00:55:18,240

earlier that parking orbit to get us

1433

00:55:22,470 --> 00:55:20,319

started and as we get into coast the

1434

00:55:25,190 --> 00:55:22,480

vehicle is performing a few maneuvers

1435

00:55:27,109 --> 00:55:25,200

now using the reaction control thrusters

1436

00:55:28,630 --> 00:55:27,119

to make sure that the liquid oxygen

1437

00:55:30,390 --> 00:55:28,640

hydrogen that are still in the tanks are

1438

00:55:33,190 --> 00:55:30,400

settled back down to the bottom of the

1439

00:55:34,870 --> 00:55:33,200

tank to get ready for main engine start

1440

00:55:37,030 --> 00:55:34,880

that's a unique thing with the r110

1441

00:55:39,190 --> 00:55:37,040

engine is you can do multiple starts

1442

00:55:40,950 --> 00:55:39,200

with it to support a mission like this

1443

00:55:42,470 --> 00:55:40,960

and the trajectories you need and the

1444

00:55:44,710 --> 00:55:42,480

purpose of that is when they get ready

1445

00:55:47,190 --> 00:55:44,720

for main engine start they will fire

1446

00:55:49,270 --> 00:55:47,200

that engine for seven minutes to get us

1447

00:55:50,950 --> 00:55:49,280

into that transfer trajectory orbit that

1448

00:55:52,870 --> 00:55:50,960

we talked about basically breaking out

1449

00:55:56,309 --> 00:55:52,880

of that circular orbit around earth and

1450

00:55:58,309 --> 00:55:56,319

getting into a transfer orbit to

1451  
00:56:00,230 --> 00:55:58,319  
head on towards the sun and start its

1452  
00:56:02,470 --> 00:56:00,240  
science mission so that's a very

1453  
00:56:04,630 --> 00:56:02,480  
important burn to make sure we get out

1454  
00:56:06,470 --> 00:56:04,640  
of the earth orbit and on towards the

1455  
00:56:09,030 --> 00:56:06,480  
sun and we can see

1456  
00:56:11,910 --> 00:56:09,040  
in this uh animation here

1457  
00:56:13,829 --> 00:56:11,920  
that there's subtle little firings there

1458  
00:56:15,510 --> 00:56:13,839  
yeah that's the rcs thrusters settling

1459  
00:56:17,510 --> 00:56:15,520  
the vehicle and getting ready for that

1460  
00:56:19,349 --> 00:56:17,520  
main engine start too

1461  
00:56:21,910 --> 00:56:19,359  
all right and so as we stand by for that

1462  
00:56:24,870 --> 00:56:21,920  
we're going to send it back to the asoc

1463  
00:56:26,630 --> 00:56:24,880

joshua we'll let it let you have it and

1464

00:56:28,470 --> 00:56:26,640

we'll continue to monitor

1465

00:56:29,589 --> 00:56:28,480

the discussion here between the launch

1466

00:56:32,630 --> 00:56:29,599

teams and

1467

00:56:33,990 --> 00:56:32,640

the centaur rocket in coast phase

1468

00:56:36,150 --> 00:56:34,000

thanks guys appreciate that update we

1469

00:56:37,670 --> 00:56:36,160

are very excited uh and as solar orbiter

1470

00:56:40,069 --> 00:56:37,680

continues pressing on to spacecraft

1471

00:56:43,990 --> 00:56:40,079

separation let's take a closer look at

1472

00:56:45,349 --> 00:56:44,000

what's ahead for this mighty explorer

1473

00:56:47,190 --> 00:56:45,359

ever since we've been pointing

1474

00:56:48,870 --> 00:56:47,200

spacecraft at the sun

1475

00:56:51,589 --> 00:56:48,880

two regions on our star have been

1476

00:56:53,670 --> 00:56:51,599

missing from satellite images

1477

00:56:55,910 --> 00:56:53,680

the sun's two poles have never been

1478

00:56:57,430 --> 00:56:55,920

mapped because all the solar images

1479

00:56:58,870 --> 00:56:57,440

we've built have remained in the

1480

00:57:01,109 --> 00:56:58,880

ecliptic plane

1481

00:57:03,190 --> 00:57:01,119

the swath of space roughly aligned with

1482

00:57:04,549 --> 00:57:03,200

the sun's equator where all the planets

1483

00:57:06,710 --> 00:57:04,559

orbit

1484

00:57:09,349 --> 00:57:06,720

a new mission from the european space

1485

00:57:11,349 --> 00:57:09,359

agency and nasa called solar orbiter

1486

00:57:14,710 --> 00:57:11,359

aims to escape this plane and take the

1487

00:57:16,630 --> 00:57:14,720

very first images of the poles

1488

00:57:18,230 --> 00:57:16,640

the planets are all moving and circling

1489

00:57:20,470 --> 00:57:18,240

the sun and so we already have some

1490

00:57:22,230 --> 00:57:20,480

velocity going one way if we want to

1491

00:57:23,990 --> 00:57:22,240

launch up out of the ecliptic it

1492

00:57:26,710 --> 00:57:24,000

requires more energy

1493

00:57:29,430 --> 00:57:26,720

to get outside the ecliptic plane solar

1494

00:57:31,349 --> 00:57:29,440

orbiter uses earth's and venus's gravity

1495

00:57:32,470 --> 00:57:31,359

to slingshot itself into a view of the

1496

00:57:34,390 --> 00:57:32,480

poles

1497

00:57:37,349 --> 00:57:34,400

the only other satellite to fly over the

1498

00:57:39,589 --> 00:57:37,359

poles was ulysses which launched in 1990

1499

00:57:41,510 --> 00:57:39,599

to study the solar atmosphere

1500

00:57:43,990 --> 00:57:41,520

but solar orbiter will be the first

1501  
00:57:46,390 --> 00:57:44,000  
mission to capture actual images of this

1502  
00:57:47,910 --> 00:57:46,400  
hard to reach region

1503  
00:57:49,670 --> 00:57:47,920  
scientists think the poles could be the

1504  
00:57:52,549 --> 00:57:49,680  
missing piece to understanding what

1505  
00:57:55,270 --> 00:57:52,559  
drives the sun's activity

1506  
00:57:58,630 --> 00:57:55,280  
every 11 years the sun's magnetic field

1507  
00:58:01,109 --> 00:57:58,640  
flips north becomes south and vice versa

1508  
00:58:03,910 --> 00:58:01,119  
this mysterious process has direct

1509  
00:58:06,309 --> 00:58:03,920  
effects on earth before the poles flip

1510  
00:58:08,470 --> 00:58:06,319  
solar activity reaches its peak the

1511  
00:58:10,710 --> 00:58:08,480  
number of eruptions increases sending

1512  
00:58:12,870 --> 00:58:10,720  
powerful bursts of solar material that

1513  
00:58:16,069 --> 00:58:12,880

can potentially harm our astronauts and

1514

00:58:18,789 --> 00:58:16,079

satellites we don't really have a good

1515

00:58:21,030 --> 00:58:18,799

understanding of the global solar

1516

00:58:23,589 --> 00:58:21,040

behavior another one of the missions

1517

00:58:27,030 --> 00:58:23,599

goals is to monitor how these eruptions

1518

00:58:29,829 --> 00:58:27,040

and solar material travel through space

1519

00:58:31,990 --> 00:58:29,839

using a suite of 10 instruments solar

1520

00:58:34,710 --> 00:58:32,000

orbiter observes an active region on the

1521

00:58:36,390 --> 00:58:34,720

surface as it explodes and then also

1522

00:58:38,150 --> 00:58:36,400

takes measurements as the escaping

1523

00:58:39,510 --> 00:58:38,160

material passes directly by the

1524

00:58:41,910 --> 00:58:39,520

spacecraft

1525

00:58:44,789 --> 00:58:41,920

solar orbiter will give us a

1526  
00:58:45,670 --> 00:58:44,799  
comprehensive full view of the entire

1527  
00:58:50,069 --> 00:58:45,680  
sun

1528  
00:58:52,390 --> 00:58:50,079  
the entire solar system at close's

1529  
00:58:55,030 --> 00:58:52,400  
approach solar orbiter will be closer to

1530  
00:58:58,150 --> 00:58:55,040  
the sun than mercury at a mere distance

1531  
00:58:59,990 --> 00:58:58,160  
of 26 million miles away the ideal

1532  
00:59:02,789 --> 00:59:00,000  
distance to get a comprehensive view of

1533  
00:59:04,789 --> 00:59:02,799  
the sun and its surrounding atmosphere

1534  
00:59:06,630 --> 00:59:04,799  
it will fly close to the sun every six

1535  
00:59:08,549 --> 00:59:06,640  
months and endure temperatures more than

1536  
00:59:11,109 --> 00:59:08,559  
900 degrees fahrenheit

1537  
00:59:13,510 --> 00:59:11,119  
to survive the intense radiation a large

1538  
00:59:15,910 --> 00:59:13,520

titanium shield protects the instruments

1539

00:59:17,510 --> 00:59:15,920

while a carefully orchestrated dance of

1540

00:59:19,670 --> 00:59:17,520

opening and closing eye holes in the

1541

00:59:21,270 --> 00:59:19,680

shield allows the instruments to peep

1542

00:59:23,109 --> 00:59:21,280

out at the right time

1543

00:59:25,670 --> 00:59:23,119

other instruments will directly measure

1544

00:59:26,710 --> 00:59:25,680

solar material from behind the shadow of

1545

00:59:28,789 --> 00:59:26,720

the shield

1546

00:59:30,870 --> 00:59:28,799

all of these observations will tell us

1547

00:59:33,829 --> 00:59:30,880

more about the sun than we've ever known

1548

00:59:36,390 --> 00:59:33,839

before and by the end of the seven year

1549

00:59:38,390 --> 00:59:36,400

mission we will have seen our star in a

1550

00:59:42,069 --> 00:59:38,400

completely new way

1551  
00:59:43,510 --> 00:59:42,079  
our understanding of the sun will change

1552  
00:59:46,030 --> 00:59:43,520  
dramatically

1553  
00:59:50,110 --> 00:59:46,040  
i will say that we are living in a

1554  
01:00:01,510 --> 00:59:50,120  
revolutionary moment in our field

1555  
01:00:04,950 --> 01:00:03,109  
so we'll get back to solar orbit in just

1556  
01:00:07,190 --> 01:00:04,960  
a minute but right now i'm joined by

1557  
01:00:08,950 --> 01:00:07,200  
kennedy space center director

1558  
01:00:10,950 --> 01:00:08,960  
four-time shuttle astronaut space

1559  
01:00:12,950 --> 01:00:10,960  
enthusiast all-around good guy second

1560  
01:00:15,190 --> 01:00:12,960  
longest running center director actually

1561  
01:00:18,069 --> 01:00:15,200  
now um coming up on the first

1562  
01:00:19,670 --> 01:00:18,079  
and not too long um bob cabana great to

1563  
01:00:20,789 --> 01:00:19,680

be here josh hey thanks for joining us

1564

01:00:23,109 --> 01:00:20,799

appreciate you taking some time for us

1565

01:00:24,549 --> 01:00:23,119

another great launch by the ula atlas 5

1566

01:00:26,950 --> 01:00:24,559

and our launch services program here at

1567

01:00:29,109 --> 01:00:26,960

the kennedy space center so beautiful

1568

01:00:30,470 --> 01:00:29,119

man awesome so i know that you love to

1569

01:00:31,750 --> 01:00:30,480

kind of think a big picture and talk a

1570

01:00:33,030 --> 01:00:31,760

big picture when it comes to the work

1571

01:00:35,109 --> 01:00:33,040

that the kennedy space and nasa are

1572

01:00:37,510 --> 01:00:35,119

doing so how does the solar orbiter kind

1573

01:00:39,109 --> 01:00:37,520

of fit in the big picture of what nasa

1574

01:00:42,390 --> 01:00:39,119

is doing how is this

1575

01:00:44,630 --> 01:00:42,400

a part of our universe absolutely so uh

1576

01:00:47,270 --> 01:00:44,640

solar orbiter is on its way to study the

1577

01:00:49,829 --> 01:00:47,280

sun right and one of the issues that we

1578

01:00:52,950 --> 01:00:49,839

have is sending astronauts beyond our

1579

01:00:55,190 --> 01:00:52,960

home planet so with artemis we're going

1580

01:00:57,349 --> 01:00:55,200

back to the moon and the ultimate goal

1581

01:00:59,510 --> 01:00:57,359

is get on to mars right right and we

1582

01:01:01,670 --> 01:00:59,520

need to understand better the sun and

1583

01:01:03,750 --> 01:01:01,680

the environment beyond our home planet

1584

01:01:05,670 --> 01:01:03,760

in order to protect astronauts from that

1585

01:01:08,309 --> 01:01:05,680

harmful ultraviolet radiation from all

1586

01:01:10,710 --> 01:01:08,319

that's going on in space so

1587

01:01:12,789 --> 01:01:10,720

i think you know this is great this is

1588

01:01:14,549 --> 01:01:12,799

what we have as a combination of science

1589

01:01:16,470 --> 01:01:14,559

and our exploration programs working

1590

01:01:18,549 --> 01:01:16,480

together so that we understand

1591

01:01:21,589 --> 01:01:18,559

so right now at kennedy

1592

01:01:23,510 --> 01:01:21,599

i'm focused on two things first off i

1593

01:01:24,789 --> 01:01:23,520

want to see commercial crew flying i

1594

01:01:26,549 --> 01:01:24,799

want to get astronauts to the

1595

01:01:29,589 --> 01:01:26,559

international space station on a us

1596

01:01:32,150 --> 01:01:29,599

rocket from u.s soil with two partners

1597

01:01:35,270 --> 01:01:32,160

that's right both spacex and boeing you

1598

01:01:37,589 --> 01:01:35,280

got to get them both both going and then

1599

01:01:39,829 --> 01:01:37,599

you know the artemis program

1600

01:01:41,030 --> 01:01:39,839

artemis one artemis one

1601  
01:01:42,630 --> 01:01:41,040  
kennedy space center is going to be

1602  
01:01:45,030 --> 01:01:42,640  
ready for that rocket when it arrives

1603  
01:01:46,470 --> 01:01:45,040  
the space launch system the core stage

1604  
01:01:48,390 --> 01:01:46,480  
is over at the stennis space center

1605  
01:01:49,750 --> 01:01:48,400  
right now in the b2 test stand getting

1606  
01:01:51,190 --> 01:01:49,760  
ready for its green run a complete

1607  
01:01:52,549 --> 01:01:51,200  
testing of that rocket they're doing

1608  
01:01:54,309 --> 01:01:52,559  
modal testing then they're going to fire

1609  
01:01:55,029 --> 01:01:54,319  
the engines full firing

1610  
01:01:57,109 --> 01:01:55,039  
and

1611  
01:01:59,589 --> 01:01:57,119  
really document the rocket before they

1612  
01:02:01,190 --> 01:01:59,599  
ship it to us for processing here the

1613  
01:02:03,589 --> 01:02:01,200

orion spacecraft the lockheed martin

1614

01:02:05,190 --> 01:02:03,599

orion spacecraft that's up at the plum

1615

01:02:07,109 --> 01:02:05,200

brook facility at the glen research

1616

01:02:08,950 --> 01:02:07,119

center up in ohio and it's going through

1617

01:02:11,270 --> 01:02:08,960

thermal back testing it's going to be

1618

01:02:14,470 --> 01:02:11,280

back here around april time frame and

1619

01:02:16,870 --> 01:02:14,480

then it'll be ready for processing so

1620

01:02:19,430 --> 01:02:16,880

we're going to get the spacecraft here

1621

01:02:21,990 --> 01:02:19,440

and then the core stage we've already

1622

01:02:24,549 --> 01:02:22,000

got solid rocket motor segments arriving

1623

01:02:26,549 --> 01:02:24,559

and we're going to send orion

1624

01:02:28,789 --> 01:02:26,559

on a test without crew

1625

01:02:29,990 --> 01:02:28,799

in and around the moon right they're not

1626

01:02:31,190 --> 01:02:30,000

going to land it's just going to be

1627

01:02:32,549 --> 01:02:31,200

without crew it's going to go around the

1628

01:02:34,789 --> 01:02:32,559

moon we're going to really document the

1629

01:02:36,309 --> 01:02:34,799

spacecraft how it operates and make sure

1630

01:02:40,309 --> 01:02:36,319

that it's safe so that we can launch

1631

01:02:42,470 --> 01:02:40,319

astronauts in 2022 to the moon and then

1632

01:02:43,910 --> 01:02:42,480

you know the goal is having

1633

01:02:46,309 --> 01:02:43,920

the next man and the first woman on the

1634

01:02:47,750 --> 01:02:46,319

moon in 2024 that's a huge challenge

1635

01:02:49,109 --> 01:02:47,760

that we've been given by the president

1636

01:02:51,430 --> 01:02:49,119

and we're going to do our very best to

1637

01:02:53,190 --> 01:02:51,440

make that happen and uh

1638

01:02:54,950 --> 01:02:53,200

with the budget we got to come and i

1639

01:02:56,870 --> 01:02:54,960

just can't wait you know the budget had

1640

01:02:58,470 --> 01:02:56,880

the news cycle today so people had got a

1641

01:03:00,150 --> 01:02:58,480

chance to see that a little bit um so

1642

01:03:02,630 --> 01:03:00,160

there was definitely a nice little bump

1643

01:03:04,069 --> 01:03:02,640

up for nasa uh from the president yeah

1644

01:03:06,069 --> 01:03:04,079

it's awesome we're super grateful for

1645

01:03:06,789 --> 01:03:06,079

that absolutely just a great confidence

1646

01:03:09,270 --> 01:03:06,799

man

1647

01:03:10,789 --> 01:03:09,280

you know we got to make this i can't

1648

01:03:12,470 --> 01:03:10,799

we got the money now we got to go do it

1649

01:03:14,309 --> 01:03:12,480

that's right we got to go do it so and

1650

01:03:16,630 --> 01:03:14,319

obviously solar orbiter playing a part

1651

01:03:18,309 --> 01:03:16,640

in that again giving us that

1652

01:03:19,910 --> 01:03:18,319

understanding of the world beyond the

1653

01:03:21,829 --> 01:03:19,920

van allen belts that are so great

1654

01:03:23,270 --> 01:03:21,839

protecting us complete package

1655

01:03:24,230 --> 01:03:23,280

so anything else coming up for you

1656

01:03:26,150 --> 01:03:24,240

things you're thinking about obviously

1657

01:03:28,549 --> 01:03:26,160

we have march 2020 coming up this year

1658

01:03:30,470 --> 01:03:28,559

yeah you know march 2020 ships here on

1659

01:03:33,510 --> 01:03:30,480

tuesday on its way to the kennedy space

1660

01:03:36,150 --> 01:03:33,520

center that's right jpl and i you know i

1661

01:03:37,829 --> 01:03:36,160

look back on the curiosity rover and i

1662

01:03:39,430 --> 01:03:37,839

thought that was so cool you know it

1663

01:03:41,109 --> 01:03:39,440

came here and i got to see it i put a

1664

01:03:42,789 --> 01:03:41,119

bunny suit on went in and saw it when it

1665

01:03:44,390 --> 01:03:42,799

was over in the phsf getting processed

1666

01:03:46,309 --> 01:03:44,400

and everything and then i went out to

1667

01:03:48,230 --> 01:03:46,319

jpl when it landed and this is going to

1668

01:03:50,150 --> 01:03:48,240

be the same thing it's another rover the

1669

01:03:51,270 --> 01:03:50,160

same size as curiosity that we're

1670

01:03:53,829 --> 01:03:51,280

putting down

1671

01:03:55,190 --> 01:03:53,839

uh on the surface of mars right and i

1672

01:03:56,789 --> 01:03:55,200

thought well it's no big deal you know

1673

01:03:58,789 --> 01:03:56,799

they're watching it it's it's all

1674

01:04:00,470 --> 01:03:58,799

delayed it's all automated it's not like

1675

01:04:01,990 --> 01:04:00,480

it it's not like human space flight

1676

01:04:03,829 --> 01:04:02,000

human in the loop and all that stuff and

1677

01:04:05,190 --> 01:04:03,839

it they're seeing it eight minutes after

1678

01:04:07,029 --> 01:04:05,200

it happened it was one of the most

1679

01:04:09,190 --> 01:04:07,039

exciting things i've ever done it was so

1680

01:04:11,190 --> 01:04:09,200

cool you know getting the reports back

1681

01:04:13,750 --> 01:04:11,200

and watching it and you know and then to

1682

01:04:15,670 --> 01:04:13,760

see you know that rover on mars we've

1683

01:04:17,029 --> 01:04:15,680

gotten some amazing imagery back now

1684

01:04:17,829 --> 01:04:17,039

we've got to get humans there you know

1685

01:04:20,309 --> 01:04:17,839

yes

1686

01:04:22,230 --> 01:04:20,319

robots rovers they're the precursors to

1687

01:04:24,549 --> 01:04:22,240

sending humans but uh you know that

1688

01:04:26,309 --> 01:04:24,559

that's the goal in the 2030s to be

1689

01:04:27,990 --> 01:04:26,319

having humans on the surface of mars i

1690

01:04:31,029 --> 01:04:28,000

can't wait yeah we're all excited for

1691

01:04:32,390 --> 01:04:31,039

that obviously uh this this rover is the

1692

01:04:34,069 --> 01:04:32,400

same size but different science

1693

01:04:35,990 --> 01:04:34,079

instruments so it's not a one for one

1694

01:04:38,150 --> 01:04:36,000

company no no i know um and we also have

1695

01:04:40,390 --> 01:04:38,160

a helicopter on board this time which is

1696

01:04:41,829 --> 01:04:40,400

super exciting i'm gonna let you get

1697

01:04:43,510 --> 01:04:41,839

back and listen into the rest of the the

1698

01:04:45,990 --> 01:04:43,520

flight here and i'm gonna send you back

1699

01:04:47,670 --> 01:04:46,000

out now to blair who's out um oh awesome

1700

01:04:49,750 --> 01:04:47,680

those nasty edge guys are really cool

1701

01:04:52,470 --> 01:04:49,760

yeah say hello blair's online now hey

1702

01:04:54,470 --> 01:04:52,480

blair hey bob i gotta tell you with

1703

01:04:56,549 --> 01:04:54,480

curiosity there were seven minutes of

1704

01:04:59,349 --> 01:04:56,559

terror with bob cabana you get seven

1705

01:05:01,589 --> 01:04:59,359

minutes of pure unadulterated enthusiasm

1706

01:05:03,589 --> 01:05:01,599

they're really exciting to hear from him

1707

01:05:05,670 --> 01:05:03,599

but we're also very excited about solar

1708

01:05:07,829 --> 01:05:05,680

orbiter tonight and before the launch i

1709

01:05:09,990 --> 01:05:07,839

had a chance to sit down

1710

01:05:12,710 --> 01:05:10,000

with cesar garcia the project manager

1711

01:05:14,789 --> 01:05:12,720

from esa for solar orbiter let's hear

1712

01:05:16,950 --> 01:05:14,799

from him

1713

01:05:19,109 --> 01:05:16,960

we're here at astrotech space operation

1714

01:05:22,309 --> 01:05:19,119

with european space agency project

1715

01:05:24,710 --> 01:05:22,319

manager for the solar orbiter caesar

1716

01:05:26,630 --> 01:05:24,720

garcia caesar thanks so much for being

1717

01:05:29,109 --> 01:05:26,640

here today thank you for having me the

1718

01:05:30,710 --> 01:05:29,119

first question i want to ask you is tell

1719

01:05:31,750 --> 01:05:30,720

us a little bit about the overall

1720

01:05:34,390 --> 01:05:31,760

mission

1721

01:05:36,630 --> 01:05:34,400

for solar orbiter okay solar orbiter

1722

01:05:38,470 --> 01:05:36,640

mission as the name shows it's a space

1723

01:05:40,870 --> 01:05:38,480

mission that will orbit

1724

01:05:43,190 --> 01:05:40,880

around the sun in ways which we have not

1725

01:05:45,510 --> 01:05:43,200

done before we will be different in that

1726

01:05:47,589 --> 01:05:45,520

we will be relatively close to the sun

1727

01:05:49,750 --> 01:05:47,599

and we will also change the orbital

1728

01:05:51,910 --> 01:05:49,760

plane so that we can observe the poles

1729

01:05:53,670 --> 01:05:51,920

of the sun we will investigate also the

1730

01:05:55,430 --> 01:05:53,680

solar wind and features close to the

1731

01:05:56,950 --> 01:05:55,440

surface of the sun

1732

01:05:58,950 --> 01:05:56,960

then they will also look into the

1733

01:06:00,789 --> 01:05:58,960

heliosphere and we all live in the

1734

01:06:03,029 --> 01:06:00,799

heliosphere of the sun

1735

01:06:05,910 --> 01:06:03,039

and finally they will investigate the

1736

01:06:09,349 --> 01:06:05,920

reasons why we have this 11-year cycle

1737

01:06:11,029 --> 01:06:09,359

and what drives these solar variability

1738

01:06:12,789 --> 01:06:11,039

some of the instruments are going to be

1739

01:06:14,789 --> 01:06:12,799

capturing images

1740

01:06:17,589 --> 01:06:14,799

what are those images going to look like

1741

01:06:20,230 --> 01:06:17,599

well we capture images in various

1742

01:06:22,309 --> 01:06:20,240

frequencies across the spectrum

1743

01:06:24,390 --> 01:06:22,319

normally science instruments or well

1744

01:06:27,190 --> 01:06:24,400

also earth observation instruments they

1745

01:06:29,510 --> 01:06:27,200

don't take what we call white light

1746

01:06:30,870 --> 01:06:29,520

pictures we try to take pictures in a

1747

01:06:32,710 --> 01:06:30,880

very small

1748

01:06:34,950 --> 01:06:32,720

frequency band and then we combine those

1749

01:06:37,430 --> 01:06:34,960

various frequencies to create broad

1750

01:06:39,430 --> 01:06:37,440

spectrum images now solar orbiter has

1751

01:06:41,750 --> 01:06:39,440

instruments in the visible

1752

01:06:43,589 --> 01:06:41,760

so the various colors of the visible a

1753

01:06:45,589 --> 01:06:43,599

little bit in the infrared also in the

1754

01:06:48,309 --> 01:06:45,599

ultraviolet spectrum

1755

01:06:50,390 --> 01:06:48,319

and all the way up to the x-rays so the

1756

01:06:52,470 --> 01:06:50,400

various instruments will detect these

1757

01:06:54,309 --> 01:06:52,480

images in different ways and what the

1758

01:06:56,549 --> 01:06:54,319

scientists do they combine various

1759

01:06:57,829 --> 01:06:56,559

frequencies to create well pretty

1760

01:06:59,270 --> 01:06:57,839

pictures that's the one we have in the

1761

01:07:00,549 --> 01:06:59,280

background here

1762

01:07:03,430 --> 01:07:00,559

that's one element and the second

1763

01:07:05,829 --> 01:07:03,440

element is that the various instruments

1764

01:07:07,349 --> 01:07:05,839

they have different fields of view

1765

01:07:09,670 --> 01:07:07,359

some of the instruments will be able to

1766

01:07:11,109 --> 01:07:09,680

capture the complete solar disk

1767

01:07:13,510 --> 01:07:11,119

and at the same time they will be able

1768

01:07:15,029 --> 01:07:13,520

to look with very high resolution into

1769

01:07:16,230 --> 01:07:15,039

very small portions

1770

01:07:17,510 --> 01:07:16,240

of the sand

1771

01:07:18,870 --> 01:07:17,520

some of the instruments will be looking

1772

01:07:21,510 --> 01:07:18,880

at the rim

1773

01:07:23,829 --> 01:07:21,520

or to make things more interesting

1774

01:07:25,430 --> 01:07:23,839

once one of the instruments detects a

1775

01:07:27,109 --> 01:07:25,440

feature of interest he will send

1776

01:07:29,349 --> 01:07:27,119

automatically a trigger to the other

1777

01:07:31,430 --> 01:07:29,359

instruments so that they can also change

1778

01:07:34,309 --> 01:07:31,440

mode of operation and focus on that

1779

01:07:36,789 --> 01:07:34,319

specific feature to learn more about it

1780

01:07:39,430 --> 01:07:36,799

and if that involves for instance the

1781

01:07:40,630 --> 01:07:39,440

ejection of material or a change to the

1782

01:07:43,029 --> 01:07:40,640

solar wind

1783

01:07:44,710 --> 01:07:43,039

when that happens on the spacecraft then

1784

01:07:48,069 --> 01:07:44,720

also the in-situ instruments will be

1785

01:07:50,789 --> 01:07:48,079

able to react and to sense that specific

1786

01:07:52,549 --> 01:07:50,799

feature and that combination of things

1787

01:07:54,549 --> 01:07:52,559

which happen on the surface or close to

1788

01:07:56,230 --> 01:07:54,559

the surface of the sun and then

1789

01:07:57,589 --> 01:07:56,240

at the location later on at the location

1790

01:07:59,750 --> 01:07:57,599

of the spacecraft

1791

01:08:01,510 --> 01:07:59,760

is one of the key features and unique

1792

01:08:03,190 --> 01:08:01,520

features of solar orbiter

1793

01:08:05,270 --> 01:08:03,200

there are a lot of fascinating and

1794

01:08:06,950 --> 01:08:05,280

important instruments on the spacecraft

1795

01:08:08,950 --> 01:08:06,960

if the scientists see something

1796

01:08:11,029 --> 01:08:08,960

interesting during an observation do

1797

01:08:11,990 --> 01:08:11,039

they have the ability to adapt and and

1798

01:08:14,390 --> 01:08:12,000

sort of

1799

01:08:16,870 --> 01:08:14,400

reorient to to take a look at that

1800

01:08:19,269 --> 01:08:16,880

interesting event yeah they they want to

1801

01:08:21,430 --> 01:08:19,279

maximize the opportunities of course and

1802

01:08:22,950 --> 01:08:21,440

there are several ways of doing that

1803

01:08:24,470 --> 01:08:22,960

one way is something that we call the

1804

01:08:25,829 --> 01:08:24,480

short-term planning

1805

01:08:27,749 --> 01:08:25,839

as opposed to long-term planning

1806

01:08:30,309 --> 01:08:27,759

long-term planning is what the

1807

01:08:32,550 --> 01:08:30,319

scientists do they plan every instrument

1808

01:08:33,749 --> 01:08:32,560

every note of operation like six months

1809

01:08:36,309 --> 01:08:33,759

in advance

1810

01:08:39,030 --> 01:08:36,319

however every 24 hours if they see a

1811

01:08:41,030 --> 01:08:39,040

particular feature or if there is a

1812

01:08:43,430 --> 01:08:41,040

signal coming from a different space

1813

01:08:45,749 --> 01:08:43,440

mission or from the ground then they can

1814

01:08:47,430 --> 01:08:45,759

change in very short time what the

1815

01:08:49,430 --> 01:08:47,440

instruments will be doing in the next

1816

01:08:51,349 --> 01:08:49,440

observation day

1817

01:08:52,870 --> 01:08:51,359

it must feel really good now because

1818

01:08:54,309 --> 01:08:52,880

everything clearly is here on the

1819

01:08:56,470 --> 01:08:54,319

spacecraft and

1820

01:08:58,870 --> 01:08:56,480

ready to go it's got to be a good sense

1821

01:09:00,950 --> 01:08:58,880

of accomplishment i think so i think

1822

01:09:02,550 --> 01:09:00,960

that uh overall you know when you

1823

01:09:05,189 --> 01:09:02,560

develop a space mission there are always

1824

01:09:06,709 --> 01:09:05,199

many challenges there are moments

1825

01:09:08,229 --> 01:09:06,719

where you don't really know if there is

1826

01:09:09,510 --> 01:09:08,239

a technical solution for the problems

1827

01:09:11,030 --> 01:09:09,520

you're facing

1828

01:09:14,229 --> 01:09:11,040

then you know it takes time it takes

1829

01:09:16,149 --> 01:09:14,239

effort it takes teamwork and now once

1830

01:09:18,309 --> 01:09:16,159

you move to the launch space

1831

01:09:20,630 --> 01:09:18,319

then it's like an army i mean different

1832

01:09:23,110 --> 01:09:20,640

armies they are sort of coming together

1833

01:09:24,550 --> 01:09:23,120

and sometimes people who you never met

1834

01:09:25,749 --> 01:09:24,560

but they've been working on this mission

1835

01:09:27,669 --> 01:09:25,759

for years

1836

01:09:29,910 --> 01:09:27,679

then you get to meet those people and

1837

01:09:31,349 --> 01:09:29,920

then you you realize that everybody's

1838

01:09:33,269 --> 01:09:31,359

working to the same goal and i think

1839

01:09:37,749 --> 01:09:33,279

this yeah it's a real sense of

1840

01:09:41,349 --> 01:09:39,749

well and here we have it a successful

1841

01:09:44,229 --> 01:09:41,359

launch and that team that caesar

1842

01:09:46,709 --> 01:09:44,239

mentioned is uh very proud and excited

1843

01:09:49,669 --> 01:09:46,719

at this time and uh we just want to

1844

01:09:50,789 --> 01:09:49,679

congratulate them and back to you joshua

1845

01:09:52,070 --> 01:09:50,799

take it away

1846

01:09:53,510 --> 01:09:52,080

hey thanks blair yeah obviously that

1847

01:09:55,270 --> 01:09:53,520

international collaboration is such a

1848

01:09:56,870 --> 01:09:55,280

theme running throughout this program

1849

01:09:58,390 --> 01:09:56,880

and throughout this entire mission we're

1850

01:09:59,750 --> 01:09:58,400

glad to have them on board we did want

1851  
01:10:01,350 --> 01:09:59,760  
to kind of cycle back again and go

1852  
01:10:02,870 --> 01:10:01,360  
through the fact that this afternoon

1853  
01:10:04,709 --> 01:10:02,880  
this evening there was a northrop

1854  
01:10:06,630 --> 01:10:04,719  
grumman antary scheduled to launch and

1855  
01:10:08,550 --> 01:10:06,640  
it was scrubbed

1856  
01:10:10,790 --> 01:10:08,560  
after off nominal readings from a ground

1857  
01:10:12,310 --> 01:10:10,800  
support sensor northrop grumman and nasa

1858  
01:10:14,790 --> 01:10:12,320  
have said the next launch attempt to

1859  
01:10:16,870 --> 01:10:14,800  
know earlier than february 13th at 406

1860  
01:10:19,030 --> 01:10:16,880  
pm eastern time due to unfavorable

1861  
01:10:20,630 --> 01:10:19,040  
weather forecast over the next two days

1862  
01:10:22,950 --> 01:10:20,640  
and time required to address the ground

1863  
01:10:24,790 --> 01:10:22,960

support issue nasa tv coverage of the

1864

01:10:27,189 --> 01:10:24,800

launch will begin at about 3 30 pm

1865

01:10:29,990 --> 01:10:27,199

eastern time and teams will refresh 24

1866

01:10:31,510 --> 01:10:30,000

hour late load cargo the day before the

1867

01:10:33,270 --> 01:10:31,520

antares rocket and cygnus spacecraft

1868

01:10:35,110 --> 01:10:33,280

remain healthy launch thursday would

1869

01:10:36,790 --> 01:10:35,120

result in a capture of cygnus on

1870

01:10:39,510 --> 01:10:36,800

saturday february 15th for more

1871

01:10:41,590 --> 01:10:39,520

information visit [nasa.gov](http://nasa.gov) northrop

1872

01:10:43,110 --> 01:10:41,600

grumman and [nasa.gov](http://nasa.gov)

1873

01:10:44,790 --> 01:10:43,120

we're going to send you back over now to

1874

01:10:47,270 --> 01:10:44,800

mick and daryl who are going to take you

1875

01:10:48,870 --> 01:10:47,280

through spacecraft separation so this is

1876

01:10:51,030 --> 01:10:48,880

uh still not quite the end of the

1877

01:10:52,630 --> 01:10:51,040

mission today but another huge milestone

1878

01:10:55,030 --> 01:10:52,640

daryl make take it away that's right

1879

01:10:55,830 --> 01:10:55,040

joshua it's a big moment that everybody

1880

01:11:03,590 --> 01:10:55,840

is

1881

01:11:05,590 --> 01:11:03,600

woltman i'm daryl nail 25 years as a

1882

01:11:07,189 --> 01:11:05,600

vehicle systems engineer so he's got all

1883

01:11:08,790 --> 01:11:07,199

the knowledge to help break this down

1884

01:11:10,390 --> 01:11:08,800

and i will tell you it's exciting every

1885

01:11:13,110 --> 01:11:10,400

time we launch the next mission is the

1886

01:11:14,790 --> 01:11:13,120

most important and uh tonight was uh

1887

01:11:15,990 --> 01:11:14,800

great to see so order get off the ground

1888

01:11:17,990 --> 01:11:16,000

and like you said we still have some

1889

01:11:20,630 --> 01:11:18,000

things to do to make sure it's a mission

1890

01:11:22,390 --> 01:11:20,640

success but we're moving along and

1891

01:11:23,990 --> 01:11:22,400

things are looking really well centaur

1892

01:11:25,910 --> 01:11:24,000

is in its

1893

01:11:27,510 --> 01:11:25,920

phases of settling propellants and

1894

01:11:28,390 --> 01:11:27,520

getting ready for that main engine start

1895

01:11:29,990 --> 01:11:28,400

too

1896

01:11:32,310 --> 01:11:30,000

coming up so uh things are looking

1897

01:11:33,750 --> 01:11:32,320

really good yeah and he's not just uh

1898

01:11:36,070 --> 01:11:33,760

just saying that folks i literally got

1899

01:11:38,070 --> 01:11:36,080

to watch him get a little giddy as uh as

1900

01:11:39,510 --> 01:11:38,080

we're getting ready to lift off so it's

1901

01:11:41,430 --> 01:11:39,520

an exciting moment

1902

01:11:43,910 --> 01:11:41,440

we are in that coast phase we've been in

1903

01:11:46,390 --> 01:11:43,920

this coast phase um for quite a period

1904

01:11:48,229 --> 01:11:46,400

of time now we've got a few minutes left

1905

01:11:50,070 --> 01:11:48,239

in it and as you mentioned before you

1906

01:11:52,470 --> 01:11:50,080

can see in this graphical representation

1907

01:11:55,110 --> 01:11:52,480

that um there are thrusters that are

1908

01:11:57,910 --> 01:11:55,120

being fired from time to time

1909

01:11:59,830 --> 01:11:57,920

to settle that fuel inside of uh

1910

01:12:01,910 --> 01:11:59,840

inside of the centaur and that will

1911

01:12:04,470 --> 01:12:01,920

allow it to restart it's really one of

1912

01:12:07,430 --> 01:12:04,480

the keys to this vehicle and this

1913

01:12:09,510 --> 01:12:07,440

vehicle in fact is pretty reliable it's

1914

01:12:11,990 --> 01:12:09,520

gotten really good at doing this and it

1915

01:12:14,709 --> 01:12:12,000

goes all the way back to the 1960s yeah

1916

01:12:17,189 --> 01:12:14,719

centaur was designed uh for multiple uh

1917

01:12:19,750 --> 01:12:17,199

engine starts and and missions like this

1918

01:12:20,870 --> 01:12:19,760

uh so it's a very reliable uh vehicle to

1919

01:12:23,110 --> 01:12:20,880

get that way

1920

01:12:24,950 --> 01:12:23,120

we're seeing now that we have pre-chill

1921

01:12:26,390 --> 01:12:24,960

down on the engine which means the

1922

01:12:28,550 --> 01:12:26,400

engine is chilling down and getting

1923

01:12:31,189 --> 01:12:28,560

ready for fuels to

1924

01:12:33,350 --> 01:12:31,199

get through and start up ignition the

1925

01:12:35,910 --> 01:12:33,360

igniters would fire and we would get

1926

01:12:38,149 --> 01:12:35,920

mess two or standing by for that call

1927

01:12:39,350 --> 01:12:38,159

right now we should be coming up on main

1928

01:12:41,350 --> 01:12:39,360

engine start

1929

01:12:42,870 --> 01:12:41,360

fairly shortly

1930

01:12:46,390 --> 01:12:42,880

chamber pressure looks good so we just

1931

01:12:48,470 --> 01:12:46,400

heard that we have full thrust and

1932

01:12:51,910 --> 01:12:48,480

main engine has started and body rates

1933

01:12:55,350 --> 01:12:51,920

look good for this seven minute burn of

1934

01:12:58,149 --> 01:12:55,360

the centaur engine this is a key burn

1935

01:12:59,910 --> 01:12:58,159

as it re-fires that engine and starts to

1936

01:13:02,470 --> 01:12:59,920

get

1937

01:13:03,110 --> 01:13:02,480

into that transfer orbit right and it's

1938

01:13:07,910 --> 01:13:03,120

a

1939

01:13:09,830 --> 01:13:07,920

now it needs to get on to its

1940

01:13:11,590 --> 01:13:09,840

destination yeah it's gonna it's gonna

1941

01:13:14,229 --> 01:13:11,600

fire and get us into that transfer

1942

01:13:15,750 --> 01:13:14,239

trajectory uh to get uh soul orbiter on

1943

01:13:19,750 --> 01:13:15,760

its way to the sun which is very

1944

01:13:21,830 --> 01:13:19,760

important uh for us so once this burn uh

1945

01:13:24,070 --> 01:13:21,840

happens we get through this successful

1946

01:13:26,229 --> 01:13:24,080

seven minute burn uh we'll be coming up

1947

01:13:28,550 --> 01:13:26,239

on spacecraft separation which will be

1948

01:13:29,750 --> 01:13:28,560

another major milestone for us

1949

01:13:32,390 --> 01:13:29,760

however

1950

01:13:34,470 --> 01:13:32,400

we will not be celebrating quite yet

1951

01:13:36,709 --> 01:13:34,480

solar orbiter has to get moving on its

1952

01:13:38,790 --> 01:13:36,719

way and we have to make sure we acquire

1953

01:13:40,630 --> 01:13:38,800

signal from the satellite which will

1954

01:13:42,790 --> 01:13:40,640

happen about four minutes after

1955

01:13:44,709 --> 01:13:42,800

separation so that'll be a major

1956

01:13:47,030 --> 01:13:44,719

milestone for the spacecraft crew and

1957

01:13:49,430 --> 01:13:47,040

the launch team but this milestone of

1958

01:13:51,910 --> 01:13:49,440

main engine start and this burn second

1959

01:13:54,229 --> 01:13:51,920

burn that we refer to is a

1960

01:13:56,870 --> 01:13:54,239

major step in the right direction and of

1961

01:13:59,750 --> 01:13:56,880

course this is a kind of the

1962

01:14:01,669 --> 01:13:59,760

the safe period of this entire

1963

01:14:03,510 --> 01:14:01,679

launch and mission the toughest part is

1964

01:14:08,070 --> 01:14:03,520

getting it off the ground we go back to

1965

01:14:10,310 --> 01:14:08,080

1103 p.m eastern time when it lifted off

1966

01:14:12,229 --> 01:14:10,320

you know that is a that is a big moment

1967

01:14:15,270 --> 01:14:12,239

to see that thing coming off that pad

1968

01:14:16,709 --> 01:14:15,280

riding a controlled explosion on

1969

01:14:19,270 --> 01:14:16,719

the team does a very good job they make

1970

01:14:20,790 --> 01:14:19,280

it look easy uh matter of fact i as we

1971

01:14:22,790 --> 01:14:20,800

heard from scott messer earlier this was

1972

01:14:25,189 --> 01:14:22,800

the quietest count he's heard in in

1973

01:14:27,510 --> 01:14:25,199

quite a while and you know that

1974

01:14:29,510 --> 01:14:27,520

is a just a shout out to the teams and

1975

01:14:31,430 --> 01:14:29,520

how well they have done all the

1976

01:14:35,189 --> 01:14:31,440

collaboration between the international

1977

01:14:38,310 --> 01:14:35,199

partner the united space force nasa

1978

01:14:41,189 --> 01:14:38,320

lsp ula all the teams working together

1979

01:14:44,310 --> 01:14:41,199

to make sure the count happened on time

1980

01:14:45,830 --> 01:14:44,320

and the vehicle got off at 1103

1981

01:14:48,310 --> 01:14:45,840

specifically at the beginning of our

1982

01:14:50,149 --> 01:14:48,320

window that is just uh that's always

1983

01:14:53,189 --> 01:14:50,159

exciting to me to watch that

1984

01:14:55,750 --> 01:14:53,199

every launch is just amazing to

1985

01:14:57,830 --> 01:14:55,760

see that fire and lift off

1986

01:15:00,709 --> 01:14:57,840

we've been flying for about 45 and a

1987

01:15:01,830 --> 01:15:00,719

half minutes uh to this point in time

1988

01:15:03,830 --> 01:15:01,840

and

1989

01:15:05,510 --> 01:15:03,840

ula managers have been

1990

01:15:08,630 --> 01:15:05,520

working this launch

1991

01:15:11,350 --> 01:15:08,640

for that entire time and as mick said

1992

01:15:14,229 --> 01:15:11,360

they are continuing to to be very

1993

01:15:16,790 --> 01:15:14,239

diligent in tracking the telemetry and

1994

01:15:17,830 --> 01:15:16,800

tracking the flight of the centaur upper

1995

01:15:20,149 --> 01:15:17,840

stage

1996

01:15:23,910 --> 01:15:20,159

it is in the midst of a seven minute

1997

01:15:25,990 --> 01:15:23,920

burn a few minutes left in that one as

1998

01:15:29,030 --> 01:15:26,000

it positions itself

1999

01:15:31,189 --> 01:15:29,040

to get into that proper orbit

2000

01:15:34,390 --> 01:15:31,199

it is going to use a gravity assist

2001

01:15:36,950 --> 01:15:34,400

eventually much later down the road

2002

01:15:39,270 --> 01:15:36,960

but that is part of the deal in order to

2003

01:15:42,070 --> 01:15:39,280

get this thing close to the sun

2004

01:15:44,070 --> 01:15:42,080

so it can start gathering its data

2005

01:15:46,470 --> 01:15:44,080

it's got a lot of interesting

2006

01:15:47,990 --> 01:15:46,480

instruments on board in particular you

2007

01:15:49,910 --> 01:15:48,000

know one of the ones that i find one of

2008

01:15:53,030 --> 01:15:49,920

the aspects of the spacecraft that i

2009

01:15:55,030 --> 01:15:53,040

find most interesting is its ability to

2010

01:15:56,790 --> 01:15:55,040

open up little ports

2011

01:15:58,790 --> 01:15:56,800

on its heat shield

2012

01:16:00,950 --> 01:15:58,800

is going to get so close to the sun it's

2013

01:16:01,830 --> 01:16:00,960

going to point its heat shield at the

2014

01:16:03,910 --> 01:16:01,840

sun

2015

01:16:06,550 --> 01:16:03,920

but it's got little ports that it opens

2016

01:16:08,470 --> 01:16:06,560

up inside the space inside the the heat

2017

01:16:10,070 --> 01:16:08,480

shield to allow the sun to come through

2018

01:16:11,910 --> 01:16:10,080

which is an amazing thing it's got to

2019

01:16:13,910 --> 01:16:11,920

cool the instruments because yeah it's

2020

01:16:15,270 --> 01:16:13,920

so incredibly hot yeah the heat shield

2021

01:16:17,189 --> 01:16:15,280

is a is a

2022

01:16:18,950 --> 01:16:17,199

specific part of this spacecraft that's

2023

01:16:20,149 --> 01:16:18,960

required as you said it gets really

2024

01:16:22,310 --> 01:16:20,159

close to the sun you know a couple

2025

01:16:24,390 --> 01:16:22,320

million mile miles which is close for a

2026

01:16:25,990 --> 01:16:24,400

spacecraft and um

2027

01:16:27,669 --> 01:16:26,000

but those little apertures inside the

2028

01:16:30,070 --> 01:16:27,679

heat shield get opened at particular

2029

01:16:32,070 --> 01:16:30,080

times to catch things catch sunlight

2030

01:16:33,750 --> 01:16:32,080

catch ultraviolet test things in the

2031

01:16:35,430 --> 01:16:33,760

instrument and help protect the

2032

01:16:37,590 --> 01:16:35,440

instrument so the the satellite

2033

01:16:39,350 --> 01:16:37,600

basically rides around the sun with that

2034

01:16:40,229 --> 01:16:39,360

heat shield pointing at the sun at all

2035

01:16:42,149 --> 01:16:40,239

times

2036

01:16:43,590 --> 01:16:42,159

another unique feature for myself as an

2037

01:16:45,910 --> 01:16:43,600

engineer that i thought was really neat

2038

01:16:47,189 --> 01:16:45,920

of this satellite was the solar panels

2039

01:16:49,750 --> 01:16:47,199

when they come out

2040

01:16:51,350 --> 01:16:49,760

normally we see on on a satellite

2041

01:16:53,750 --> 01:16:51,360

solar panels come out and they're pretty

2042

01:16:55,830 --> 01:16:53,760

flat in order to get sunlight

2043

01:16:57,750 --> 01:16:55,840

to power the systems right

2044

01:16:59,510 --> 01:16:57,760

charge the batteries and and do all the

2045

01:17:00,630 --> 01:16:59,520

other things on board

2046

01:17:02,870 --> 01:17:00,640

these

2047

01:17:04,470 --> 01:17:02,880

because we're so close to the sun

2048

01:17:07,430 --> 01:17:04,480

they actually have the team actually has

2049

01:17:11,110 --> 01:17:07,440

to turn these uh solar panels almost at

2050

01:17:12,550 --> 01:17:11,120

78 degrees uh to keep them from from

2051

01:17:15,350 --> 01:17:12,560

getting too hot

2052

01:17:17,030 --> 01:17:15,360

and you know collecting but they have as

2053

01:17:19,590 --> 01:17:17,040

ian walters from airbus said who

2054

01:17:21,590 --> 01:17:19,600

designed this uh spacecraft uh said we

2055

01:17:23,270 --> 01:17:21,600

do not have a problem with power on the

2056

01:17:24,950 --> 01:17:23,280

solar panels

2057

01:17:26,870 --> 01:17:24,960

exactly we have a problem with heat so

2058

01:17:28,470 --> 01:17:26,880

uh that's a unique uh thing about the

2059

01:17:30,390 --> 01:17:28,480

spacecraft that i find interesting

2060

01:17:33,110 --> 01:17:30,400

absolutely just a little less than two

2061

01:17:35,910 --> 01:17:33,120

minutes left in this burn the second

2062

01:17:38,229 --> 01:17:35,920

burn of the centaur upper stage as

2063

01:17:39,590 --> 01:17:38,239

it gets ready to transfer into its new

2064

01:17:41,510 --> 01:17:39,600

orbit

2065

01:17:43,270 --> 01:17:41,520

is an exciting time

2066

01:17:45,030 --> 01:17:43,280

we certainly know that the team is

2067

01:17:47,350 --> 01:17:45,040

anticipating that

2068

01:17:49,430 --> 01:17:47,360

cut off of that engine but also more

2069

01:17:51,350 --> 01:17:49,440

importantly looking for

2070

01:17:53,430 --> 01:17:51,360

the separation of the spacecraft which

2071

01:17:56,950 --> 01:17:53,440

is coming up just a few minutes after

2072

01:17:59,030 --> 01:17:56,960

that and then followed by hopefully some

2073

01:18:00,790 --> 01:17:59,040

signal acquisition absolutely the

2074

01:18:02,950 --> 01:18:00,800

spacecraft tells us

2075

01:18:04,709 --> 01:18:02,960

i'm here it's kind of opened its eyes so

2076

01:18:06,229 --> 01:18:04,719

to speak right and says uh i'm in

2077

01:18:07,750 --> 01:18:06,239

position i'm heading the right direction

2078

01:18:09,189 --> 01:18:07,760

yeah the spacecraft team knows that the

2079

01:18:11,110 --> 01:18:09,199

satellite's where it's supposed to be

2080

01:18:13,350 --> 01:18:11,120

and and that the atlas centaurs

2081

01:18:15,110 --> 01:18:13,360

delivered it on the proper orbit as you

2082

01:18:16,470 --> 01:18:15,120

were talking earlier that precise orbit

2083

01:18:18,709 --> 01:18:16,480

that we need you know we've had two

2084

01:18:20,870 --> 01:18:18,719

burns now this is the second burn and

2085

01:18:23,669 --> 01:18:20,880

that second burn of this centaur will

2086

01:18:25,270 --> 01:18:23,679

put it in that orbit uh trajectory or

2087

01:18:27,350 --> 01:18:25,280

transfer trajectory that the team is

2088

01:18:29,910 --> 01:18:27,360

looking for so acquisition of signal

2089

01:18:30,709 --> 01:18:29,920

after sep is is very important

2090

01:18:32,790 --> 01:18:30,719

but

2091

01:18:35,110 --> 01:18:32,800

we're still still getting there so 49

2092

01:18:37,270 --> 01:18:35,120

minutes into flight and things are going

2093

01:18:38,790 --> 01:18:37,280

well uh centaur pressures on the engine

2094

01:18:40,709 --> 01:18:38,800

look really good

2095

01:18:42,470 --> 01:18:40,719

engine continues to perform normally and

2096

01:18:44,550 --> 01:18:42,480

the rcs thrusters

2097

01:18:46,790 --> 01:18:44,560

continue to keep centaur where it needs

2098

01:18:48,950 --> 01:18:46,800

to be a little less than a minute until

2099

01:18:51,669 --> 01:18:48,960

main engine cutoff you can see in the

2100

01:18:54,229 --> 01:18:51,679

graphical representation this centaur

2101

01:18:56,310 --> 01:18:54,239

continues to fly with solar orbiter at

2102

01:18:58,310 --> 01:18:56,320

the very front of it

2103

01:19:01,350 --> 01:18:58,320

that r10

2104

01:19:03,750 --> 01:19:01,360

firing behind it as it goes and just

2105

01:19:06,790 --> 01:19:03,760

about 20 seconds now until we see that

2106

01:19:08,950 --> 01:19:06,800

engine cut off and go into that next

2107

01:19:11,590 --> 01:19:08,960

coast phase so let's

2108

01:19:13,350 --> 01:19:11,600

watch now and listen in as they get

2109

01:19:16,550 --> 01:19:13,360

close to this moment

2110

01:19:18,870 --> 01:19:16,560

this is the again the uh sec the center

2111

01:19:20,950 --> 01:19:18,880

our second main engine cutting nominal

2112

01:19:22,709 --> 01:19:20,960

body rates look good

2113

01:19:24,630 --> 01:19:22,719

so yeah centaur continues to perform

2114

01:19:26,310 --> 01:19:24,640

normally body rates on centaur look

2115

01:19:29,030 --> 01:19:26,320

really good hanging by for kind of

2116

01:19:35,110 --> 01:19:29,040

standing by here for a main engine cut

2117

01:19:39,669 --> 01:19:37,750

and we have miko managing cut off

2118

01:19:40,950 --> 01:19:39,679

and there you go body rate stamped out

2119

01:19:42,630 --> 01:19:40,960

nicely yeah i'm going to cut off

2120

01:19:44,390 --> 01:19:42,640

transient main engine cut off from the

2121

01:19:45,990 --> 01:19:44,400

centaur that's great that second burn

2122

01:19:47,669 --> 01:19:46,000

has performed

2123

01:19:49,590 --> 01:19:47,679

so now we're about three minutes away

2124

01:19:51,750 --> 01:19:49,600

from spacecraft separation our next big

2125

01:19:53,990 --> 01:19:51,760

milestone so i can tell you the the

2126  
01:19:56,310 --> 01:19:54,000  
launch team is very happy on how centaur

2127  
01:19:58,550 --> 01:19:56,320  
performed and looking at the data

2128  
01:20:00,790 --> 01:19:58,560  
centaur performed very well on this

2129  
01:20:02,950 --> 01:20:00,800  
second burn getting solar orbiter onto

2130  
01:20:04,550 --> 01:20:02,960  
that transfer trajectory so

2131  
01:20:06,149 --> 01:20:04,560  
spacecraft separation will be our next

2132  
01:20:07,830 --> 01:20:06,159  
milestone darrell yeah and if we can

2133  
01:20:09,270 --> 01:20:07,840  
take a shot of the mission director

2134  
01:20:11,110 --> 01:20:09,280  
center here we had a little bit of a

2135  
01:20:13,270 --> 01:20:11,120  
celebration after that main engine

2136  
01:20:15,430 --> 01:20:13,280  
cutoff i believe that was probably the

2137  
01:20:16,790 --> 01:20:15,440  
spacecraft team back there that was

2138  
01:20:18,229 --> 01:20:16,800

cheering i think it might have been a

2139

01:20:19,669 --> 01:20:18,239

little bit of both a little bit about a

2140

01:20:21,830 --> 01:20:19,679

little bit of both because

2141

01:20:24,310 --> 01:20:21,840

centaur performs very well looking at

2142

01:20:26,229 --> 01:20:24,320

the telemetry data here and uh so the

2143

01:20:28,310 --> 01:20:26,239

launch vehicle team is very happy with

2144

01:20:31,350 --> 01:20:28,320

rl10 and centaur performance tonight a

2145

01:20:33,910 --> 01:20:31,360

lot of pride and deservedly so

2146

01:20:37,030 --> 01:20:33,920

talk about now what what the space uh

2147

01:20:40,070 --> 01:20:37,040

what the centaur is doing as it prepares

2148

01:20:42,470 --> 01:20:40,080

for this um the separation event yeah

2149

01:20:45,030 --> 01:20:42,480

centaur's maneuvering into position uh

2150

01:20:45,750 --> 01:20:45,040

getting ready to separate spacecraft on

2151  
01:20:48,310 --> 01:20:45,760  
the

2152  
01:20:50,390 --> 01:20:48,320  
trajectory that it needs to

2153  
01:20:52,550 --> 01:20:50,400  
head off into this transfer trajectory

2154  
01:20:54,070 --> 01:20:52,560  
so the rcs thrusters and everything are

2155  
01:20:56,310 --> 01:20:54,080  
moving the vehicle around since body

2156  
01:20:58,390 --> 01:20:56,320  
rates have slowed down and it's

2157  
01:21:01,510 --> 01:20:58,400  
positioning itself in for

2158  
01:21:04,070 --> 01:21:01,520  
to deliver solar orbiter onto

2159  
01:21:05,750 --> 01:21:04,080  
its transfer trajectory

2160  
01:21:07,830 --> 01:21:05,760  
and you can see in that representation

2161  
01:21:12,070 --> 01:21:07,840  
how it is maneuvering to get into that

2162  
01:21:13,590 --> 01:21:12,080  
position just a few seconds away from

2163  
01:21:16,870 --> 01:21:13,600

that

2164

01:21:17,750 --> 01:21:16,880

separation now in fact just less than a

2165

01:21:21,830 --> 01:21:17,760

minute

2166

01:21:24,550 --> 01:21:21,840

the centaur continues to perform well

2167

01:21:28,149 --> 01:21:24,560

and it is positioning itself at this

2168

01:21:29,350 --> 01:21:28,159

very moment um

2169

01:21:34,870 --> 01:21:29,360

the

2170

01:21:36,709 --> 01:21:34,880

procedure that takes place in order for

2171

01:21:40,310 --> 01:21:36,719

this spacecraft to separate from the

2172

01:21:42,149 --> 01:21:40,320

centaur well first thing is as we said

2173

01:21:44,310 --> 01:21:42,159

main engine start main engine cut off on

2174

01:21:45,910 --> 01:21:44,320

that second burn was very important uh

2175

01:21:48,310 --> 01:21:45,920

to get us where we need to be now

2176  
01:21:50,229 --> 01:21:48,320  
centaur has positioned itself and as you

2177  
01:21:52,870 --> 01:21:50,239  
can see in the sdk firing there the

2178  
01:21:54,950 --> 01:21:52,880  
graphic the rcs continues to fire to

2179  
01:21:57,590 --> 01:21:54,960  
settle out the body rates and the

2180  
01:21:59,430 --> 01:21:57,600  
centaur to get it into position

2181  
01:22:02,629 --> 01:21:59,440  
and a stable mode

2182  
01:22:04,550 --> 01:22:02,639  
to separate this spacecraft so ra the

2183  
01:22:07,270 --> 01:22:04,560  
erection control system continues to

2184  
01:22:09,350 --> 01:22:07,280  
fire at a 50 percent duty cycle to keep

2185  
01:22:11,350 --> 01:22:09,360  
that vehicle stable and where it needs

2186  
01:22:13,590 --> 01:22:11,360  
to be to separate

2187  
01:22:15,590 --> 01:22:13,600  
a spacecraft's sep we want to know all

2188  
01:22:17,830 --> 01:22:15,600

the body rates out so that we can make

2189

01:22:19,510 --> 01:22:17,840

sure that we get good separation and no

2190

01:22:20,790 --> 01:22:19,520

tip off just a few seconds away from

2191

01:22:23,030 --> 01:22:20,800

separation you're about to see some

2192

01:22:24,950 --> 01:22:23,040

celebration here at the various control

2193

01:22:27,990 --> 01:22:24,960

rooms across the cape and uh across the

2194

01:22:30,550 --> 01:22:28,000

country the solar orbiter spacecraft

2195

01:22:33,189 --> 01:22:30,560

so we just heard from patrick moore

2196

01:22:35,030 --> 01:22:33,199

indication of separation that is a huge

2197

01:22:37,110 --> 01:22:35,040

milestone for the solar orbiter team

2198

01:22:39,030 --> 01:22:37,120

daryl as you see in the asoc there they

2199

01:22:40,470 --> 01:22:39,040

are celebrating yeah and they were

2200

01:22:42,229 --> 01:22:40,480

celebrating here in the mission

2201

01:22:45,430 --> 01:22:42,239

director's center as well you can see

2202

01:22:48,390 --> 01:22:45,440

some hugs and handshakes uh going around

2203

01:22:49,910 --> 01:22:48,400

this is a of course a big mission

2204

01:22:52,310 --> 01:22:49,920

for ula

2205

01:22:55,430 --> 01:22:52,320

especially given the collaboration that

2206

01:22:57,189 --> 01:22:55,440

took place you're talking about 22

2207

01:23:00,709 --> 01:22:57,199

different countries

2208

01:23:03,669 --> 01:23:00,719

that were involved in this spacecraft

2209

01:23:05,350 --> 01:23:03,679

the solar orbiter we're talking about

2210

01:23:08,550 --> 01:23:05,360

a decade or more

2211

01:23:10,790 --> 01:23:08,560

in the planning so certainly united

2212

01:23:12,310 --> 01:23:10,800

launch alliance has a lot to be happy

2213

01:23:14,629 --> 01:23:12,320

about as they celebrate just a couple

2214

01:23:16,550 --> 01:23:14,639

miles from us there uh the folks there

2215

01:23:19,189 --> 01:23:16,560

standing up from their console that's

2216

01:23:22,229 --> 01:23:19,199

tim dunn and i believe in the lower

2217

01:23:23,910 --> 01:23:22,239

left corner there nasa's launch manager

2218

01:23:25,430 --> 01:23:23,920

launch director and uh

2219

01:23:28,229 --> 01:23:25,440

give me some good handshakes all the way

2220

01:23:30,629 --> 01:23:28,239

around uh for their hard work this

2221

01:23:32,149 --> 01:23:30,639

evening late in the evening

2222

01:23:34,070 --> 01:23:32,159

yeah the team the launch team is very

2223

01:23:36,390 --> 01:23:34,080

happy i've been looking at the data for

2224

01:23:38,390 --> 01:23:36,400

centaur and the quick look looks like

2225

01:23:41,030 --> 01:23:38,400

centaur performed very well well within

2226

01:23:43,910 --> 01:23:41,040

our pre-flight predictions to get the

2227

01:23:45,270 --> 01:23:43,920

solar orbiter where it needed to be and

2228

01:23:48,229 --> 01:23:45,280

as you just heard and saw the

2229

01:23:49,590 --> 01:23:48,239

celebration a successful separation now

2230

01:23:52,310 --> 01:23:49,600

we're just waiting to hear from our

2231

01:23:53,990 --> 01:23:52,320

spacecraft team you know roughly uh two

2232

01:23:56,709 --> 01:23:54,000

minutes from now hopefully that we will

2233

01:23:58,790 --> 01:23:56,719

get acquisition of signal and make sure

2234

01:24:01,110 --> 01:23:58,800

that everything is going well with the

2235

01:24:04,149 --> 01:24:01,120

solar orbiter spacecraft so the mission

2236

01:24:06,229 --> 01:24:04,159

is a success so far but we still have a

2237

01:24:08,310 --> 01:24:06,239

little bit more to go to make sure solar

2238

01:24:11,110 --> 01:24:08,320

orbiter is on its way hold now for those

2239

01:24:13,910 --> 01:24:11,120

uh those final moments as they pass to

2240

01:24:16,310 --> 01:24:13,920

get this spacecraft separation we know

2241

01:24:17,830 --> 01:24:16,320

the spacecraft team is here with us just

2242

01:24:18,790 --> 01:24:17,840

behind us here in the mission director's

2243

01:24:21,510 --> 01:24:18,800

center

2244

01:24:22,790 --> 01:24:21,520

they've been pretty calm and collected

2245

01:24:24,229 --> 01:24:22,800

throughout their

2246

01:24:26,229 --> 01:24:24,239

work

2247

01:24:27,830 --> 01:24:26,239

and you know them oh yeah very well the

2248

01:24:29,590 --> 01:24:27,840

spacecraft team and you're going to talk

2249

01:24:32,629 --> 01:24:29,600

to them a little bit later how things

2250

01:24:33,910 --> 01:24:32,639

are going from that aspect and i think

2251

01:24:36,470 --> 01:24:33,920

they're going to be very happy you can

2252

01:24:39,189 --> 01:24:36,480

see here the denver op center in denver

2253

01:24:41,110 --> 01:24:39,199

colorado the ula engineering team is

2254

01:24:42,870 --> 01:24:41,120

still looking at data on performance a

2255

01:24:45,350 --> 01:24:42,880

launch vehicle even though we've had a

2256

01:24:46,950 --> 01:24:45,360

successful sep things still get looked

2257

01:24:49,350 --> 01:24:46,960

at to make sure everything was within

2258

01:24:50,390 --> 01:24:49,360

our pre-flight uh predictions from that

2259

01:24:52,790 --> 01:24:50,400

aspect

2260

01:24:55,430 --> 01:24:52,800

again a very exciting moment i i'm very

2261

01:24:58,870 --> 01:24:55,440

excited that we we're here and looking

2262

01:25:00,790 --> 01:24:58,880

forward to get uh acquisition for that

2263

01:25:04,149 --> 01:25:00,800

so things are going well with the teams

2264

01:25:07,270 --> 01:25:04,159

and as we proceed forward

2265

01:25:08,709 --> 01:25:07,280

so now the centaur has separated away

2266

01:25:10,629 --> 01:25:08,719

and there's a little bit of business

2267

01:25:13,110 --> 01:25:10,639

that actually has to do as it leaves the

2268

01:25:14,709 --> 01:25:13,120

spacecraft yeah now the spacecraft is

2269

01:25:16,470 --> 01:25:14,719

left the centaur has to perform a couple

2270

01:25:19,270 --> 01:25:16,480

maneuvers to get out of the way and make

2271

01:25:21,030 --> 01:25:19,280

sure that it's uh uh basically done with

2272

01:25:22,870 --> 01:25:21,040

its mission so the solar rover can move

2273

01:25:24,390 --> 01:25:22,880

on and we have no interferences and

2274

01:25:26,550 --> 01:25:24,400

things like that so it's going to fire

2275

01:25:29,669 --> 01:25:26,560

its structures a little bit longer to

2276

01:25:31,990 --> 01:25:29,679

make sure that it's well away from solar

2277

01:25:34,790 --> 01:25:32,000

orbiter as we continue with the mission

2278

01:25:36,470 --> 01:25:34,800

and wait for acquisition of signal and

2279

01:25:38,470 --> 01:25:36,480

as you see there on your screen that's a

2280

01:25:40,629 --> 01:25:38,480

picture of the mission director center

2281

01:25:43,590 --> 01:25:40,639

here at ae where our esa friends are

2282

01:25:45,350 --> 01:25:43,600

sitting and waiting on that acquisition

2283

01:25:47,030 --> 01:25:45,360

signal from their spacecraft so i'm

2284

01:25:48,229 --> 01:25:47,040

looking forward to seeing and hearing

2285

01:25:50,709 --> 01:25:48,239

that from them

2286

01:25:52,070 --> 01:25:50,719

and see how excited they are to know

2287

01:25:53,910 --> 01:25:52,080

that solar orbiter is out there and

2288

01:25:56,070 --> 01:25:53,920

doing its thing that's right and just a

2289

01:25:58,070 --> 01:25:56,080

few seconds away from that event mick is

2290

01:25:59,830 --> 01:25:58,080

and the spacecraft team is sitting in

2291

01:26:02,950 --> 01:25:59,840

the front row that you see there on the

2292

01:26:05,590 --> 01:26:02,960

left portion of your screen so

2293

01:26:07,110 --> 01:26:05,600

once that confirmation comes in that the

2294

01:26:08,870 --> 01:26:07,120

spacecraft

2295

01:26:11,030 --> 01:26:08,880

has indeed

2296

01:26:14,310 --> 01:26:11,040

sent its signal and they've verified

2297

01:26:17,189 --> 01:26:14,320

that is in the place that it is expected

2298

01:26:19,189 --> 01:26:17,199

you can probably expect to see a great

2299

01:26:21,590 --> 01:26:19,199

amount of relief and celebration from

2300

01:26:24,149 --> 01:26:21,600

that front row here at the mission

2301  
01:26:25,830 --> 01:26:24,159  
directors center uh the cape canaveral

2302  
01:26:28,229 --> 01:26:25,840  
air force station of course we're in the

2303  
01:26:30,310 --> 01:26:28,239  
broadcast booth to the upper right with

2304  
01:26:31,590 --> 01:26:30,320  
our backs to you but it's not uh not

2305  
01:26:33,270 --> 01:26:31,600  
trying to be impolite but we are

2306  
01:26:35,110 --> 01:26:33,280  
monitoring our systems here as well yeah

2307  
01:26:39,270 --> 01:26:35,120  
we like you said we're looking at data

2308  
01:26:44,950 --> 01:26:42,070  
hope hopefully we're going to hear that

2309  
01:26:46,629 --> 01:26:44,960  
we get acquisition from signals uh from

2310  
01:26:49,590 --> 01:26:46,639  
the spacecraft but we'll continue to

2311  
01:26:52,229 --> 01:26:49,600  
wait and uh hear that uh from this is

2312  
01:26:54,950 --> 01:26:52,239  
from from our issa friends so

2313  
01:26:57,830 --> 01:26:54,960

um with that i think we are ready to

2314

01:26:59,910 --> 01:26:57,840

throw it back over to uh joshua

2315

01:27:02,709 --> 01:26:59,920

who's with my good friend and who's

2316

01:27:05,270 --> 01:27:02,719

excited about this launch my favorite

2317

01:27:06,950 --> 01:27:05,280

nasa launch manager uh mr tim dunn can't

2318

01:27:08,390 --> 01:27:06,960

do much uh better introduction than that

2319

01:27:10,229 --> 01:27:08,400

take it away guys is he saying that

2320

01:27:12,310 --> 01:27:10,239

because omar is not here is that why

2321

01:27:14,790 --> 01:27:12,320

only because omar is not i see i see you

2322

01:27:16,709 --> 01:27:14,800

know mick omar is in the next room

2323

01:27:18,229 --> 01:27:16,719

no yeah and uh this is nasa launch

2324

01:27:19,669 --> 01:27:18,239

manager tim dunn he's the nasa launch

2325

01:27:21,270 --> 01:27:19,679

manager for this mission yeah so

2326

01:27:23,030 --> 01:27:21,280

appreciate you taking a few minutes away

2327

01:27:24,790 --> 01:27:23,040

we we kind of keep saying this that

2328

01:27:25,830 --> 01:27:24,800

we're not done yet right but we're close

2329

01:27:27,350 --> 01:27:25,840

we're getting there close we keep

2330

01:27:28,870 --> 01:27:27,360

getting there everything's going well so

2331

01:27:31,030 --> 01:27:28,880

tell us about the flight so far how do

2332

01:27:33,669 --> 01:27:31,040

we do so flight's going really well so

2333

01:27:36,229 --> 01:27:33,679

far i'm a little bit tamped down on my

2334

01:27:38,390 --> 01:27:36,239

enthusiasm just because we want to get a

2335

01:27:40,790 --> 01:27:38,400

few key mark events from the spacecraft

2336

01:27:42,229 --> 01:27:40,800

but obviously countdown went incredibly

2337

01:27:44,229 --> 01:27:42,239

smooth

2338

01:27:46,790 --> 01:27:44,239

worked a couple of minor issues in the

2339

01:27:48,790 --> 01:27:46,800

background nothing of significance

2340

01:27:50,870 --> 01:27:48,800

boy gorgeous weather

2341

01:27:53,270 --> 01:27:50,880

range instrumentation from the 45th

2342

01:27:55,430 --> 01:27:53,280

space wing was exceptional today

2343

01:27:57,830 --> 01:27:55,440

the ula team i can't say enough about

2344

01:28:00,629 --> 01:27:57,840

the ula team just incredible how they're

2345

01:28:03,189 --> 01:28:00,639

able to process and prepare this rocket

2346

01:28:05,350 --> 01:28:03,199

so a great countdown beautiful night

2347

01:28:06,629 --> 01:28:05,360

liftoff here on the space coast uh i

2348

01:28:11,590 --> 01:28:06,639

hope folks

2349

01:28:13,350 --> 01:28:11,600

watching on nasa tv i know you guys

2350

01:28:15,189 --> 01:28:13,360

showed them some great shots had to be

2351

01:28:16,950 --> 01:28:15,199

beautiful out there we felt the rumble

2352

01:28:19,510 --> 01:28:16,960

here in the mission director center in

2353

01:28:21,830 --> 01:28:19,520

the asoc and uh nothing like a

2354

01:28:23,990 --> 01:28:21,840

successful launch so obviously we got

2355

01:28:25,350 --> 01:28:24,000

great spacecrafts up a few minutes ago

2356

01:28:27,510 --> 01:28:25,360

and now we're just waiting for a couple

2357

01:28:29,510 --> 01:28:27,520

of mark events and then we'll want to

2358

01:28:31,350 --> 01:28:29,520

tell you the full story and share the

2359

01:28:33,110 --> 01:28:31,360

real excitement then there you go yeah

2360

01:28:35,110 --> 01:28:33,120

we're uh we're excited for the folks

2361

01:28:36,629 --> 01:28:35,120

from here from esa as well as the

2362

01:28:38,070 --> 01:28:36,639

tourists in the area and just employees

2363

01:28:39,750 --> 01:28:38,080

and everybody it was a beautiful night

2364

01:28:41,510 --> 01:28:39,760

out uh clear skies so if you were

2365

01:28:43,430 --> 01:28:41,520

outside you were treated to a beautiful

2366

01:28:45,350 --> 01:28:43,440

launch just you could see that thing

2367

01:28:47,270 --> 01:28:45,360

almost to the horizon i think yep

2368

01:28:48,709 --> 01:28:47,280

gorgeous so tim again i appreciate you

2369

01:28:50,229 --> 01:28:48,719

stopping by i don't want to keep you too

2370

01:28:51,669 --> 01:28:50,239

long um because i know that you're still

2371

01:28:53,910 --> 01:28:51,679

focused on that because the job is not

2372

01:28:55,030 --> 01:28:53,920

done yet for today all right i'm looking

2373

01:28:56,470 --> 01:28:55,040

forward to coming back and talking to

2374

01:28:58,470 --> 01:28:56,480

you in a few minutes thanks for stopping

2375

01:29:00,950 --> 01:28:58,480

by and if this is not excited i can't

2376

01:29:02,229 --> 01:29:00,960

wait for super excited tim so all right

2377

01:29:04,470 --> 01:29:02,239

thanks tim uh we're actually gonna send

2378

01:29:06,470 --> 01:29:04,480

you now uh we wanna

2379

01:29:08,550 --> 01:29:06,480

look at one of the greatest mysteries of

2380

01:29:10,229 --> 01:29:08,560

the sun and that's that in the corona

2381

01:29:12,229 --> 01:29:10,239

the temperature is actually millions of

2382

01:29:14,070 --> 01:29:12,239

degrees hotter than actually on the

2383

01:29:17,590 --> 01:29:14,080

surface of the sun we call it the

2384

01:29:19,750 --> 01:29:17,600

coronal heating problem take a look

2385

01:29:21,910 --> 01:29:19,760

the sun's core is the hottest part of

2386

01:29:24,470 --> 01:29:21,920

the sun but our star's temperature

2387

01:29:26,709 --> 01:29:24,480

doesn't behave as you might expect the

2388

01:29:29,189 --> 01:29:26,719

core is roughly 27 million degrees

2389

01:29:31,750 --> 01:29:29,199

fahrenheit and 10 times more dense than

2390

01:29:34,629 --> 01:29:31,760

gold as you move outward the layers of

2391

01:29:36,950 --> 01:29:34,639

the sun become cooler and less dense

2392

01:29:39,270 --> 01:29:36,960

something unusual however occurs when

2393

01:29:41,350 --> 01:29:39,280

you reach the outermost layer

2394

01:29:43,990 --> 01:29:41,360

while the surface is around 10 000

2395

01:29:45,910 --> 01:29:44,000

degrees fahrenheit the corona the sun's

2396

01:29:48,310 --> 01:29:45,920

outer atmosphere is several hundred

2397

01:29:50,550 --> 01:29:48,320

times hotter that's the opposite of what

2398

01:29:52,550 --> 01:29:50,560

happens with a fire when it gets cooler

2399

01:29:54,470 --> 01:29:52,560

the farther away you get

2400

01:29:57,110 --> 01:29:54,480

scientists call this the coronal heating

2401  
01:30:00,390 --> 01:29:57,120  
problem and evidence for this was first

2402  
01:30:03,110 --> 01:30:00,400  
uncovered during an eclipse in the 1800s

2403  
01:30:05,030 --> 01:30:03,120  
the corona is usually hard to see it's

2404  
01:30:07,270 --> 01:30:05,040  
too dim to be seen next to the sun's

2405  
01:30:09,590 --> 01:30:07,280  
bright body but it can be seen with the

2406  
01:30:11,990 --> 01:30:09,600  
naked eye when the moon blocks the sun

2407  
01:30:13,830 --> 01:30:12,000  
during a total solar eclipse

2408  
01:30:15,669 --> 01:30:13,840  
to understand how this mystery was

2409  
01:30:17,669 --> 01:30:15,679  
discovered it helps to know how

2410  
01:30:20,470 --> 01:30:17,679  
scientists started studying the chemical

2411  
01:30:22,790 --> 01:30:20,480  
properties of materials on earth in the

2412  
01:30:25,189 --> 01:30:22,800  
early 1800s instruments named

2413  
01:30:27,990 --> 01:30:25,199

spectroscopes were invented to identify

2414

01:30:29,990 --> 01:30:28,000

materials that emit light when heated

2415

01:30:32,790 --> 01:30:30,000

light enters the spectroscope and is

2416

01:30:35,430 --> 01:30:32,800

filtered through a tiny hole to isolate

2417

01:30:37,350 --> 01:30:35,440

a single area it then bounces off a

2418

01:30:39,510 --> 01:30:37,360

special grating that disperses light

2419

01:30:42,070 --> 01:30:39,520

into its different wavelengths

2420

01:30:43,750 --> 01:30:42,080

while sunlight contains every wavelength

2421

01:30:45,910 --> 01:30:43,760

scientists discovered that every

2422

01:30:47,750 --> 01:30:45,920

chemical element and compound contains a

2423

01:30:49,510 --> 01:30:47,760

unique pattern of wavelengths that

2424

01:30:52,310 --> 01:30:49,520

allows scientists to determine the

2425

01:30:54,310 --> 01:30:52,320

composition of light sources it was long

2426  
01:30:56,229 --> 01:30:54,320  
before astronomers started extracting

2427  
01:30:57,990 --> 01:30:56,239  
information from the light of distant

2428  
01:31:01,189 --> 01:30:58,000  
stellar objects

2429  
01:31:03,669 --> 01:31:01,199  
in 1869 two scientists independently

2430  
01:31:06,470 --> 01:31:03,679  
decided to point a spectroscope toward

2431  
01:31:08,629 --> 01:31:06,480  
the corona during a total solar eclipse

2432  
01:31:11,110 --> 01:31:08,639  
as the sun's light disappeared the

2433  
01:31:13,510 --> 01:31:11,120  
pattern of wavelengths changed they saw

2434  
01:31:16,149 --> 01:31:13,520  
something they had never seen before

2435  
01:31:18,790 --> 01:31:16,159  
a bright green line that did not relate

2436  
01:31:21,910 --> 01:31:18,800  
to any element found on earth for a

2437  
01:31:24,470 --> 01:31:21,920  
short while scientists named it coronium

2438  
01:31:26,470 --> 01:31:24,480

it wasn't until 70 years later that a

2439

01:31:28,790 --> 01:31:26,480

swedish scientist discovered that these

2440

01:31:31,990 --> 01:31:28,800

lines were the result of elements such

2441

01:31:33,990 --> 01:31:32,000

as iron being stripped of its electrons

2442

01:31:36,310 --> 01:31:34,000

every element has a specific number of

2443

01:31:38,790 --> 01:31:36,320

electrons surrounding the nucleus as

2444

01:31:40,790 --> 01:31:38,800

each electron is removed more energy is

2445

01:31:42,870 --> 01:31:40,800

needed to remove the next one

2446

01:31:46,070 --> 01:31:42,880

the green line shows that iron has been

2447

01:31:48,310 --> 01:31:46,080

stripped off 13 of its 26 electrons

2448

01:31:49,950 --> 01:31:48,320

indicating that the corona needed to be

2449

01:31:52,070 --> 01:31:49,960

millions of degrees

2450

01:31:54,310 --> 01:31:52,080

counter-intuitively far hotter than the

2451

01:31:56,390 --> 01:31:54,320

sun's surface

2452

01:31:58,470 --> 01:31:56,400

scientists have since proposed a variety

2453

01:32:00,070 --> 01:31:58,480

of theories for what mechanisms could be

2454

01:32:01,430 --> 01:32:00,080

adding that extra heat into the

2455

01:32:03,590 --> 01:32:01,440

atmosphere

2456

01:32:05,910 --> 01:32:03,600

one theory suggests that small waves in

2457

01:32:08,550 --> 01:32:05,920

the sun's surface pushes particles and

2458

01:32:10,870 --> 01:32:08,560

heat into the atmosphere a bit like how

2459

01:32:12,950 --> 01:32:10,880

ocean waves push surfers

2460

01:32:14,950 --> 01:32:12,960

another theory suggests small bomb-like

2461

01:32:17,750 --> 01:32:14,960

explosions from the realignment of the

2462

01:32:19,669 --> 01:32:17,760

sun's magnetic field create heat

2463

01:32:20,629 --> 01:32:19,679

many scientists think it may be a mix of

2464

01:32:22,390 --> 01:32:20,639

both

2465

01:32:24,870 --> 01:32:22,400

we've studied the corona from earth

2466

01:32:26,470 --> 01:32:24,880

during many eclipses but to solve our

2467

01:32:28,709 --> 01:32:26,480

star's biggest mystery

2468

01:32:33,470 --> 01:32:28,719

we have to make direct observations from

2469

01:32:33,480 --> 01:32:44,070

[Music]

2470

01:32:47,990 --> 01:32:46,070

we just heard great news the signal

2471

01:32:49,910 --> 01:32:48,000

acquisition has been confirmed so

2472

01:32:51,430 --> 01:32:49,920

another check on the list of things that

2473

01:32:53,110 --> 01:32:51,440

need to go right today

2474

01:32:54,629 --> 01:32:53,120

and so that list is coming together very

2475

01:32:59,030 --> 01:32:54,639

beautifully we're going to send you now

2476

01:33:01,590 --> 01:32:59,040

out to nasa edges franklin fitzgerald

2477

01:33:04,070 --> 01:33:01,600

to take a look and talk to an

2478

01:33:05,910 --> 01:33:04,080

astrophysicist a solar astrophysicist

2479

01:33:08,790 --> 01:33:05,920

franklin

2480

01:33:11,910 --> 01:33:08,800

thank you joshua yeah i'm here with dr

2481

01:33:13,510 --> 01:33:11,920

alex uh young who is an astrophysicist

2482

01:33:15,430 --> 01:33:13,520

from goddard uh

2483

01:33:17,510 --> 01:33:15,440

alex how are you today i'm doing

2484

01:33:20,950 --> 01:33:17,520

fantastic how are you i'm doing pretty

2485

01:33:23,750 --> 01:33:20,960

good uh you saw the launch from banana

2486

01:33:26,229 --> 01:33:23,760

creek how was it it was spectacular it

2487

01:33:27,510 --> 01:33:26,239

was so spectacular that that's not the

2488

01:33:29,189 --> 01:33:27,520

first launch but it's the first time

2489

01:33:31,430 --> 01:33:29,199

i've seen one from there and it was

2490

01:33:34,470 --> 01:33:31,440

amazing and being with that crowd was

2491

01:33:37,110 --> 01:33:34,480

amazing that is good to hear now

2492

01:33:40,470 --> 01:33:37,120

i know you are very interested in

2493

01:33:43,669 --> 01:33:40,480

getting to the science of solar orbiter

2494

01:33:45,430 --> 01:33:43,679

uh tell me about what you most

2495

01:33:46,470 --> 01:33:45,440

are looking forward to

2496

01:33:48,790 --> 01:33:46,480

well

2497

01:33:50,790 --> 01:33:48,800

uh i mean one of the

2498

01:33:54,390 --> 01:33:50,800

most obvious things that comes to mind

2499

01:33:57,750 --> 01:33:54,400

is the unique view of the poles

2500

01:33:59,590 --> 01:33:57,760

we have never imaged the poles of the

2501

01:34:01,270 --> 01:33:59,600

sun we've never

2502

01:34:04,470 --> 01:34:01,280

gathered

2503

01:34:06,629 --> 01:34:04,480

detailed magnetic field observations of

2504

01:34:09,110 --> 01:34:06,639

the poles directly

2505

01:34:11,189 --> 01:34:09,120

and that's a really really important

2506

01:34:13,430 --> 01:34:11,199

thing for understanding the sun's

2507

01:34:15,189 --> 01:34:13,440

activity cycle and so

2508

01:34:17,669 --> 01:34:15,199

that is really really critical because

2509

01:34:20,790 --> 01:34:17,679

that's what you know the sun's magnetic

2510

01:34:22,070 --> 01:34:20,800

activity drives space weather

2511

01:34:25,030 --> 01:34:22,080

and so

2512

01:34:26,790 --> 01:34:25,040

this is going to be a game changer with

2513

01:34:29,030 --> 01:34:26,800

these kind of observations from from

2514

01:34:30,790 --> 01:34:29,040

solar orbiter now

2515

01:34:34,390 --> 01:34:30,800

you got a couple years until you start

2516

01:34:37,590 --> 01:34:34,400

gathering data from solar orbiter uh but

2517

01:34:39,669 --> 01:34:37,600

you do have a recent uh solar mission

2518

01:34:41,910 --> 01:34:39,679

where you've been receiving some some

2519

01:34:43,590 --> 01:34:41,920

data and that's parker solar probe can

2520

01:34:46,070 --> 01:34:43,600

you give us a little update on that yeah

2521

01:34:48,550 --> 01:34:46,080

so parker solar probe is already been

2522

01:34:51,109 --> 01:34:48,560

around the sun three times it's going to

2523

01:34:53,910 --> 01:34:51,119

make 24

2524

01:34:55,590 --> 01:34:53,920

orbits and each one you know it's good

2525

01:34:56,870 --> 01:34:55,600

every time it passes venus which will

2526

01:34:59,189 --> 01:34:56,880

give it a little kick it'll be closer

2527

01:35:01,430 --> 01:34:59,199

and closer but they've already brought

2528

01:35:04,070 --> 01:35:01,440

back data they've already brought back

2529

01:35:04,870 --> 01:35:04,080

tons of data and

2530

01:35:06,229 --> 01:35:04,880

have

2531

01:35:09,109 --> 01:35:06,239

gathered

2532

01:35:10,550 --> 01:35:09,119

amazing number of questions

2533

01:35:13,669 --> 01:35:10,560

that they hadn't expected you know

2534

01:35:15,910 --> 01:35:13,679

they've made amazing discoveries already

2535

01:35:18,550 --> 01:35:15,920

they haven't even gotten to

2536

01:35:21,189 --> 01:35:18,560

the the final goal

2537

01:35:24,550 --> 01:35:21,199

and we have a new understanding already

2538

01:35:27,030 --> 01:35:24,560

of the turbulence sort of the region

2539

01:35:32,229 --> 01:35:27,040

where the solar wind

2540

01:35:34,709 --> 01:35:32,239

sort of relaxes

2541

01:35:36,950 --> 01:35:34,719

we found out that the magnetic fields

2542

01:35:41,030 --> 01:35:36,960

that come away from the sun

2543

01:35:43,750 --> 01:35:41,040

actually do these crazy 180 turns back i

2544

01:35:45,590 --> 01:35:43,760

call those switchbacks

2545

01:35:47,830 --> 01:35:45,600

and you know some of the scientists have

2546

01:35:50,390 --> 01:35:47,840

even discovered

2547

01:35:51,990 --> 01:35:50,400

something non-solar

2548

01:35:54,709 --> 01:35:52,000

they've seen

2549

01:35:57,590 --> 01:35:54,719

some of the the dust trails

2550

01:36:00,390 --> 01:35:57,600

that are what cause meteor showers here

2551  
01:36:02,070 --> 01:36:00,400  
on earth due to comets and asteroids

2552  
01:36:03,990 --> 01:36:02,080  
that they've been trying to see for a

2553  
01:36:06,629 --> 01:36:04,000  
long time but they're so difficult to

2554  
01:36:07,669 --> 01:36:06,639  
find because so close to the sun is too

2555  
01:36:09,910 --> 01:36:07,679  
bright

2556  
01:36:11,590 --> 01:36:09,920  
but we've used really really sensitive

2557  
01:36:12,950 --> 01:36:11,600  
cameras on the side of the spacecraft

2558  
01:36:15,189 --> 01:36:12,960  
that have seen these so

2559  
01:36:16,470 --> 01:36:15,199  
it is so cool and

2560  
01:36:17,830 --> 01:36:16,480  
this is one of the things you know you

2561  
01:36:19,669 --> 01:36:17,840  
and i have talked about one of the

2562  
01:36:22,070 --> 01:36:19,679  
things that excites me so much about

2563  
01:36:23,750 --> 01:36:22,080

science is the fact that you always come

2564

01:36:25,669 --> 01:36:23,760

back with more questions than you do

2565

01:36:27,189 --> 01:36:25,679

answers and that's what really drives

2566

01:36:28,550 --> 01:36:27,199

science forward

2567

01:36:30,550 --> 01:36:28,560

speaking about the science a little bit

2568

01:36:33,109 --> 01:36:30,560

more is there is there going to be any

2569

01:36:36,149 --> 01:36:33,119

overlap in the type of

2570

01:36:38,709 --> 01:36:36,159

discoveries you'll make between solar

2571

01:36:41,189 --> 01:36:38,719

orbiter and parker oh absolutely so

2572

01:36:44,470 --> 01:36:41,199

these are really two complementary

2573

01:36:47,350 --> 01:36:44,480

missions because solar orbiter is going

2574

01:36:49,590 --> 01:36:47,360

to get really really close and give us a

2575

01:36:51,910 --> 01:36:49,600

lot of detail of what's happening in the

2576

01:36:54,149 --> 01:36:51,920

regions where we think the solar wind is

2577

01:36:57,109 --> 01:36:54,159

accelerated away from the sun where we

2578

01:36:59,750 --> 01:36:57,119

think energetic particles

2579

01:37:00,790 --> 01:36:59,760

are accelerated from the sun but solar

2580

01:37:03,990 --> 01:37:00,800

orbiter

2581

01:37:05,669 --> 01:37:04,000

is going to be slightly farther out

2582

01:37:07,590 --> 01:37:05,679

and give us

2583

01:37:09,590 --> 01:37:07,600

more details as to what's happening in

2584

01:37:12,790 --> 01:37:09,600

these transition regions as things are

2585

01:37:13,830 --> 01:37:12,800

moving out as well as this perspective

2586

01:37:15,750 --> 01:37:13,840

you know

2587

01:37:17,750 --> 01:37:15,760

out of the plane

2588

01:37:21,030 --> 01:37:17,760

of the solar system

2589

01:37:22,870 --> 01:37:21,040

and so having all of these missions

2590

01:37:24,070 --> 01:37:22,880

so close

2591

01:37:25,830 --> 01:37:24,080

because even

2592

01:37:28,310 --> 01:37:25,840

even though solar orbiter is not as

2593

01:37:30,149 --> 01:37:28,320

close as parker solar probe it's still

2594

01:37:32,950 --> 01:37:30,159

in an unknown area it's still in a

2595

01:37:35,430 --> 01:37:32,960

region which we've barely sampled

2596

01:37:37,270 --> 01:37:35,440

it's closer than we've been

2597

01:37:39,270 --> 01:37:37,280

before not including solar orbiters

2598

01:37:41,350 --> 01:37:39,280

closer than we've ever been before so

2599

01:37:43,590 --> 01:37:41,360

both of these are sampling

2600

01:37:45,430 --> 01:37:43,600

a really unique area and a really

2601

01:37:48,390 --> 01:37:45,440

important area in the sun

2602

01:37:51,270 --> 01:37:48,400

and uh it's the the data is going to

2603

01:37:54,310 --> 01:37:51,280

continue to surprise us and excite us

2604

01:37:57,030 --> 01:37:54,320

hey uh alex it is great to have you on

2605

01:37:59,270 --> 01:37:57,040

the show great seeing you again and we

2606

01:38:01,590 --> 01:37:59,280

look forward to getting more uh data

2607

01:38:04,629 --> 01:38:01,600

from parker solar probe and from the

2608

01:38:05,990 --> 01:38:04,639

solar orbiter absolutely joshua back to

2609

01:38:09,590 --> 01:38:06,000

you

2610

01:38:12,229 --> 01:38:09,600

good insight there and i'm joined now by

2611

01:38:14,550 --> 01:38:12,239

omar baez who today is the assistant

2612

01:38:17,430 --> 01:38:14,560

launch manager nasa launch manager um

2613

01:38:19,750 --> 01:38:17,440

and so you and tim flip-flop roles uh

2614

01:38:21,430 --> 01:38:19,760

depending upon the mission so today tim

2615

01:38:23,669 --> 01:38:21,440

was the the manager and you're the

2616

01:38:25,510 --> 01:38:23,679

assistant um but then in the future

2617

01:38:27,990 --> 01:38:25,520

coming up this year uh what missions are

2618

01:38:30,310 --> 01:38:28,000

yours what are you the the lead for so

2619

01:38:31,830 --> 01:38:30,320

it we talked about it earlier bob cabana

2620

01:38:34,149 --> 01:38:31,840

was here he started talking about the

2621

01:38:37,350 --> 01:38:34,159

mars 2020 mission yes that's our next

2622

01:38:39,510 --> 01:38:37,360

mission up um we expect the rover to be

2623

01:38:41,669 --> 01:38:39,520

arriving this week parts of it have

2624

01:38:44,310 --> 01:38:41,679

already arrived

2625

01:38:47,750 --> 01:38:44,320

and we really are looking forward to

2626

01:38:50,149 --> 01:38:47,760

that um that's going to go on an atlas

2627

01:38:53,270 --> 01:38:50,159

uh with a couple of more solid rocket

2628

01:38:56,550 --> 01:38:53,280

motors and this one here to get it out

2629

01:38:58,950 --> 01:38:56,560

to the mars for its seven-month voyage

2630

01:39:01,830 --> 01:38:58,960

we plan to launch that on july 17th and

2631

01:39:03,669 --> 01:39:01,840

hopefully land on mars february 18th of

2632

01:39:05,350 --> 01:39:03,679

2021

2633

01:39:07,830 --> 01:39:05,360

seven month voyage

2634

01:39:09,350 --> 01:39:07,840

a really exciting mission uh the the

2635

01:39:11,590 --> 01:39:09,360

country's going to be overwhelmed the

2636

01:39:15,270 --> 01:39:11,600

world's going to be overwhelmed when we

2637

01:39:18,070 --> 01:39:15,280

see this helicopter uh as as its payload

2638

01:39:19,830 --> 01:39:18,080

and not a primary instrument but it

2639

01:39:22,149 --> 01:39:19,840

really cool stuff going on with that

2640

01:39:26,870 --> 01:39:24,470

the public's going to really love

2641

01:39:29,510 --> 01:39:26,880

the missions out there to get uh

2642

01:39:31,510 --> 01:39:29,520

catch some uh samples and hopefully get

2643

01:39:33,189 --> 01:39:31,520

a sample return mission to keep that

2644

01:39:35,910 --> 01:39:33,199

continuity going

2645

01:39:37,189 --> 01:39:35,920

and we're super excited about doing that

2646

01:39:38,870 --> 01:39:37,199

uh this summer

2647

01:39:41,350 --> 01:39:38,880

yeah that's awesome um so you're the

2648

01:39:44,149 --> 01:39:41,360

lead for i am i am the launch director

2649

01:39:45,350 --> 01:39:44,159

for the mars 2020 mission very cool so

2650

01:39:47,109 --> 01:39:45,360

uh tell me a little bit about the

2651

01:39:49,030 --> 01:39:47,119

relationship that you and tim have on

2652

01:39:50,390 --> 01:39:49,040

launch day obviously one of you's launch

2653

01:39:52,310 --> 01:39:50,400

manager one of you is the assistant

2654

01:39:53,750 --> 01:39:52,320

launch manager so

2655

01:39:56,629 --> 01:39:53,760

practically speaking what does that mean

2656

01:39:58,950 --> 01:39:56,639

we're completely interchangeable okay so

2657

01:40:03,270 --> 01:39:58,960

uh no matter what's going on things get

2658

01:40:05,109 --> 01:40:03,280

busy we're able to to um take on that um

2659

01:40:07,189 --> 01:40:05,119

if we get really busy the other one can

2660

01:40:09,669 --> 01:40:07,199

take some load off of the primary guy

2661

01:40:12,390 --> 01:40:09,679

that is what i'm there for today

2662

01:40:15,030 --> 01:40:12,400

is to to do those things where um when

2663

01:40:15,910 --> 01:40:15,040

he's time crunched um i can help him out

2664

01:40:17,830 --> 01:40:15,920

with

2665

01:40:18,950 --> 01:40:17,840

likewise when he's uh

2666

01:40:21,189 --> 01:40:18,960

um

2667

01:40:23,350 --> 01:40:21,199

you know stuff happens

2668

01:40:25,830 --> 01:40:23,360

uh you have to go to bathroom you have

2669

01:40:28,229 --> 01:40:25,840

to eat sure sure the practical thing you

2670

01:40:29,510 --> 01:40:28,239

got to step in yeah very good so and i

2671

01:40:30,950 --> 01:40:29,520

think it's really important point to key

2672

01:40:32,470 --> 01:40:30,960

on is that it's really interchangeable

2673

01:40:34,629 --> 01:40:32,480

where essentially you just have to have

2674

01:40:36,070 --> 01:40:34,639

one person in charge and so it's him but

2675

01:40:37,830 --> 01:40:36,080

ultimately you all kind of carry carry

2676

01:40:39,590 --> 01:40:37,840

that weight together correct so beyond

2677

01:40:41,669 --> 01:40:39,600

march 2020 what's ahead for the launch

2678

01:40:44,550 --> 01:40:41,679

services program obviously i think we're

2679

01:40:47,030 --> 01:40:44,560

coming up on 22 years of of

2680

01:40:48,870 --> 01:40:47,040

existence um so what's the next decade

2681

01:40:50,950 --> 01:40:48,880

hold for launch services program there's

2682

01:40:53,189 --> 01:40:50,960

an array of missions it's been a pl i've

2683

01:40:55,830 --> 01:40:53,199

been with the launch services program

2684

01:40:57,350 --> 01:40:55,840

for um the 20 years and a couple of

2685

01:40:59,270 --> 01:40:57,360

years before that when we were the

2686

01:41:01,590 --> 01:40:59,280

predecessor organization

2687

01:41:03,910 --> 01:41:01,600

and uh

2688

01:41:04,950 --> 01:41:03,920

we've assaulted all the planets

2689

01:41:06,709 --> 01:41:04,960

and

2690

01:41:09,350 --> 01:41:06,719

in a very research oriented way

2691

01:41:11,990 --> 01:41:09,360

absolutely and uh

2692

01:41:14,229 --> 01:41:12,000

it's phenomenal to think back uh an

2693

01:41:16,790 --> 01:41:14,239

organization that was

2694

01:41:19,270 --> 01:41:16,800

very tiny a very a small portion of the

2695

01:41:21,510 --> 01:41:19,280

agency we weren't even noticed

2696

01:41:24,950 --> 01:41:21,520

uh we're able to reach out

2697

01:41:26,790 --> 01:41:24,960

um to the fur furthest uh planetary

2698

01:41:28,550 --> 01:41:26,800

bodies around us

2699

01:41:31,109 --> 01:41:28,560

and uh it's been a real pleasure and

2700

01:41:32,390 --> 01:41:31,119

we're we're gonna continue doing that

2701  
01:41:34,470 --> 01:41:32,400  
and

2702  
01:41:36,550 --> 01:41:34,480  
as bob said earlier these

2703  
01:41:39,109 --> 01:41:36,560  
these missions are precursors

2704  
01:41:40,149 --> 01:41:39,119  
to the humans going out beyond earth's

2705  
01:41:41,189 --> 01:41:40,159  
orbit

2706  
01:41:43,750 --> 01:41:41,199  
and

2707  
01:41:46,709 --> 01:41:43,760  
we really look forward to doing all the

2708  
01:41:48,709 --> 01:41:46,719  
pre-work that we can with automation

2709  
01:41:50,470 --> 01:41:48,719  
before the human gets out there sure

2710  
01:41:52,070 --> 01:41:50,480  
good does this job ever get old you've

2711  
01:41:53,910 --> 01:41:52,080  
been doing this a while now do you ever

2712  
01:41:55,350 --> 01:41:53,920  
get tired of sitting there another

2713  
01:41:56,709 --> 01:41:55,360

launch countdown does it ever feel that

2714

01:41:58,870 --> 01:41:56,719

way no

2715

01:42:00,390 --> 01:41:58,880

it's always exciting i've got the most

2716

01:42:03,669 --> 01:42:00,400

uh

2717

01:42:06,390 --> 01:42:03,679

i'm most fortunate in the job that i do

2718

01:42:09,030 --> 01:42:06,400

i really love it uh someday there will

2719

01:42:09,750 --> 01:42:09,040

be a sunset for me just this prior week

2720

01:42:28,629 --> 01:42:09,760

i

2721

01:42:30,550 --> 01:42:28,639

what's above what's better than a launch

2722

01:42:31,910 --> 01:42:30,560

director i can't think of it right now

2723

01:42:33,830 --> 01:42:31,920

except being retired and having a

2724

01:42:35,430 --> 01:42:33,840

margarita somewhere

2725

01:42:37,270 --> 01:42:35,440

all right and with that omar i will let

2726

01:42:39,030 --> 01:42:37,280

you get back again uh we kind of keep

2727

01:42:40,790 --> 01:42:39,040

saying this but it's true we've done a

2728

01:42:41,590 --> 01:42:40,800

lot we're not quite done yet um so i

2729

01:42:43,430 --> 01:42:41,600

want to make sure you get back and

2730

01:42:44,470 --> 01:42:43,440

support tim um as we close out this

2731

01:42:46,629 --> 01:42:44,480

mission let's close out this launch

2732

01:42:49,270 --> 01:42:46,639

activity today okay thanks so much we're

2733

01:42:50,790 --> 01:42:49,280

gonna leave you now with uh this video

2734

01:42:52,070 --> 01:42:50,800

um not leave you now um but we're gonna

2735

01:42:54,709 --> 01:42:52,080

check in with this video we showed it

2736

01:43:25,120 --> 01:42:54,719

earlier but this is a preview of the lsp

2737

01:43:53,350 --> 01:43:40,740

[Music]

2738

01:43:55,990 --> 01:43:54,790

obviously we're incredibly grateful for

2739

01:43:57,109 --> 01:43:56,000

the support and the service of the

2740

01:43:58,709 --> 01:43:57,119

launch services program and all that

2741

01:44:00,229 --> 01:43:58,719

they do helping make all this science

2742

01:44:01,590 --> 01:44:00,239

research and robotic exploration

2743

01:44:03,109 --> 01:44:01,600

possible we're going to send you now

2744

01:44:05,030 --> 01:44:03,119

over for an update on where we are with

2745

01:44:07,189 --> 01:44:05,040

the spacecraft daryl and nick how we

2746

01:44:08,470 --> 01:44:07,199

looking josh we're looking good so far

2747

01:44:11,270 --> 01:44:08,480

we're here at the mission director

2748

01:44:13,350 --> 01:44:11,280

center where behind us the spacecraft

2749

01:44:15,830 --> 01:44:13,360

team from the european space agency

2750

01:44:17,990 --> 01:44:15,840

continues to work uh this mission as

2751  
01:44:19,510 --> 01:44:18,000  
they uh are communicating with their

2752  
01:44:21,830 --> 01:44:19,520  
spacecraft we got a little bit of an

2753  
01:44:24,550 --> 01:44:21,840  
update we heard the project manager

2754  
01:44:26,070 --> 01:44:24,560  
cesar garcia uh talk over the audio

2755  
01:44:27,910 --> 01:44:26,080  
loops he gave a little bit of an update

2756  
01:44:29,510 --> 01:44:27,920  
yeah he confirmed that we did get

2757  
01:44:31,990 --> 01:44:29,520  
acquisitions said normally joshua

2758  
01:44:33,910 --> 01:44:32,000  
reported out so we know that uh soul

2759  
01:44:36,390 --> 01:44:33,920  
orbiter is on its way and at the folks

2760  
01:44:38,229 --> 01:44:36,400  
in germany have acquired soul orbiter at

2761  
01:44:39,750 --> 01:44:38,239  
the right position that tells me the

2762  
01:44:41,030 --> 01:44:39,760  
launch vehicle did a great job tonight

2763  
01:44:42,470 --> 01:44:41,040

at delivering them in the orbit they

2764

01:44:43,990 --> 01:44:42,480  
needed to head off

2765

01:44:46,070 --> 01:44:44,000  
we did hear that they started their auto

2766

01:44:48,950 --> 01:44:46,080  
sequences which is the software programs

2767

01:44:50,470 --> 01:44:48,960  
on board of the spacecraft to get ready

2768

01:44:51,910 --> 01:44:50,480  
for solar ray deployment that we're

2769

01:44:54,390 --> 01:44:51,920  
waiting on

2770

01:44:56,229 --> 01:44:54,400  
so that is in work and what's been

2771

01:44:58,149 --> 01:44:56,239  
reported so far is that

2772

01:45:00,149 --> 01:44:58,159  
all things are nominal and proceeding

2773

01:45:03,030 --> 01:45:00,159  
per the timeline so we're just waiting

2774

01:45:05,830 --> 01:45:03,040  
to hear from them if the solar ray

2775

01:45:08,709 --> 01:45:05,840  
deployment and that they're getting good

2776  
01:45:10,149 --> 01:45:08,719  
sun signals about an hour and 15 minutes

2777  
01:45:12,390 --> 01:45:10,159  
ago we launched here from the cape

2778  
01:45:13,910 --> 01:45:12,400  
canaveral air force station on an atlas

2779  
01:45:16,629 --> 01:45:13,920  
v rocket

2780  
01:45:19,830 --> 01:45:16,639  
bound for the sun the solar orbiter

2781  
01:45:22,629 --> 01:45:19,840  
spacecraft on top it was a good flight

2782  
01:45:24,070 --> 01:45:22,639  
initially off the ground we saw a good

2783  
01:45:25,350 --> 01:45:24,080  
separation and now we're getting some

2784  
01:45:26,660 --> 01:45:25,360  
celebration

2785  
01:45:28,070 --> 01:45:26,670  
here at the nbc

2786  
01:45:29,910 --> 01:45:28,080  
[Applause]

2787  
01:45:32,550 --> 01:45:29,920  
we're getting more information on that

2788  
01:45:35,030 --> 01:45:32,560

solar array deployment um

2789

01:45:36,950 --> 01:45:35,040

as you can see there we've just uh they

2790

01:45:40,149 --> 01:45:36,960

just erupted in applause on the front

2791

01:45:41,990 --> 01:45:40,159

row that is the spacecraft team

2792

01:45:43,669 --> 01:45:42,000

all from overseas

2793

01:45:48,149 --> 01:45:43,679

the european space agency and their

2794

01:45:51,669 --> 01:45:50,149

they have celebrated yeah we've seen the

2795

01:45:53,750 --> 01:45:51,679

celebration here in the mdc i haven't

2796

01:45:55,350 --> 01:45:53,760

heard anything i confirmed

2797

01:45:57,189 --> 01:45:55,360

whether solar rays were deployed or not

2798

01:45:58,709 --> 01:45:57,199

but i'm going to assume that based on

2799

01:46:00,310 --> 01:45:58,719

their celebration something in the

2800

01:46:03,270 --> 01:46:00,320

sequence happened uh the way it was

2801  
01:46:05,430 --> 01:46:03,280  
supposed to be so we'll continue to

2802  
01:46:07,430 --> 01:46:05,440  
monitor and find out what's going on but

2803  
01:46:10,149 --> 01:46:07,440  
uh based on that i would say things are

2804  
01:46:11,669 --> 01:46:10,159  
going very well for solar orbiter and uh

2805  
01:46:13,750 --> 01:46:11,679  
you know we'll just wait for that uh

2806  
01:46:15,189 --> 01:46:13,760  
confirmation verbal confirmation that

2807  
01:46:17,350 --> 01:46:15,199  
solar rays were

2808  
01:46:20,070 --> 01:46:17,360  
just deployed but uh we'll see it's been

2809  
01:46:22,629 --> 01:46:20,080  
an exciting night with the liftoff of uh

2810  
01:46:25,189 --> 01:46:22,639  
uh soul orbiter on the atlas v 411

2811  
01:46:27,350 --> 01:46:25,199  
vehicle and uh things are going well so

2812  
01:46:29,109 --> 01:46:27,360  
far so we're we're getting to that point

2813  
01:46:30,790 --> 01:46:29,119

that i like to say we can really

2814

01:46:32,390 --> 01:46:30,800

celebrate that things have all gone

2815

01:46:33,669 --> 01:46:32,400

successful it's a good moment in time

2816

01:46:35,669 --> 01:46:33,679

for this mission which has been going

2817

01:46:38,310 --> 01:46:35,679

for an hour and 17 minutes now as we

2818

01:46:40,870 --> 01:46:38,320

approach uh just 20 minutes after

2819

01:46:42,550 --> 01:46:40,880

midnight here on the east coast

2820

01:46:45,030 --> 01:46:42,560

there was a there was a little bit of a

2821

01:46:46,629 --> 01:46:45,040

treat for us although we we can't quite

2822

01:46:49,990 --> 01:46:46,639

show this yet but we certainly saw it on

2823

01:46:52,950 --> 01:46:50,000

our screens where we saw the replay of a

2824

01:46:54,550 --> 01:46:52,960

spacecraft separation event

2825

01:46:56,229 --> 01:46:54,560

certainly they confirmed that there was

2826

01:46:58,790 --> 01:46:56,239

spacecraft separation but to see that

2827

01:47:01,270 --> 01:46:58,800

visually it looked really good yeah it

2828

01:47:03,510 --> 01:47:01,280

is uh the team uh had a camera on board

2829

01:47:05,350 --> 01:47:03,520

unfortunately based on the flight and

2830

01:47:07,590 --> 01:47:05,360

the orbit that we were putting solar

2831

01:47:09,189 --> 01:47:07,600

orbiter into you could not get that real

2832

01:47:11,910 --> 01:47:09,199

time and live

2833

01:47:13,350 --> 01:47:11,920

so the team had stored that in telemetry

2834

01:47:15,109 --> 01:47:13,360

downloaded it once they got over a

2835

01:47:17,430 --> 01:47:15,119

ground station that they could get that

2836

01:47:19,270 --> 01:47:17,440

they're verifying that video

2837

01:47:20,790 --> 01:47:19,280

and making sure it's all good so i'm

2838

01:47:21,669 --> 01:47:20,800

sure in the days to come you will see

2839

01:47:24,709 --> 01:47:21,679

some

2840

01:47:26,390 --> 01:47:24,719

live video of soul rovers uh separation

2841

01:47:28,550 --> 01:47:26,400

from the atlas v but

2842

01:47:30,870 --> 01:47:28,560

it's always good to get that

2843

01:47:32,790 --> 01:47:30,880

confirmation from the spacecraft and

2844

01:47:35,030 --> 01:47:32,800

from the

2845

01:47:37,590 --> 01:47:35,040

team that everything's going well and as

2846

01:47:40,790 --> 01:47:37,600

you see on the screen there we have live

2847

01:47:43,430 --> 01:47:40,800

coverage from the mdc here at ae on the

2848

01:47:46,550 --> 01:47:43,440

right hand side and on the left we have

2849

01:47:49,350 --> 01:47:46,560

a live shot of the esoc in germany from

2850

01:47:52,070 --> 01:47:49,360

the isa team so things are going well

2851

01:47:54,550 --> 01:47:52,080

there and uh hope that all is

2852

01:47:56,709 --> 01:47:54,560

progressing forward for solar ray

2853

01:47:59,350 --> 01:47:56,719

deployment on solar orbiter yeah that uh

2854

01:48:01,189 --> 01:47:59,360

esox stands for european space operation

2855

01:48:03,270 --> 01:48:01,199

center that uh that you're looking at

2856

01:48:05,109 --> 01:48:03,280

right there that is in germany and that

2857

01:48:07,990 --> 01:48:05,119

is a live view

2858

01:48:09,750 --> 01:48:08,000

of the control team there and

2859

01:48:10,870 --> 01:48:09,760

the operations that have been going on

2860

01:48:12,149 --> 01:48:10,880

there

2861

01:48:15,189 --> 01:48:12,159

those people

2862

01:48:16,870 --> 01:48:15,199

very excited because there are 22

2863

01:48:19,750 --> 01:48:16,880

different countries that all came

2864

01:48:22,950 --> 01:48:19,760

together in order to make solar orbiter

2865

01:48:25,669 --> 01:48:22,960

happen and that control room was part of

2866

01:48:27,830 --> 01:48:25,679

uh the launch today and we're getting a

2867

01:48:29,990 --> 01:48:27,840

live peek in to how they do things

2868

01:48:32,470 --> 01:48:30,000

overseas yeah and that's actually a very

2869

01:48:34,870 --> 01:48:32,480

important part of this mission the esoc

2870

01:48:37,109 --> 01:48:34,880

is where the team the isa team as you

2871

01:48:38,950 --> 01:48:37,119

stated is controlling solar orbiter

2872

01:48:41,430 --> 01:48:38,960

right now and and they're performing

2873

01:48:43,669 --> 01:48:41,440

their their sequences to get those solar

2874

01:48:46,629 --> 01:48:43,679

arrays deployed and in position

2875

01:48:48,790 --> 01:48:46,639

that team is monitoring the spacecraft

2876

01:48:51,030 --> 01:48:48,800

very closely they're communicating that

2877

01:48:52,149 --> 01:48:51,040

status back to cesar garcia here in the

2878

01:48:54,149 --> 01:48:52,159

mdc

2879

01:48:55,990 --> 01:48:54,159

and uh you know we'll hopefully hear

2880

01:48:57,030 --> 01:48:56,000

from cesar a little bit later in the

2881

01:48:59,830 --> 01:48:57,040

show here

2882

01:49:02,470 --> 01:48:59,840

but that team is is doing a lot of work

2883

01:49:04,149 --> 01:49:02,480

to make sure solar orbiter is performing

2884

01:49:06,149 --> 01:49:04,159

well and doing what they

2885

01:49:08,390 --> 01:49:06,159

have to accomplish to get solar rays out

2886

01:49:10,070 --> 01:49:08,400

so we'll continue to monitor that

2887

01:49:11,910 --> 01:49:10,080

situation and

2888

01:49:15,990 --> 01:49:11,920

see how that goes watching that very

2889

01:49:17,830 --> 01:49:16,000

closely and as we await solar deploy the

2890

01:49:19,830 --> 01:49:17,840

solar array deployment

2891

01:49:21,669 --> 01:49:19,840

certainly to have a lot of work to do in

2892

01:49:24,550 --> 01:49:21,679

the future because

2893

01:49:26,310 --> 01:49:24,560

it will be several years before solar

2894

01:49:29,189 --> 01:49:26,320

orbiter is in position to start

2895

01:49:30,390 --> 01:49:29,199

gathering data and doing its science on

2896

01:49:32,870 --> 01:49:30,400

the sun

2897

01:49:34,470 --> 01:49:32,880

so that operation center in germany that

2898

01:49:35,910 --> 01:49:34,480

you're looking at on the left

2899

01:49:37,830 --> 01:49:35,920

they've they've got a lot of work ahead

2900

01:49:39,350 --> 01:49:37,840

of them oh absolutely in the next just

2901

01:49:41,589 --> 01:49:39,360

in the next few months they have a lot

2902

01:49:43,189 --> 01:49:41,599

of checkout they want to do to verify

2903

01:49:45,109 --> 01:49:43,199

that everything is operational and

2904

01:49:47,830 --> 01:49:45,119

working after that smooth ride on the

2905

01:49:49,830 --> 01:49:47,840

atlas 5 tonight but they want to double

2906

01:49:52,390 --> 01:49:49,840

check and triple check all that stuff

2907

01:49:53,589 --> 01:49:52,400

before they head on their way make sure

2908

01:49:56,390 --> 01:49:53,599

everything is working all the

2909

01:49:58,470 --> 01:49:56,400

instruments are performing well check

2910

01:50:00,390 --> 01:49:58,480

out those little apertures that you like

2911

01:50:01,669 --> 01:50:00,400

so much on the heat

2912

01:50:03,350 --> 01:50:01,679

heat shield you know to make sure

2913

01:50:04,870 --> 01:50:03,360

they're working well right because you

2914

01:50:07,270 --> 01:50:04,880

don't want those to fail once you get to

2915

01:50:09,109 --> 01:50:07,280

the sun and so the team will be doing a

2916

01:50:11,430 --> 01:50:09,119

lot of checkout on the satellite over

2917

01:50:13,589 --> 01:50:11,440

the next few months and possibly a year

2918

01:50:16,070 --> 01:50:13,599

to get ready for that and they'll get

2919

01:50:18,470 --> 01:50:16,080

into their gravity assist

2920

01:50:19,669 --> 01:50:18,480

maneuvers around venus and then head to

2921

01:50:21,430 --> 01:50:19,679

the sun

2922

01:50:23,669 --> 01:50:21,440

and then come back and do some more work

2923

01:50:25,669 --> 01:50:23,679

and as we heard earlier in the show two

2924

01:50:26,950 --> 01:50:25,679

to four years as josh had mentioned to

2925

01:50:29,830 --> 01:50:26,960

get things

2926  
01:50:31,669 --> 01:50:29,840  
going so team will be working hard out

2927  
01:50:34,790 --> 01:50:31,679  
of that esoc and we have a lot of folks

2928  
01:50:36,470 --> 01:50:34,800  
here from overseas in fact during our

2929  
01:50:38,950 --> 01:50:36,480  
pre-launch press briefing we heard from

2930  
01:50:41,750 --> 01:50:38,960  
cesar garcia who told us that there were

2931  
01:50:44,229 --> 01:50:41,760  
800 people that had come over

2932  
01:50:45,669 --> 01:50:44,239  
from europe to to be here to not only

2933  
01:50:47,109 --> 01:50:45,679  
work this launch certainly we've got

2934  
01:50:48,550 --> 01:50:47,119  
many of them here in our own control

2935  
01:50:50,550 --> 01:50:48,560  
room which you're looking at right now

2936  
01:50:53,189 --> 01:50:50,560  
as they are in the front row of the

2937  
01:50:55,510 --> 01:50:53,199  
mission director center but also

2938  
01:50:57,030 --> 01:50:55,520

throughout the space center both both as

2939

01:51:00,310 --> 01:50:57,040

uh just to

2940

01:51:02,790 --> 01:51:00,320

witness uh the launch uh to also support

2941

01:51:04,709 --> 01:51:02,800

it in many ways and we also

2942

01:51:06,550 --> 01:51:04,719

just heard an eruption of applause take

2943

01:51:07,830 --> 01:51:06,560

a look there yeah we we see them

2944

01:51:09,910 --> 01:51:07,840

applauding in the mission director's

2945

01:51:11,750 --> 01:51:09,920

center i haven't heard what that's for

2946

01:51:14,149 --> 01:51:11,760

yet but again we're assuming that's

2947

01:51:15,750 --> 01:51:14,159

phase two of the solar array deployment

2948

01:51:18,470 --> 01:51:15,760

so there's several milestones that have

2949

01:51:20,470 --> 01:51:18,480

to occur for that to uh to happen so

2950

01:51:22,870 --> 01:51:20,480

we'll uh hopefully

2951  
01:51:23,990 --> 01:51:22,880  
hopefully hear that soon

2952  
01:51:25,910 --> 01:51:24,000  
from

2953  
01:51:26,870 --> 01:51:25,920  
cesar garcia

2954  
01:51:30,709 --> 01:51:26,880  
and

2955  
01:51:33,189 --> 01:51:30,719  
things will be moving forward so uh

2956  
01:51:34,870 --> 01:51:33,199  
i'm hearing now from cesar that solar

2957  
01:51:37,589 --> 01:51:34,880  
rays are confirmed deployed and they are

2958  
01:51:39,109 --> 01:51:37,599  
power positive that's a good news so uh

2959  
01:51:41,270 --> 01:51:39,119  
that's why they were celebrating daryl

2960  
01:51:43,430 --> 01:51:41,280  
yeah very very very very good thing for

2961  
01:51:46,390 --> 01:51:43,440  
the mission tonight

2962  
01:51:48,070 --> 01:51:46,400  
and uh he certainly sounds uh excited on

2963  
01:51:49,270 --> 01:51:48,080

on the nets when he just made that

2964

01:51:51,109 --> 01:51:49,280

announcement and we're in fact we're

2965

01:51:52,229 --> 01:51:51,119

going to talk to him in just a few

2966

01:51:54,550 --> 01:51:52,239

minutes

2967

01:51:56,790 --> 01:51:54,560

when cesar garcia makes his way over

2968

01:51:58,950 --> 01:51:56,800

here to the broadcast booth

2969

01:52:01,030 --> 01:51:58,960

that was a that was a pretty excited

2970

01:52:04,149 --> 01:52:01,040

report that he just gave and got a

2971

01:52:05,750 --> 01:52:04,159

congratulations from the team at nasa's

2972

01:52:07,350 --> 01:52:05,760

launch services program absolutely as

2973

01:52:09,510 --> 01:52:07,360

you see them there in the mbc they are

2974

01:52:11,430 --> 01:52:09,520

celebrating they deserve it it's been a

2975

01:52:13,830 --> 01:52:11,440

lot of years some of these folks seven

2976

01:52:15,750 --> 01:52:13,840

to eight years spent on solar orbiter

2977

01:52:17,350 --> 01:52:15,760

and uh they're very happy for this

2978

01:52:20,070 --> 01:52:17,360

tonight so that's a huge thing and

2979

01:52:22,629 --> 01:52:20,080

they'll get started uh they're happy but

2980

01:52:24,870 --> 01:52:22,639

they will uh get going in the esoc and

2981

01:52:26,790 --> 01:52:24,880

start checking things out so very happy

2982

01:52:28,790 --> 01:52:26,800

for the solar orbiter team and the

2983

01:52:30,550 --> 01:52:28,800

successful mission tonight

2984

01:52:33,030 --> 01:52:30,560

we always loved this one and as you

2985

01:52:34,870 --> 01:52:33,040

heard from omar earlier uh this is just

2986

01:52:37,510 --> 01:52:34,880

the beginning for us at launch services

2987

01:52:39,030 --> 01:52:37,520

program we've got mars 2020 coming up

2988

01:52:41,510 --> 01:52:39,040

next which is another

2989

01:52:44,950 --> 01:52:41,520

atlas v with a few more solids

2990

01:52:48,149 --> 01:52:44,960

than we had tonight but things are going

2991

01:52:49,430 --> 01:52:48,159

great for a solo orbiter so um daryl i'd

2992

01:52:51,030 --> 01:52:49,440

like to say thanks for having me on the

2993

01:52:53,189 --> 01:52:51,040

show tonight it's been a pleasure

2994

01:52:55,910 --> 01:52:53,199

working with you and and following this

2995

01:52:57,270 --> 01:52:55,920

mission as usual uh you did a great job

2996

01:52:58,550 --> 01:52:57,280

and uh thanks for having me well

2997

01:53:01,189 --> 01:52:58,560

likewise mick we appreciate your

2998

01:53:03,510 --> 01:53:01,199

expertise thank you for saying that you

2999

01:53:05,830 --> 01:53:03,520

have been a wealth of knowledge uh

3000

01:53:07,990 --> 01:53:05,840

during this entire mission and it's

3001  
01:53:09,830 --> 01:53:08,000  
always nice to to have somebody who

3002  
01:53:12,709 --> 01:53:09,840  
knows the rocket knows it well and

3003  
01:53:15,510 --> 01:53:12,719  
you've uh not only were giving us good

3004  
01:53:17,750 --> 01:53:15,520  
insight into the flight today but also

3005  
01:53:19,990 --> 01:53:17,760  
on the fly calculations

3006  
01:53:21,350 --> 01:53:20,000  
standard metric that was something to

3007  
01:53:23,109 --> 01:53:21,360  
behold uh

3008  
01:53:25,510 --> 01:53:23,119  
watching you peck away at your

3009  
01:53:27,350 --> 01:53:25,520  
calculator to uh to get those for us and

3010  
01:53:28,790 --> 01:53:27,360  
then scribbling them down just the

3011  
01:53:30,870 --> 01:53:28,800  
old-fashioned way

3012  
01:53:32,470 --> 01:53:30,880  
all right well that's gonna wrap it uh

3013  
01:53:33,589 --> 01:53:32,480

for us for the moment here at the

3014

01:53:36,709 --> 01:53:33,599

mission director's center we're gonna

3015

01:53:38,629 --> 01:53:36,719

send it back to joshua and tim dunn

3016

01:53:40,629 --> 01:53:38,639

thanks darrell yes i am with tim dunn

3017

01:53:43,030 --> 01:53:40,639

again and now we can say

3018

01:53:44,950 --> 01:53:43,040

we did it we did it we did it we all did

3019

01:53:46,310 --> 01:53:44,960

it absolutely so i'm i'm just here

3020

01:53:47,510 --> 01:53:46,320

getting to share the good news but you

3021

01:53:49,350 --> 01:53:47,520

guys are doing the hard work so tim

3022

01:53:51,430 --> 01:53:49,360

congrats again to you and your team and

3023

01:53:54,470 --> 01:53:51,440

the ula team and everybody else here isa

3024

01:53:57,350 --> 01:53:54,480

and just a phenomenal effort excellent

3025

01:54:00,390 --> 01:53:57,360

no i just just got off the net with our

3026  
01:54:02,950 --> 01:54:00,400  
spacecraft mission director cesar garcia

3027  
01:54:05,030 --> 01:54:02,960  
and he as you can imagine he gave me the

3028  
01:54:07,750 --> 01:54:05,040  
final two milestones that the solar

3029  
01:54:10,229 --> 01:54:07,760  
arrays were completely deployed as well

3030  
01:54:13,030 --> 01:54:10,239  
as the spacecraft acquiring the sun the

3031  
01:54:15,270 --> 01:54:13,040  
solar rays acquiring the sun and

3032  
01:54:18,070 --> 01:54:15,280  
power positive meaning generating good

3033  
01:54:19,910 --> 01:54:18,080  
power on the vehicle vehicles healthy

3034  
01:54:22,390 --> 01:54:19,920  
completely healthy awesome and on its

3035  
01:54:25,270 --> 01:54:22,400  
way to the sun now awesome really good

3036  
01:54:26,149 --> 01:54:25,280  
news uh now i can celebrate there you go

3037  
01:54:27,830 --> 01:54:26,159  
awesome

3038  
01:54:29,430 --> 01:54:27,840

do you do you all celebrate collectively

3039

01:54:31,030 --> 01:54:29,440

or do you just go home and take a nap is

3040

01:54:33,669 --> 01:54:31,040

that well is that celebration for you

3041

01:54:35,589 --> 01:54:33,679

guys given the hour of day uh we'll

3042

01:54:37,430 --> 01:54:35,599

probably uh celebrate a little bit

3043

01:54:39,109 --> 01:54:37,440

tonight go home we've got a few

3044

01:54:41,350 --> 01:54:39,119

celebrations planned for tomorrow later

3045

01:54:42,870 --> 01:54:41,360

in the day goodness yeah so practically

3046

01:54:43,669 --> 01:54:42,880

speaking on kind of the business side of

3047

01:54:46,550 --> 01:54:43,679

things

3048

01:54:49,350 --> 01:54:46,560

what happens for lsp after a launch are

3049

01:54:51,350 --> 01:54:49,360

you all just you're done and you kind of

3050

01:54:53,669 --> 01:54:51,360

you're done is there more work to do for

3051

01:54:55,910 --> 01:54:53,679

solar orbiter well for solar orbiter we

3052

01:54:58,149 --> 01:54:55,920

obviously have to review all of the data

3053

01:55:01,030 --> 01:54:58,159

from the rocket so that's a process that

3054

01:55:03,189 --> 01:55:01,040

takes uh on the order of a few weeks

3055

01:55:05,189 --> 01:55:03,199

maybe a month month and a half because

3056

01:55:08,229 --> 01:55:05,199

what we want to do is we want to look at

3057

01:55:10,709 --> 01:55:08,239

every piece every parameter every little

3058

01:55:13,189 --> 01:55:10,719

bit of data that happened tonight and in

3059

01:55:15,030 --> 01:55:13,199

flight during the countdown and flight

3060

01:55:16,870 --> 01:55:15,040

analyze it see if there's anything that

3061

01:55:19,030 --> 01:55:16,880

the data is telling us we're all a bunch

3062

01:55:20,709 --> 01:55:19,040

of engineers we want to scrutinize the

3063

01:55:22,709 --> 01:55:20,719

data and then

3064

01:55:24,310 --> 01:55:22,719

apply that and look at that if we see

3065

01:55:25,910 --> 01:55:24,320

something a little funny

3066

01:55:28,629 --> 01:55:25,920

address it before we have our next

3067

01:55:30,310 --> 01:55:28,639

launch and certainly if we the lsp team

3068

01:55:31,990 --> 01:55:30,320

find something in data we would

3069

01:55:33,589 --> 01:55:32,000

obviously share that with united launch

3070

01:55:36,229 --> 01:55:33,599

alliance and

3071

01:55:38,390 --> 01:55:36,239

likewise uh they provide us a lot of

3072

01:55:40,790 --> 01:55:38,400

very detailed data so uh getting ready

3073

01:55:42,470 --> 01:55:40,800

for mars 2020 you spoke to omar yes just

3074

01:55:45,350 --> 01:55:42,480

a bit ago we're going to be really

3075

01:55:47,990 --> 01:55:45,360

excited about flying on this magnificent

3076

01:55:50,070 --> 01:55:48,000

caucus one more time this year so

3077

01:55:52,790 --> 01:55:50,080

there's uh the you know the atlas v is

3078

01:55:54,390 --> 01:55:52,800

just incredible we love flying on it uh

3079

01:55:57,910 --> 01:55:54,400

the united launch alliance team is

3080

01:56:01,189 --> 01:55:57,920

amazing uh i would like to say uh the

3081

01:56:03,589 --> 01:56:01,199

launch services program team my team uh

3082

01:56:06,470 --> 01:56:03,599

is it's it's incredible thank you for

3083

01:56:08,950 --> 01:56:06,480

all of your dedication for many years to

3084

01:56:10,950 --> 01:56:08,960

make what happened happen tonight

3085

01:56:13,270 --> 01:56:10,960

working right alongside united launch

3086

01:56:15,430 --> 01:56:13,280

alliance and your colleagues there and

3087

01:56:17,750 --> 01:56:15,440

then we all worked alongside our

3088

01:56:21,510 --> 01:56:17,760

colleagues here at the eastern range

3089

01:56:24,149 --> 01:56:21,520

with 45th space wing and then i can't uh

3090

01:56:26,310 --> 01:56:24,159

end my comments without thanking our

3091

01:56:28,229 --> 01:56:26,320

spacecraft customer yes and in this case

3092

01:56:29,990 --> 01:56:28,239

it's the european space agency with

3093

01:56:32,550 --> 01:56:30,000

their airbus contractor who built a

3094

01:56:33,910 --> 01:56:32,560

spacecraft yes just a joy to work with

3095

01:56:36,709 --> 01:56:33,920

those guys

3096

01:56:38,550 --> 01:56:36,719

an international collaboration 10 plus

3097

01:56:41,189 --> 01:56:38,560

years in the making i know you guys have

3098

01:56:43,669 --> 01:56:41,199

been talking about that all night but a

3099

01:56:45,270 --> 01:56:43,679

lot of challenges but i tell you what

3100

01:56:47,510 --> 01:56:45,280

when a team is focused on mission

3101  
01:56:50,070 --> 01:56:47,520  
success that's the universal language

3102  
01:56:52,950 --> 01:56:50,080  
that we all speak and here we are able

3103  
01:56:55,750 --> 01:56:52,960  
to celebrate that yeah and i wish we

3104  
01:56:57,350 --> 01:56:55,760  
could somehow share something more

3105  
01:56:59,109 --> 01:56:57,360  
specific with people to kind of let them

3106  
01:57:00,790 --> 01:56:59,119  
understand what it means to thank that

3107  
01:57:02,709 --> 01:57:00,800  
many teams the fact that there's all

3108  
01:57:05,189 --> 01:57:02,719  
those teams and all of the people on

3109  
01:57:07,030 --> 01:57:05,199  
that doing their part right of the piece

3110  
01:57:08,310 --> 01:57:07,040  
the piece of the puzzle to bring it all

3111  
01:57:10,629 --> 01:57:08,320  
together to make this beautiful picture

3112  
01:57:13,189 --> 01:57:10,639  
of a spacecraft in flight on the way to

3113  
01:57:14,790 --> 01:57:13,199

the sun happen so absolutely um tim

3114

01:57:16,149 --> 01:57:14,800

congratulations to you and your team all

3115

01:57:17,350 --> 01:57:16,159

right i appreciate it your service

3116

01:57:19,030 --> 01:57:17,360

appreciate everybody's hard work and

3117

01:57:20,709 --> 01:57:19,040

effort you're welcome again rocketry is

3118

01:57:22,310 --> 01:57:20,719

a team sport absolutely space flight is

3119

01:57:24,550 --> 01:57:22,320

a team sport and we've got some of the

3120

01:57:25,990 --> 01:57:24,560

best around no doubt all right thank you

3121

01:57:27,669 --> 01:57:26,000

so much josh tim i'll let you go

3122

01:57:29,189 --> 01:57:27,679

celebrate all right have a good night

3123

01:57:33,910 --> 01:57:29,199

send it back over to daryl with cesar

3124

01:57:38,709 --> 01:57:35,750

thank you joshua we're here with cesar

3125

01:57:40,629 --> 01:57:38,719

garcia the program manager for solar

3126

01:57:42,550 --> 01:57:40,639

orbiter thank you for coming over and

3127

01:57:45,350 --> 01:57:42,560

talking to us and congratulations thank

3128

01:57:46,629 --> 01:57:45,360

you very much this is a very good moment

3129

01:57:49,030 --> 01:57:46,639

yeah tell me a little bit about the

3130

01:57:50,629 --> 01:57:49,040

moment uh just a few minutes ago where

3131

01:57:53,109 --> 01:57:50,639

you made the announcement

3132

01:57:54,870 --> 01:57:53,119

yeah there's always a bit of tension

3133

01:57:57,109 --> 01:57:54,880

before you get the signal and we got the

3134

01:57:59,030 --> 01:57:57,119

signal of the spacecraft pretty quickly

3135

01:58:01,030 --> 01:57:59,040

and that's a good sign and then we had

3136

01:58:02,709 --> 01:58:01,040

to deploy and point to the sign and

3137

01:58:04,629 --> 01:58:02,719

deploy the solar arrays

3138

01:58:06,709 --> 01:58:04,639

then there was a

3139

01:58:08,310 --> 01:58:06,719

switch over of the local antennas and it

3140

01:58:10,070 --> 01:58:08,320

took a bit longer to receive the

3141

01:58:11,350 --> 01:58:10,080

information that the solaris had fully

3142

01:58:13,430 --> 01:58:11,360

deployed

3143

01:58:15,030 --> 01:58:13,440

so we were a bit tense and then we got

3144

01:58:17,430 --> 01:58:15,040

the the confirmation and then once you

3145

01:58:19,750 --> 01:58:17,440

get the confirmation then it's like well

3146

01:58:22,229 --> 01:58:19,760

the waters come and then you start

3147

01:58:23,910 --> 01:58:22,239

becoming um

3148

01:58:25,910 --> 01:58:23,920

not only let's say confident but

3149

01:58:27,750 --> 01:58:25,920

extremely happy and then it's the moment

3150

01:58:29,750 --> 01:58:27,760

when you start hanging people around

3151  
01:58:31,990 --> 01:58:29,760  
because this is the at the moment after

3152  
01:58:34,310 --> 01:58:32,000  
so many years of work nothing was saying

3153  
01:58:36,470 --> 01:58:34,320  
before and we are on the way to the sun

3154  
01:58:38,870 --> 01:58:36,480  
let's go solar orbiter it's a fantastic

3155  
01:58:41,510 --> 01:58:38,880  
moment and it's really something unique

3156  
01:58:42,390 --> 01:58:41,520  
if i may say and and you may and it was

3157  
01:58:44,390 --> 01:58:42,400  
certainly capped with a lot of

3158  
01:58:46,390 --> 01:58:44,400  
celebration saw you hugging a lot of

3159  
01:58:47,910 --> 01:58:46,400  
people in the room a lot of handshakes

3160  
01:58:50,310 --> 01:58:47,920  
and going back to the beginning of

3161  
01:58:52,229 --> 01:58:50,320  
launch where we launched right at 1103

3162  
01:58:54,950 --> 01:58:52,239  
eastern time from right here at the cape

3163  
01:58:57,109 --> 01:58:54,960

canaveral air force station um what was

3164

01:58:58,629 --> 01:58:57,119

launch like for you as you kind of uh

3165

01:59:00,629 --> 01:58:58,639

experienced that

3166

01:59:02,149 --> 01:59:00,639

here inside the mission director center

3167

01:59:04,070 --> 01:59:02,159

well i have to admit that i abandoned

3168

01:59:07,510 --> 01:59:04,080

post

3169

01:59:09,510 --> 01:59:07,520

continuously throughout the year through

3170

01:59:11,910 --> 01:59:09,520

the launch but after

3171

01:59:15,030 --> 01:59:11,920

I minus 15 seconds where we cannot call

3172

01:59:17,510 --> 01:59:15,040

hold anymore so i actually

3173

01:59:19,030 --> 01:59:17,520

picked up the phone and called

3174

01:59:20,470 --> 01:59:19,040

our colleagues in izoc so that i could

3175

01:59:23,030 --> 01:59:20,480

still have permanent contact with them

3176

01:59:25,189 --> 01:59:23,040

on the phone and i will run out to see

3177

01:59:27,109 --> 01:59:25,199

the launch and it's a fantastic

3178

01:59:28,470 --> 01:59:27,119

experience first you see you know the

3179

01:59:31,270 --> 01:59:28,480

the night is

3180

01:59:33,350 --> 01:59:31,280

is lit by the by the rocket and then

3181

01:59:35,910 --> 01:59:33,360

like 15 seconds later you start feeling

3182

01:59:37,830 --> 01:59:35,920

the not hearing but feeling the roar

3183

01:59:40,390 --> 01:59:37,840

and then you see all the dreams all the

3184

01:59:42,790 --> 01:59:40,400

expectations going up in sky and it was

3185

01:59:46,390 --> 01:59:42,800

very clear sky we could see it for

3186

01:59:49,270 --> 01:59:46,400

very many seconds going south southeast

3187

01:59:51,589 --> 01:59:49,280

and um i don't know it's difficult to

3188

01:59:53,669 --> 01:59:51,599

for me to describe it but it's like well

3189

01:59:55,990 --> 01:59:53,679

it's we are unstoppable

3190

01:59:58,070 --> 01:59:56,000

you get that feeling yeah right i love

3191

01:59:59,990 --> 01:59:58,080

that you actually got up and got on the

3192

02:00:01,510 --> 02:00:00,000

phone so you could stay connected yes

3193

02:00:03,350 --> 02:00:01,520

and got outside to see a launch because

3194

02:00:05,430 --> 02:00:03,360

that is one of the most amazing things

3195

02:00:07,030 --> 02:00:05,440

about uh for folks who live here who get

3196

02:00:08,790 --> 02:00:07,040

to see these launches but even those who

3197

02:00:11,669 --> 02:00:08,800

travel here from long distances to watch

3198

02:00:13,669 --> 02:00:11,679

it it's a very unique uh experience yeah

3199

02:00:15,270 --> 02:00:13,679

yeah yeah it is i mean we've been here

3200

02:00:17,910 --> 02:00:15,280

for a few months we've been able to see

3201

02:00:20,229 --> 02:00:17,920

some other launches before

3202

02:00:21,109 --> 02:00:20,239

but nothing compares to actually seeing

3203

02:00:23,910 --> 02:00:21,119

yours

3204

02:00:25,910 --> 02:00:23,920

when your spacecraft is going up and

3205

02:00:28,229 --> 02:00:25,920

then you see as i said the dreams and

3206

02:00:30,550 --> 02:00:28,239

the expectations of so many people

3207

02:00:32,310 --> 02:00:30,560

going up with a with a with the rocket

3208

02:00:34,310 --> 02:00:32,320

and with the with the spacecraft in this

3209

02:00:36,149 --> 02:00:34,320

case right and it was fantastic to see

3210

02:00:38,070 --> 02:00:36,159

it up and then it was of course very

3211

02:00:39,189 --> 02:00:38,080

interesting to follow the trajectory

3212

02:00:40,629 --> 02:00:39,199

also through

3213

02:00:42,470 --> 02:00:40,639

the quiet moments during the costing

3214

02:00:44,070 --> 02:00:42,480

phase and then the excite

3215

02:00:46,229 --> 02:00:44,080

excitation of the end when you know

3216

02:00:47,830 --> 02:00:46,239

there is the separation and then they

3217

02:00:49,270 --> 02:00:47,840

you start getting the good signs that

3218

02:00:51,030 --> 02:00:49,280

the separation was adequate that the

3219

02:00:53,510 --> 02:00:51,040

tractor was adequate that we acquired

3220

02:00:55,189 --> 02:00:53,520

the signal and then eventually that we

3221

02:00:57,430 --> 02:00:55,199

have positive power in the spacecraft

3222

02:01:00,229 --> 02:00:57,440

now the spacecraft is safe it's pointing

3223

02:01:02,229 --> 02:01:00,239

to the sun and it's quite robust now to

3224

02:01:05,109 --> 02:01:02,239

to the next days where we'll start uh

3225

02:01:06,950 --> 02:01:05,119

operating the various uh deployables and

3226

02:01:08,950 --> 02:01:06,960

subsystems right very good and so you

3227

02:01:11,430 --> 02:01:08,960

got a lot of work ahead of you certainly

3228

02:01:13,510 --> 02:01:11,440

no doubt um the the probably the tough

3229

02:01:15,669 --> 02:01:13,520

part of space flight is over but now a

3230

02:01:18,950 --> 02:01:15,679

couple years uh before the science

3231

02:01:20,950 --> 02:01:18,960

starts right yeah well uh the first uh

3232

02:01:22,870 --> 02:01:20,960

few days are critical where we do the

3233

02:01:25,589 --> 02:01:22,880

the basic deployments and the basic

3234

02:01:26,629 --> 02:01:25,599

tests then through during february we

3235

02:01:29,669 --> 02:01:26,639

will do

3236

02:01:32,310 --> 02:01:29,679

again a complete checkout of all the

3237

02:01:34,070 --> 02:01:32,320

systems and slowly we will start

3238

02:01:35,750 --> 02:01:34,080

switching on the instruments

3239

02:01:37,510 --> 02:01:35,760

we will be making sure that the

3240

02:01:39,830 --> 02:01:37,520

instruments are operational that they

3241

02:01:43,109 --> 02:01:39,840

can as well change modes of operation

3242

02:01:46,709 --> 02:01:43,119

and so on and we expect to finalize this

3243

02:01:48,629 --> 02:01:46,719

phase of testing uh in june end of june

3244

02:01:49,669 --> 02:01:48,639

uh however we can some of the

3245

02:01:51,030 --> 02:01:49,679

instruments will start measuring

3246

02:01:52,629 --> 02:01:51,040

immediately but some instruments will

3247

02:01:56,629 --> 02:01:52,639

wait a bit longer

3248

02:01:58,550 --> 02:01:56,639

until the volatiles in the underwater

3249

02:02:01,270 --> 02:01:58,560

will evaporate or split from the

3250

02:02:02,870 --> 02:02:01,280

spacecraft uh but yeah in like in three

3251  
02:02:04,950 --> 02:02:02,880  
months we will be able to start taking

3252  
02:02:07,270 --> 02:02:04,960  
science data well that's exciting

3253  
02:02:08,629 --> 02:02:07,280  
that early yeah yeah very good i mean we

3254  
02:02:11,510 --> 02:02:08,639  
always talk

3255  
02:02:13,030 --> 02:02:11,520  
say well we want to wait for one 1.8

3256  
02:02:15,589 --> 02:02:13,040  
years until

3257  
02:02:18,149 --> 02:02:15,599  
the perihelium is gets closer but i

3258  
02:02:20,629 --> 02:02:18,159  
think our scientists will not wait uh

3259  
02:02:22,709 --> 02:02:20,639  
they will start immediately to take

3260  
02:02:24,950 --> 02:02:22,719  
data and i'm sure that it will stop very

3261  
02:02:26,310 --> 02:02:24,960  
very clearly too to learn from the sun

3262  
02:02:28,390 --> 02:02:26,320  
fire up those instruments you got it

3263  
02:02:29,830 --> 02:02:28,400

pointed at the sun i've seen some data

3264

02:02:32,950 --> 02:02:29,840

right absolutely well you're going to

3265

02:02:34,550 --> 02:02:32,960

leave here certainly uh a changed person

3266

02:02:37,270 --> 02:02:34,560

right because i believe that you've uh i

3267

02:02:39,589 --> 02:02:37,280

got some kind of tattoo oh yeah you want

3268

02:02:41,830 --> 02:02:39,599

to show that yeah i can show this yeah

3269

02:02:43,669 --> 02:02:41,840

that's a solar orbiter

3270

02:02:45,750 --> 02:02:43,679

temporary tactical temperature it's a

3271

02:02:47,990 --> 02:02:45,760

pain it's a painless tattoo and i think

3272

02:02:50,870 --> 02:02:48,000

i will wear it with pride oh very good

3273

02:02:52,629 --> 02:02:50,880

don't wash it off for a long time well i

3274

02:02:53,990 --> 02:02:52,639

might have to take a shower one of those

3275

02:02:55,910 --> 02:02:54,000

days

3276

02:02:57,510 --> 02:02:55,920

well certainly your spacecraft's going

3277

02:02:59,189 --> 02:02:57,520

to leave quite the imprint on our

3278

02:03:01,430 --> 02:02:59,199

scientific community we get we're very

3279

02:03:03,510 --> 02:03:01,440

excited to get that data back and and

3280

02:03:05,750 --> 02:03:03,520

learn a lot more about the star that

3281

02:03:07,510 --> 02:03:05,760

keeps us alive yeah i think this is the

3282

02:03:09,750 --> 02:03:07,520

purpose of this mission is the purpose

3283

02:03:12,070 --> 02:03:09,760

of all the missions before us and then

3284

02:03:14,550 --> 02:03:12,080

of uh missions that will come it's the

3285

02:03:17,430 --> 02:03:14,560

purpose of ground instrumentation which

3286

02:03:20,070 --> 02:03:17,440

is also investigating the sand

3287

02:03:22,070 --> 02:03:20,080

and i think the it's a growing community

3288

02:03:24,070 --> 02:03:22,080

space weather is coming very strong we

3289

02:03:26,790 --> 02:03:24,080

will we will need to understand our star

3290

02:03:28,149 --> 02:03:26,800

much better so that we can support

3291

02:03:29,669 --> 02:03:28,159

our infrastructure but also our

3292

02:03:32,629 --> 02:03:29,679

astronauts as they go deeper into the

3293

02:03:35,350 --> 02:03:32,639

solar system so this is a growing field

3294

02:03:37,030 --> 02:03:35,360

absolutely cesar garcia program manager

3295

02:03:38,629 --> 02:03:37,040

for solar orbiter and it's very pleasing

3296

02:03:40,149 --> 02:03:38,639

to be with you tonight it's good to see

3297

02:03:42,070 --> 02:03:40,159

you again thank you congratulations

3298

02:03:44,149 --> 02:03:42,080

thank you all right joshua we'll throw

3299

02:03:45,669 --> 02:03:44,159

it back to you in the asoc hey daryl

3300

02:03:47,910 --> 02:03:45,679

thank you so much tonight for all your

3301

02:03:50,229 --> 02:03:47,920

help and mick as well laura franklin

3302

02:03:51,830 --> 02:03:50,239

blair uh everybody uh what a phenomenal

3303

02:03:53,750 --> 02:03:51,840

show this is going to conclude our live

3304

02:03:55,350 --> 02:03:53,760

coverage of the launch of solar orbiter

3305

02:03:56,950 --> 02:03:55,360

destined to unlock secrets of the sun

3306

02:03:58,950 --> 02:03:56,960

and provide a better understanding of

3307

02:04:00,629 --> 02:03:58,960

our planetary community community for

3308

02:04:03,189 --> 02:04:00,639

more information about solar orbiter

3309

02:04:04,550 --> 02:04:03,199

mission visit [nasa.gov](http://nasa.gov)

3310

02:04:05,750 --> 02:04:04,560

a huge thanks to the guests who joined

3311

02:04:08,390 --> 02:04:05,760

us tonight and the men and women from

3312

02:04:09,990 --> 02:04:08,400

both issa nasa united launch alliance

3313

02:04:11,430 --> 02:04:10,000

and everybody else who worked diligently

3314

02:04:13,669 --> 02:04:11,440

behind the scenes to make this broadcast

3315

02:04:15,350 --> 02:04:13,679

happen we couldn't do without you

3316

02:04:16,629 --> 02:04:15,360

i'm joshua santora from all of us here

3317

02:04:18,470 --> 02:04:16,639

at the kennedy space center and cape

3318

02:04:20,229 --> 02:04:18,480

canaveral air force station thank you

3319

02:04:22,229 --> 02:04:20,239

for joining us we wish you a very good

3320

02:04:24,310 --> 02:04:22,239

morning enjoy these beautiful replays of

3321

02:04:27,270 --> 02:04:24,320

solar orbiter's launch to view the sun

3322

02:04:32,310 --> 02:04:27,280

in unprecedented ways and remember even

3323

02:04:35,990 --> 02:04:33,830

there you heard the final status check

3324

02:04:39,270 --> 02:04:36,000

for booster centaur and spacecraft

3325

02:04:42,790 --> 02:04:39,280

everything is go and so here we go

3326  
02:04:43,830 --> 02:04:42,800  
t minus 10 seconds nine eight

3327  
02:04:44,790 --> 02:04:43,840  
seven

3328  
02:04:45,750 --> 02:04:44,800  
six

3329  
02:04:46,709 --> 02:04:45,760  
five

3330  
02:04:47,669 --> 02:04:46,719  
four

3331  
02:04:48,629 --> 02:04:47,679  
three

3332  
02:04:49,510 --> 02:04:48,639  
two

3333  
02:04:51,510 --> 02:04:49,520  
one

3334  
02:04:53,270 --> 02:04:51,520  
zero

3335  
02:04:55,750 --> 02:04:53,280  
and lift off

3336  
02:04:58,310 --> 02:04:55,760  
of our solar orbiter and international

3337  
02:04:59,910 --> 02:04:58,320  
collaboration to give us new images and

3338  
02:05:17,910 --> 02:04:59,920

a better understanding of our

3339

02:05:20,950 --> 02:05:19,750

chamber pressure on the srv looks good

3340

02:05:22,950 --> 02:05:20,960

engine operating parameters on the