



1  
00:00:13,589 --> 00:00:11,749  
hello everyone and welcome to today's

2  
00:00:16,150 --> 00:00:13,599  
update on the progress being made on the

3  
00:00:18,150 --> 00:00:16,160  
orion spacecraft ahead of its first trip

4  
00:00:20,230 --> 00:00:18,160  
to space later this year

5  
00:00:21,990 --> 00:00:20,240  
here at kennedy space center orion's

6  
00:00:23,189 --> 00:00:22,000  
heat shield was recently attached to the

7  
00:00:25,029 --> 00:00:23,199  
crew module

8  
00:00:27,269 --> 00:00:25,039  
and just last week it was stacked on top

9  
00:00:29,589 --> 00:00:27,279  
of the service module marking two

10  
00:00:31,509 --> 00:00:29,599  
significant steps towards its

11  
00:00:33,270 --> 00:00:31,519  
flight test and developing the

12  
00:00:34,870 --> 00:00:33,280  
spacecraft that will eventually send

13  
00:00:36,709 --> 00:00:34,880

humans to mars

14

00:00:38,470 --> 00:00:36,719

to talk about the progress being made

15

00:00:40,709 --> 00:00:38,480

here and to highlight the upcoming

16

00:00:42,229 --> 00:00:40,719

flight test our nasa administrator

17

00:00:45,110 --> 00:00:42,239

charlie bolden

18

00:00:47,350 --> 00:00:45,120

orion program manager mark guyer

19

00:00:48,950 --> 00:00:47,360

lockheed martin's orion program manager

20

00:00:50,869 --> 00:00:48,960

cleon lacefield

21

00:00:52,150 --> 00:00:50,879

and kennedy space center director bob

22

00:00:54,389 --> 00:00:52,160

cabana

23

00:00:55,990 --> 00:00:54,399

for those of you watching on tv or

24

00:00:58,150 --> 00:00:56,000

through the web today

25

00:01:00,389 --> 00:00:58,160

we'll take questions from you via social

26  
00:01:01,549 --> 00:01:00,399  
media you can ask questions using the

27  
00:01:03,270 --> 00:01:01,559  
hashtag

28  
00:01:05,429 --> 00:01:03,280  
asknasa

29  
00:01:07,510 --> 00:01:05,439  
and we'll start off with a few opening

30  
00:01:10,710 --> 00:01:07,520  
remarks so charlie if you'd like to

31  
00:01:12,469 --> 00:01:10,720  
start us off thanks very much thank you

32  
00:01:14,310 --> 00:01:12,479  
first of all thanks very much for uh

33  
00:01:16,149 --> 00:01:14,320  
everybody coming today this is a big

34  
00:01:17,910 --> 00:01:16,159  
deal uh for us

35  
00:01:20,149 --> 00:01:17,920  
and um i was trying to think of how to

36  
00:01:22,710 --> 00:01:20,159  
relate this to something that that all

37  
00:01:24,550 --> 00:01:22,720  
of you can can wrap your minds around

38  
00:01:26,230 --> 00:01:24,560

but as i look out there

39

00:01:28,149 --> 00:01:26,240

the unfortunate thing is that most of

40

00:01:30,469 --> 00:01:28,159

you are too young

41

00:01:34,230 --> 00:01:30,479

uh to be able to relate but how many of

42

00:01:37,590 --> 00:01:34,240

you remember alt does that ring a bell

43

00:01:40,870 --> 00:01:37,600

anybody know what alt was

44

00:01:43,030 --> 00:01:40,880

how about approach and landing test

45

00:01:44,630 --> 00:01:43,040

okay you remember out at edwards air

46

00:01:46,469 --> 00:01:44,640

force base when we

47

00:01:47,270 --> 00:01:46,479

took the space shuttle and we dropped it

48

00:01:49,990 --> 00:01:47,280

off

49

00:01:51,670 --> 00:01:50,000

the 747 because we wanted to make sure

50

00:01:54,950 --> 00:01:51,680

it could fly

51  
00:01:56,870 --> 00:01:54,960  
and uh and it did pretty well well

52  
00:01:59,030 --> 00:01:56,880  
if you want to try to relate what's

53  
00:02:01,270 --> 00:01:59,040  
about to happen in december to something

54  
00:02:03,990 --> 00:02:01,280  
that that all of you can relate to

55  
00:02:06,389 --> 00:02:04,000  
this is sort of like the first of

56  
00:02:09,749 --> 00:02:06,399  
however many flights of alt

57  
00:02:12,070 --> 00:02:09,759  
that we're gonna do uh with orion

58  
00:02:13,110 --> 00:02:12,080  
right in front of behind me but in front

59  
00:02:15,750 --> 00:02:13,120  
of you

60  
00:02:17,830 --> 00:02:15,760  
is a tangible piece of our path to mars

61  
00:02:20,309 --> 00:02:17,840  
an orion spacecraft that's going to

62  
00:02:22,390 --> 00:02:20,319  
travel farther into space than humans

63  
00:02:24,309 --> 00:02:22,400

have gone for 40 years

64

00:02:26,309 --> 00:02:24,319

over the past four years nasa has been

65

00:02:29,110 --> 00:02:26,319

implementing the nasa authorization act

66

00:02:31,030 --> 00:02:29,120

of 2010 which was enacted on a broad

67

00:02:32,470 --> 00:02:31,040

bipartisan basis i know you all find

68

00:02:34,470 --> 00:02:32,480

that hard to believe

69

00:02:36,630 --> 00:02:34,480

but it actually was enacted on a broad

70

00:02:38,390 --> 00:02:36,640

bipartisan basis and reflects agreements

71

00:02:40,229 --> 00:02:38,400

between the congress and the

72

00:02:41,990 --> 00:02:40,239

administration on the nation's next

73

00:02:44,309 --> 00:02:42,000

steps in space

74

00:02:46,790 --> 00:02:44,319

exploration flight test one or eft one

75

00:02:50,070 --> 00:02:46,800

as we call it call it is a critical part

76

00:02:52,470 --> 00:02:50,080

of that strategy and a big step uh

77

00:02:55,350 --> 00:02:52,480

forward on the path to mars

78

00:02:57,830 --> 00:02:55,360

the test demonstrates how bob cabana and

79

00:03:00,149 --> 00:02:57,840

the kennedy space center team continue

80

00:03:02,309 --> 00:03:00,159

to transform this center into a

81

00:03:04,390 --> 00:03:02,319

multi-user facility capable of many

82

00:03:06,869 --> 00:03:04,400

different kinds of launches

83

00:03:09,110 --> 00:03:06,879

and it's possible possibly the most

84

00:03:11,509 --> 00:03:09,120

significant human space flight milestone

85

00:03:13,830 --> 00:03:11,519

this year pointing toward our return

86

00:03:16,149 --> 00:03:13,840

with humans to deep space

87

00:03:17,990 --> 00:03:16,159

sustained investment in nasa technology

88

00:03:19,270 --> 00:03:18,000

advances the agency's exploration

89

00:03:21,430 --> 00:03:19,280

capabilities

90

00:03:23,509 --> 00:03:21,440

and supports the innovations

91

00:03:25,350 --> 00:03:23,519

in the innovation economy

92

00:03:27,430 --> 00:03:25,360

we need to keep doing that in order to

93

00:03:29,509 --> 00:03:27,440

reach an asteroid in mars and other

94

00:03:31,990 --> 00:03:29,519

destinations in the future

95

00:03:33,350 --> 00:03:32,000

as mark guyer can tell you about in

96

00:03:35,670 --> 00:03:33,360

great detail

97

00:03:37,990 --> 00:03:35,680

orion's flight test will stress systems

98

00:03:40,630 --> 00:03:38,000

critical to safety including the heat

99

00:03:42,390 --> 00:03:40,640

shield parachutes avionics and attitude

100

00:03:44,149 --> 00:03:42,400

control

101  
00:03:45,589 --> 00:03:44,159  
when was the last time you saw a vehicle

102  
00:03:46,949 --> 00:03:45,599  
that could reach a speed this is a

103  
00:03:49,589 --> 00:03:46,959  
question

104  
00:03:51,990 --> 00:03:49,599  
okay this is not rhetorical

105  
00:03:54,229 --> 00:03:52,000  
when was the last time that you saw

106  
00:03:56,550 --> 00:03:54,239  
a vehicle that could reach a speed of 20

107  
00:04:00,710 --> 00:03:56,560  
000 miles per hour and a temperature of

108  
00:04:04,470 --> 00:04:02,470  
when

109  
00:04:07,350 --> 00:04:04,480  
1975.

110  
00:04:09,509 --> 00:04:07,360  
that's absolutely right apollo solutes

111  
00:04:11,830 --> 00:04:09,519  
this test is going to show us a lot

112  
00:04:14,149 --> 00:04:11,840  
before orion carries humans on missions

113  
00:04:15,750 --> 00:04:14,159

to explore an asteroid and eventually

114

00:04:17,670 --> 00:04:15,760

mars

115

00:04:19,270 --> 00:04:17,680

it gives us the chance to see how this

116

00:04:21,270 --> 00:04:19,280

vehicle will perform in the orbital

117

00:04:23,909 --> 00:04:21,280

environment as it faces some of the

118

00:04:25,749 --> 00:04:23,919

challenges that will endure on future

119

00:04:28,390 --> 00:04:25,759

missions to space

120

00:04:30,150 --> 00:04:28,400

that's incredibly exciting for me

121

00:04:32,150 --> 00:04:30,160

and i couldn't be happier to see the

122

00:04:34,070 --> 00:04:32,160

full system integration of orion

123

00:04:35,990 --> 00:04:34,080

proceeding so well

124

00:04:37,749 --> 00:04:36,000

while orion hardware has been tested

125

00:04:40,310 --> 00:04:37,759

extensively on the ground putting the

126

00:04:42,629 --> 00:04:40,320

spacecraft through its paces in space

127

00:04:43,590 --> 00:04:42,639

provides data you just can't get here on

128

00:04:45,430 --> 00:04:43,600

earth

129

00:04:46,870 --> 00:04:45,440

right now nasa's building on knowledge

130

00:04:49,270 --> 00:04:46,880

gained through the international space

131

00:04:51,189 --> 00:04:49,280

station and more than 50 years of human

132

00:04:53,030 --> 00:04:51,199

space flight experience

133

00:04:55,189 --> 00:04:53,040

solving difficult challenges that will

134

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

enable humans to safely explore deep

135

00:05:00,230 --> 00:04:57,840

space what you see here today is a

136

00:05:02,469 --> 00:05:00,240

critical part of that strategic work

137

00:05:04,950 --> 00:05:02,479

it's not often you get this close to

138

00:05:06,790 --> 00:05:04,960

something that's bound for space

139

00:05:09,350 --> 00:05:06,800

and we look forward to telling you more

140

00:05:12,070 --> 00:05:09,360

about orion and our path to mars and

141

00:05:13,270 --> 00:05:12,080

since i don't i'm not the detailed guy

142

00:05:15,830 --> 00:05:13,280

and i probably couldn't answer the

143

00:05:17,990 --> 00:05:15,840

details if you tried me

144

00:05:19,990 --> 00:05:18,000

i have my trusty friend behind me and

145

00:05:21,990 --> 00:05:20,000

i'm going to ask mark guyer the orion

146

00:05:24,469 --> 00:05:22,000

program manager to step up and make a

147

00:05:25,270 --> 00:05:24,479

few remarks before we take your go on

148

00:05:27,510 --> 00:05:25,280

and

149

00:05:31,909 --> 00:05:27,520

uh a couple more remarks before we take

150

00:05:35,510 --> 00:05:33,430

thank you charlie and thanks everybody

151  
00:05:37,029 --> 00:05:35,520  
for coming today it's a big day for us

152  
00:05:39,590 --> 00:05:37,039  
to actually stack these two elements

153  
00:05:41,110 --> 00:05:39,600  
together we'll finish now the integrated

154  
00:05:42,790 --> 00:05:41,120  
testing between the two and then we'll

155  
00:05:44,710 --> 00:05:42,800  
send it off to get fueled and then

156  
00:05:46,230 --> 00:05:44,720  
stacked on the rocket as charlie said

157  
00:05:47,670 --> 00:05:46,240  
we're going to launch in less than six

158  
00:05:50,230 --> 00:05:47,680  
months

159  
00:05:52,390 --> 00:05:50,240  
so this spacecraft of course is the the

160  
00:05:53,510 --> 00:05:52,400  
first human exploration spacecraft

161  
00:05:55,590 --> 00:05:53,520  
developed in

162  
00:05:57,350 --> 00:05:55,600  
now over 30 years it's a big deal and

163  
00:05:59,909 --> 00:05:57,360

it's the product of

164

00:06:01,749 --> 00:05:59,919

a very dedicated workforce that believes

165

00:06:04,390 --> 00:06:01,759

that keeping america first in space

166

00:06:06,309 --> 00:06:04,400

exploration is critical

167

00:06:07,670 --> 00:06:06,319

the the launch itself coming up in six

168

00:06:09,749 --> 00:06:07,680

months is going to be very is going to

169

00:06:11,350 --> 00:06:09,759

be uh visible evidence

170

00:06:13,749 --> 00:06:11,360

that we are still exploring but there's

171

00:06:14,629 --> 00:06:13,759

other visible pieces that you can see

172

00:06:16,070 --> 00:06:14,639

today

173

00:06:18,309 --> 00:06:16,080

that show us how we're feeding forward

174

00:06:20,230 --> 00:06:18,319

to the next launches when you when you

175

00:06:22,870 --> 00:06:20,240

come here and see the same event for

176

00:06:24,870 --> 00:06:22,880

em-1 and em-2 you would notice it's

177

00:06:26,710 --> 00:06:24,880

going to look remarkably similar and i

178

00:06:28,390 --> 00:06:26,720

don't mean just the outer

179

00:06:30,790 --> 00:06:28,400

mould line but actually the guts of the

180

00:06:32,550 --> 00:06:30,800

spacecraft that's because all of these

181

00:06:33,990 --> 00:06:32,560

systems that are flying on eft-1 were

182

00:06:36,070 --> 00:06:34,000

designed from the beginning to be

183

00:06:37,830 --> 00:06:36,080

human-rated to be able to fly people on

184

00:06:40,150 --> 00:06:37,840

board

185

00:06:41,909 --> 00:06:40,160

and now we're actually not just drawings

186

00:06:44,150 --> 00:06:41,919

and powerpoint but we actually put it

187

00:06:45,510 --> 00:06:44,160

into hardware assemble it and now we're

188

00:06:47,510 --> 00:06:45,520

going to fly it

189

00:06:49,189 --> 00:06:47,520

we will make some updates

190

00:06:50,950 --> 00:06:49,199

in some cases we found things we can

191

00:06:52,550 --> 00:06:50,960

make lighter for example the heat shield

192

00:06:54,230 --> 00:06:52,560

so it was a huge experience for us to

193

00:06:56,390 --> 00:06:54,240

build the first one

194

00:06:57,990 --> 00:06:56,400

in some cases we found ways to make it

195

00:06:59,510 --> 00:06:58,000

cheaper on the next one for example if

196

00:07:01,589 --> 00:06:59,520

you think about the cone up there at the

197

00:07:03,749 --> 00:07:01,599

top the green part we found a way to

198

00:07:06,390 --> 00:07:03,759

make that in fewer parts

199

00:07:07,990 --> 00:07:06,400

so yes this one could fly people but now

200

00:07:09,830 --> 00:07:08,000

we're going to update it and save money

201

00:07:12,629 --> 00:07:09,840

on the next unit things like the

202

00:07:14,469 --> 00:07:12,639

computer system that's on this bird

203

00:07:15,990 --> 00:07:14,479

will be exactly the same on the next

204

00:07:17,670 --> 00:07:16,000

flights except we'll add another string

205

00:07:19,749 --> 00:07:17,680

of redundancy because on a test flight

206

00:07:22,230 --> 00:07:19,759

we don't need it but when we fly people

207

00:07:23,749 --> 00:07:22,240

we'll have three strings

208

00:07:26,230 --> 00:07:23,759

another thing to think about is the

209

00:07:27,990 --> 00:07:26,240

software which is always a challenge

210

00:07:29,670 --> 00:07:28,000

if you think about the full software for

211

00:07:31,430 --> 00:07:29,680

flying people on the manned flight we

212

00:07:33,510 --> 00:07:31,440

have we've written now half of that

213

00:07:36,469 --> 00:07:33,520

already half of the software is done

214

00:07:38,550 --> 00:07:36,479

tested and we'll fly on eft one

215

00:07:40,230 --> 00:07:38,560

so we have more work to go to get to em1

216

00:07:41,990 --> 00:07:40,240

and em2 but this flight not just the

217

00:07:43,670 --> 00:07:42,000

launch in december but the work that

218

00:07:45,670 --> 00:07:43,680

went into this design

219

00:07:47,510 --> 00:07:45,680

it sets us up very well for the next

220

00:07:50,790 --> 00:07:47,520

flights and for eventually getting

221

00:07:52,869 --> 00:07:50,800

people into space

222

00:07:55,189 --> 00:07:52,879

so now what i want to do is introduce

223

00:07:57,029 --> 00:07:55,199

cleon lacefield cleon is the lockheed

224

00:07:58,869 --> 00:07:57,039

program manager for orion and a big part

225

00:08:00,309 --> 00:07:58,879

of why we are here today and he's going

226

00:08:01,189 --> 00:08:00,319

to describe more about the mission

227

00:08:05,830 --> 00:08:01,199

itself

228

00:08:08,550 --> 00:08:07,510

yeah it's great to be here today with

229

00:08:10,950 --> 00:08:08,560

our

230

00:08:13,430 --> 00:08:10,960

vehicle getting so close to launch and

231

00:08:15,749 --> 00:08:13,440

what i thought i would do today is talk

232

00:08:17,430 --> 00:08:15,759

a little bit about the flight test that

233

00:08:19,510 --> 00:08:17,440

we're going to do

234

00:08:22,070 --> 00:08:19,520

with the orion vehicle we're calling it

235

00:08:23,110 --> 00:08:22,080

exploration flight test one and this is

236

00:08:25,749 --> 00:08:23,120

the first

237

00:08:27,350 --> 00:08:25,759

high orbital flight test of the orion

238

00:08:28,150 --> 00:08:27,360

spacecraft

239

00:08:34,469 --> 00:08:28,160

this

240

00:08:37,110 --> 00:08:34,479

countdown clock that we're seeing over

241

00:08:39,670 --> 00:08:37,120

here is to is the number of days to the

242

00:08:42,709 --> 00:08:39,680

december 4th launch

243

00:08:44,550 --> 00:08:42,719

during that flight orion will travel 15

244

00:08:46,949 --> 00:08:44,560

times further out into space than the

245

00:08:49,269 --> 00:08:46,959

space station is currently today

246

00:08:55,350 --> 00:08:49,279

and it's further than humans have gone

247

00:08:59,190 --> 00:08:56,870

so um

248

00:09:01,350 --> 00:08:59,200

we we talked about uh

249

00:09:04,150 --> 00:09:01,360

a little bit charlie talked about what

250

00:09:06,070 --> 00:09:04,160

we're getting out of the flight with

251  
00:09:08,389 --> 00:09:06,080  
the checkout of all the systems the

252  
00:09:09,750 --> 00:09:08,399  
computers the software the guidance and

253  
00:09:13,190 --> 00:09:09,760  
control

254  
00:09:15,990 --> 00:09:13,200  
the separation events the heat shield

255  
00:09:18,710 --> 00:09:16,000  
and as mark said this is this is the

256  
00:09:20,949 --> 00:09:18,720  
spacecraft that we will be building for

257  
00:09:25,030 --> 00:09:20,959  
the exploration missions one and two

258  
00:09:27,350 --> 00:09:25,040  
that are coming up later in this decade

259  
00:09:29,430 --> 00:09:27,360  
this flight will be an uncrude

260  
00:09:32,150 --> 00:09:29,440  
launch on a delta iv heavy

261  
00:09:34,790 --> 00:09:32,160  
it will launch from pad 37 at cape

262  
00:09:37,590 --> 00:09:34,800  
canaveral air force base

263  
00:09:40,230 --> 00:09:37,600

and it will travel 3 600 miles beyond

264

00:09:43,350 --> 00:09:40,240

lower low earth orbit and re-enter at

265

00:09:46,310 --> 00:09:43,360

approximately 20 000 miles per hour and

266

00:09:48,790 --> 00:09:46,320

splash down on in the pacific ocean

267

00:09:51,350 --> 00:09:48,800

where the u.s navy and and nasa ground

268

00:09:53,110 --> 00:09:51,360

personnel will recover the spacecraft

269

00:09:55,910 --> 00:09:53,120

the entire flight will take about four

270

00:09:58,310 --> 00:09:55,920

hours in 25 minutes

271

00:10:01,110 --> 00:09:58,320

as far as the timeline goes

272

00:10:03,990 --> 00:10:01,120

the launch will occur at approximately

273

00:10:06,389 --> 00:10:04,000

sunrise on december 4th which is right

274

00:10:07,829 --> 00:10:06,399

around 8 a.m

275

00:10:10,230 --> 00:10:07,839

five and a half minutes later there's

276

00:10:12,630 --> 00:10:10,240

service model module fairings will

277

00:10:14,630 --> 00:10:12,640

jettison those are those big white

278

00:10:15,990 --> 00:10:14,640

fairings that are that are shown right

279

00:10:17,590 --> 00:10:16,000

behind us

280

00:10:20,310 --> 00:10:17,600

over six minutes into the flight the

281

00:10:22,150 --> 00:10:20,320

launch abort system is jettisoned

282

00:10:23,110 --> 00:10:22,160

and about the two hour mark the upper

283

00:10:27,910 --> 00:10:23,120

stage

284

00:10:31,110 --> 00:10:27,920

orion in

285

00:10:34,069 --> 00:10:31,120

the orbit to create the high uh reentry

286

00:10:35,750 --> 00:10:34,079

velocity at 3 hours and 45 minutes the

287

00:10:38,470 --> 00:10:35,760

crew module will separate from the

288

00:10:40,470 --> 00:10:38,480

service module in the upper stage at 4

289

00:10:42,790 --> 00:10:40,480

hours 15 minutes the crew module begins

290

00:10:45,030 --> 00:10:42,800

to encounter earth's atmosphere

291

00:10:47,030 --> 00:10:45,040

and at 4 hours and 20 minutes the ford

292

00:10:49,110 --> 00:10:47,040

bay cover is jettisoned allowing the

293

00:10:51,110 --> 00:10:49,120

shoots to deploy which happens about two

294

00:10:52,870 --> 00:10:51,120

seconds later

295

00:10:55,590 --> 00:10:52,880

in about four hours and 25 minutes the

296

00:10:57,110 --> 00:10:55,600

vehicle splashes down into the

297

00:10:59,190 --> 00:10:57,120

pacific ocean

298

00:11:01,110 --> 00:10:59,200

and it is recovered by the

299

00:11:02,949 --> 00:11:01,120

navy and nasa ground operations

300

00:11:05,509 --> 00:11:02,959

personnel

301

00:11:08,230 --> 00:11:05,519

the vehicle will be transported back

302

00:11:11,509 --> 00:11:08,240

here and we will actually reuse this

303

00:11:12,829 --> 00:11:11,519

vehicle for an ascent abort flight test

304

00:11:16,470 --> 00:11:12,839

prior to

305

00:11:18,470 --> 00:11:16,480

em2 and with that i'd like to

306

00:11:21,509 --> 00:11:18,480

turn over

307

00:11:26,150 --> 00:11:21,519

the discussion to the center director mr

308

00:11:31,269 --> 00:11:29,590

thanks clean well for the first time

309

00:11:33,990 --> 00:11:31,279

since we went to the moon

310

00:11:34,870 --> 00:11:34,000

we're stacking a vehicle in this high

311

00:11:36,949 --> 00:11:34,880

bay

312

00:11:39,030 --> 00:11:36,959

that will allow us to explore beyond our

313

00:11:41,509 --> 00:11:39,040

home planet and one day put boots on

314

00:11:43,910 --> 00:11:41,519

mars and that's pretty darn exciting

315

00:11:46,069 --> 00:11:43,920

this is a world-class manufacturing

316

00:11:48,230 --> 00:11:46,079

facility with a world-class team

317

00:11:50,389 --> 00:11:48,240

operating it and i want to thank the

318

00:11:52,470 --> 00:11:50,399

state of florida for helping to make it

319

00:11:55,350 --> 00:11:52,480

possible and i commend the lockheed

320

00:11:57,509 --> 00:11:55,360

martin team on the outstanding job that

321

00:12:00,069 --> 00:11:57,519

they've done manufacturing and

322

00:12:01,750 --> 00:12:00,079

processing orion for its flight test

323

00:12:04,310 --> 00:12:01,760

this december

324

00:12:07,350 --> 00:12:04,320

we are well on our way to establishing a

325

00:12:09,509 --> 00:12:07,360

human presence in our solar system

326

00:12:11,030 --> 00:12:09,519

and when we leave planet earth to do it

327

00:12:12,710 --> 00:12:11,040

we're going to be leaving from right

328

00:12:14,870 --> 00:12:12,720

here at the kennedy space center i

329

00:12:16,710 --> 00:12:14,880

couldn't be more proud of this team in

330

00:12:19,269 --> 00:12:16,720

what we're doing in the path that we

331

00:12:21,670 --> 00:12:19,279

have going forward so to everyone thanks

332

00:12:25,509 --> 00:12:21,680

for your outstanding support and go

333

00:12:30,389 --> 00:12:27,670

okay we're going to take

334

00:12:31,990 --> 00:12:30,399

questions from those here and as a

335

00:12:33,670 --> 00:12:32,000

reminder for those who are going to be

336

00:12:34,870 --> 00:12:33,680

up at the mic please

337

00:12:37,350 --> 00:12:34,880

be sure to state your name and

338

00:12:39,829 --> 00:12:37,360

affiliation and direct your question to

339

00:12:42,389 --> 00:12:39,839

a particular person if you can and then

340

00:12:44,230 --> 00:12:42,399

for those uh watching from afar as a

341

00:12:46,870 --> 00:12:44,240

reminder you can

342

00:12:48,310 --> 00:12:46,880

ask your question on social media using

343

00:12:50,550 --> 00:12:48,320

the hashtag

344

00:12:52,389 --> 00:12:50,560

asknasa

345

00:12:54,470 --> 00:12:52,399

first question go ahead irene thanks

346

00:12:55,509 --> 00:12:54,480

irene klotz with uh reuters and space

347

00:12:58,550 --> 00:12:55,519

news um

348

00:13:04,470 --> 00:12:58,560

uh for uh mr lightsfield uh when is that

349

00:13:12,310 --> 00:13:09,430

the ascent aboard is scheduled in 2018

350

00:13:14,230 --> 00:13:12,320

and it has to happen before em2 because

351  
00:13:15,269 --> 00:13:14,240  
it's part of the certification before we

352  
00:13:17,509 --> 00:13:15,279  
have

353  
00:13:19,990 --> 00:13:17,519  
the astronauts on board the vehicle

354  
00:13:22,870 --> 00:13:20,000  
thanks and how many capsules is lockheed

355  
00:13:25,829 --> 00:13:22,880  
martin currently under contract to build

356  
00:13:34,150 --> 00:13:25,839  
we will be building this one and two

357  
00:13:38,790 --> 00:13:36,949  
hi dan billow from wesh tv a question

358  
00:13:41,030 --> 00:13:38,800  
for general bolden

359  
00:13:43,990 --> 00:13:41,040  
um what

360  
00:13:45,910 --> 00:13:44,000  
what year will the first

361  
00:13:49,350 --> 00:13:45,920  
astronaut climb aboard one of these

362  
00:13:51,829 --> 00:13:49,360  
ships as far as you know and is it is it

363  
00:13:54,790 --> 00:13:51,839

a little hard to sustain uh momentum for

364

00:13:57,509 --> 00:13:54,800

a for a grand mission to uh asteroids

365

00:13:59,910 --> 00:13:57,519

and mars when you're not flying uh

366

00:14:01,110 --> 00:13:59,920

people very often we had conversation

367

00:14:03,269 --> 00:14:01,120

about that this morning with some of the

368

00:14:05,910 --> 00:14:03,279

young leaders here as well as the the

369

00:14:07,910 --> 00:14:05,920

senior leadership and um it's not hard

370

00:14:10,550 --> 00:14:07,920

to maintain momentum among the workforce

371

00:14:12,870 --> 00:14:10,560

the the momentum that's difficult is

372

00:14:14,310 --> 00:14:12,880

among many of you the

373

00:14:15,829 --> 00:14:14,320

you know the general public people who

374

00:14:18,550 --> 00:14:15,839

don't who aren't around this every

375

00:14:20,949 --> 00:14:18,560

single day the in terms of the specific

376

00:14:22,790 --> 00:14:20,959

year that will actually fly i assume

377

00:14:26,110 --> 00:14:22,800

that's what you mean

378

00:14:28,389 --> 00:14:26,120

a a human launch is in the

379

00:14:30,629 --> 00:14:28,399

2019-2020 time frame if i remember

380

00:14:33,110 --> 00:14:30,639

correctly 2021

381

00:14:36,150 --> 00:14:33,120

um but we have already had

382

00:14:38,790 --> 00:14:36,160

humans in the spacecraft and and we've

383

00:14:40,470 --> 00:14:38,800

got doug hurley and and rex waldheim who

384

00:14:42,069 --> 00:14:40,480

are back here in the blue suits

385

00:14:45,030 --> 00:14:42,079

and they're here to answer all the hard

386

00:14:46,389 --> 00:14:45,040

questions but uh they can you know i

387

00:14:48,230 --> 00:14:46,399

would recommend that when you have an

388

00:14:50,310 --> 00:14:48,240

opportunity to talk to them

389

00:14:51,829 --> 00:14:50,320

ask them about what kind of training or

390

00:14:53,430 --> 00:14:51,839

what kind of preparation is going on in

391

00:14:55,670 --> 00:14:53,440

the astronaut office how do they get

392

00:14:57,269 --> 00:14:55,680

prepared so they're probably going to be

393

00:14:59,350 --> 00:14:57,279

the ones that tell us when they're ready

394

00:15:02,389 --> 00:14:59,360

to start getting fully integrated into

395

00:15:04,230 --> 00:15:02,399

the system itself but but the 2020 2021

396

00:15:06,870 --> 00:15:04,240

time frame is when we hope to fly the

397

00:15:12,790 --> 00:15:06,880

first the first human rated mission

398

00:15:18,550 --> 00:15:15,750

hi kalarama with wkmg can you talk about

399

00:15:20,949 --> 00:15:18,560

the cameras attached so uh we could talk

400

00:15:22,550 --> 00:15:20,959

about the views that you'll get in orbit

401  
00:15:23,430 --> 00:15:22,560  
yes he can

402  
00:15:25,350 --> 00:15:23,440  
so we

403  
00:15:27,269 --> 00:15:25,360  
uh we thought about that quite a bit

404  
00:15:29,189 --> 00:15:27,279  
some of it is so that we can share that

405  
00:15:31,030 --> 00:15:29,199  
with the public a lot of it is for uh

406  
00:15:32,230 --> 00:15:31,040  
engineering data so we can see things so

407  
00:15:34,550 --> 00:15:32,240  
we'll have cameras that watch the

408  
00:15:35,829 --> 00:15:34,560  
separation events or the fairings

409  
00:15:37,509 --> 00:15:35,839  
uh coming off the side these big

410  
00:15:39,110 --> 00:15:37,519  
fairings on the side we have cameras

411  
00:15:40,790 --> 00:15:39,120  
that'll watch the launch abort system

412  
00:15:41,990 --> 00:15:40,800  
ogive separate

413  
00:15:43,990 --> 00:15:42,000

we'll have cameras that watch the

414

00:15:45,910 --> 00:15:44,000

parachutes unfurl we have cameras out

415

00:15:47,749 --> 00:15:45,920

the windows so we'll see some of those

416

00:15:48,790 --> 00:15:47,759

events and probably some during entry so

417

00:15:56,710 --> 00:15:48,800

we get we're gonna have a lot of good

418

00:16:00,949 --> 00:15:58,710

hi stephen clark with space flight now

419

00:16:02,230 --> 00:16:00,959

uh first for mr guy or mr lace field

420

00:16:03,509 --> 00:16:02,240

placefield can you tell us what it's

421

00:16:04,790 --> 00:16:03,519

going to look like inside this

422

00:16:06,629 --> 00:16:04,800

spacecraft

423

00:16:09,509 --> 00:16:06,639

uh when it flies on eft-1 and i have

424

00:16:12,310 --> 00:16:09,519

another follow-up as well

425

00:16:14,389 --> 00:16:12,320

yes so this uh inside it will look

426

00:16:15,910 --> 00:16:14,399

exactly the avionics bay which is where

427

00:16:18,230 --> 00:16:15,920

all the computers and all the cooling

428

00:16:19,590 --> 00:16:18,240

system will look exactly like it will

429

00:16:21,269 --> 00:16:19,600

look on the manned flight when we

430

00:16:23,590 --> 00:16:21,279

actually put people inside but it's

431

00:16:25,829 --> 00:16:23,600

basically once you come in the hatch

432

00:16:27,590 --> 00:16:25,839

there's a there's a platform

433

00:16:29,749 --> 00:16:27,600

that you would step onto below that is

434

00:16:31,990 --> 00:16:29,759

where the computers are attached and

435

00:16:33,430 --> 00:16:32,000

then connected on the inside

436

00:16:35,590 --> 00:16:33,440

eventually when we fly people though

437

00:16:37,430 --> 00:16:35,600

they'll obviously be the seats

438

00:16:39,509 --> 00:16:37,440

the other stowage areas and then the

439

00:16:41,189 --> 00:16:39,519

displays and controls

440

00:16:42,870 --> 00:16:41,199

on this flight though we do fly some

441

00:16:44,150 --> 00:16:42,880

what we call mass simulators so we

442

00:16:45,910 --> 00:16:44,160

actually have a mass simulator for

443

00:16:47,350 --> 00:16:45,920

displays and control panels so you look

444

00:16:48,310 --> 00:16:47,360

looked in there there'd be this metal

445

00:16:50,150 --> 00:16:48,320

thing

446

00:16:52,230 --> 00:16:50,160

that represents a display and control

447

00:16:53,910 --> 00:16:52,240

panel because we need to understand in

448

00:16:55,910 --> 00:16:53,920

the environments we see

449

00:16:57,350 --> 00:16:55,920

how that mass reacts with the structure

450

00:16:58,310 --> 00:16:57,360

so when we fly the real one we know it

451  
00:16:59,749 --> 00:16:58,320  
but obviously it doesn't need the

452  
00:17:01,749 --> 00:16:59,759  
switches and all the other stuff that's

453  
00:17:03,829 --> 00:17:01,759  
a part of that

454  
00:17:05,510 --> 00:17:03,839  
and for administrator bolden um i wanted

455  
00:17:07,990 --> 00:17:05,520  
to get your thoughts on

456  
00:17:09,909 --> 00:17:08,000  
whether you think it's time for

457  
00:17:12,069 --> 00:17:09,919  
america to invest in a new rocket engine

458  
00:17:13,990 --> 00:17:12,079  
to replace the rd-180 i think it's

459  
00:17:16,230 --> 00:17:14,000  
premature to think about investing in a

460  
00:17:18,390 --> 00:17:16,240  
new rocket engine we we've also been

461  
00:17:20,470 --> 00:17:18,400  
discussing this quite a bit

462  
00:17:22,549 --> 00:17:20,480  
you know what we encourage people to do

463  
00:17:24,789 --> 00:17:22,559

is think about what it is you want to do

464

00:17:26,949 --> 00:17:24,799

and our focus is on access

465

00:17:30,310 --> 00:17:26,959

to space how do we provide

466

00:17:32,390 --> 00:17:30,320

uh routine reliable access to space and

467

00:17:35,110 --> 00:17:32,400

so if you get focused on a specific

468

00:17:36,470 --> 00:17:35,120

engine uh you may ask yourself then okay

469

00:17:38,710 --> 00:17:36,480

what do we what vehicle are we going to

470

00:17:39,590 --> 00:17:38,720

put it on everything else

471

00:17:42,150 --> 00:17:39,600

so

472

00:17:44,870 --> 00:17:42,160

nasa's approach is let's focus on access

473

00:17:47,990 --> 00:17:44,880

to space we've decided that for low

474

00:17:49,510 --> 00:17:48,000

earth orbit and to to make a sustainable

475

00:17:51,110 --> 00:17:49,520

low earth orbit infrastructure that

476  
00:17:53,990 --> 00:17:51,120  
we're going to need

477  
00:17:55,669 --> 00:17:54,000  
for the future flights of orion on sls

478  
00:17:57,990 --> 00:17:55,679  
to go to deep space

479  
00:18:00,070 --> 00:17:58,000  
that's why we work with our industry

480  
00:18:02,150 --> 00:18:00,080  
partners to develop commercial crew and

481  
00:18:04,070 --> 00:18:02,160  
cargo capability because they're the

482  
00:18:06,150 --> 00:18:04,080  
ones that provide the routine access to

483  
00:18:08,230 --> 00:18:06,160  
low earth orbit so that we have a place

484  
00:18:10,630 --> 00:18:08,240  
that we can go and come from

485  
00:18:12,710 --> 00:18:10,640  
uh our job right now is to provide the

486  
00:18:15,350 --> 00:18:12,720  
vehicle that can that can get us access

487  
00:18:17,990 --> 00:18:15,360  
to deep space and that's why our focus

488  
00:18:20,230 --> 00:18:18,000

on sls on orion right now

489

00:18:22,549 --> 00:18:20,240

with our international partners we

490

00:18:24,950 --> 00:18:22,559

continue to work with them i think most

491

00:18:26,950 --> 00:18:24,960

of you know that the service module

492

00:18:29,590 --> 00:18:26,960

for orion is going to be prepared by the

493

00:18:31,590 --> 00:18:29,600

european space agency

494

00:18:33,350 --> 00:18:31,600

you know lockheed martin as the prime

495

00:18:35,190 --> 00:18:33,360

contractor for orion is working with

496

00:18:36,950 --> 00:18:35,200

them already so

497

00:18:39,350 --> 00:18:36,960

we're looking at all of those kinds of

498

00:18:42,870 --> 00:18:39,360

things but we're focused on access and

499

00:18:44,789 --> 00:18:42,880

not specific um specific uh

500

00:18:51,190 --> 00:18:44,799

vehicles if you will are engines to get

501  
00:18:55,029 --> 00:18:52,950  
uh james d in florida today i think

502  
00:18:56,470 --> 00:18:55,039  
questions maybe for mark or or for

503  
00:18:57,750 --> 00:18:56,480  
whomever um

504  
00:18:59,990 --> 00:18:57,760  
it sounds like you got you know quite a

505  
00:19:01,190 --> 00:19:00,000  
lot of capability in this vehicle ready

506  
00:19:02,230 --> 00:19:01,200  
to go i'm just

507  
00:19:03,750 --> 00:19:02,240  
wondering if you can discuss a little

508  
00:19:06,470 --> 00:19:03,760  
more why is it going to take so long to

509  
00:19:09,270 --> 00:19:06,480  
get to that first crude flight

510  
00:19:11,510 --> 00:19:09,280  
is it more a function of waiting for sls

511  
00:19:14,310 --> 00:19:11,520  
or you know why does it take seven more

512  
00:19:15,190 --> 00:19:14,320  
years minimum to to get from this stage

513  
00:19:16,789 --> 00:19:15,200

to your

514

00:19:18,870 --> 00:19:16,799

crew ready vehicle yeah good question

515

00:19:21,110 --> 00:19:18,880

because we we have a lot on this vehicle

516

00:19:22,549 --> 00:19:21,120

so in this vehicle we do as i mentioned

517

00:19:24,070 --> 00:19:22,559

the parachutes the structure the heat

518

00:19:25,909 --> 00:19:24,080

shield those were big risk items you

519

00:19:27,029 --> 00:19:25,919

could think of schedule risk items but

520

00:19:28,870 --> 00:19:27,039

we still have a lot of work in the

521

00:19:30,549 --> 00:19:28,880

service module area some of which is

522

00:19:32,870 --> 00:19:30,559

going to do which takes time they just

523

00:19:35,669 --> 00:19:32,880

finish their pdr

524

00:19:37,590 --> 00:19:35,679

we also have to work then on the

525

00:19:39,510 --> 00:19:37,600

the rest of the eclipse life support

526

00:19:41,190 --> 00:19:39,520

system the crew displays the crew seats

527

00:19:42,630 --> 00:19:41,200

all those kind of internal things and

528

00:19:43,990 --> 00:19:42,640

then the other part that is a little

529

00:19:46,230 --> 00:19:44,000

hard to describe but we have a

530

00:19:47,990 --> 00:19:46,240

qualification program where you take the

531

00:19:49,270 --> 00:19:48,000

unit and you actually test it to the

532

00:19:51,190 --> 00:19:49,280

extremes

533

00:19:53,110 --> 00:19:51,200

where you actually uh

534

00:19:54,870 --> 00:19:53,120

all your acoustics loads all the other

535

00:19:57,110 --> 00:19:54,880

thermal environments that testing

536

00:19:58,390 --> 00:19:57,120

program on the test unit takes time and

537

00:19:59,909 --> 00:19:58,400

money to do and you want to make sure

538

00:20:01,909 --> 00:19:59,919

you've tested it on the ground before

539

00:20:04,470 --> 00:20:01,919

you actually put the people in space so

540

00:20:07,029 --> 00:20:04,480

it's the combination of all those pieces

541

00:20:09,190 --> 00:20:07,039

and the and the and the flatline budget

542

00:20:12,070 --> 00:20:09,200

uh and some of our fixed costs that

543

00:20:14,149 --> 00:20:12,080

drive the the schedule to the right

544

00:20:16,230 --> 00:20:14,159

answer your question sure okay and

545

00:20:19,350 --> 00:20:16,240

could you uh talk about about what

546

00:20:22,630 --> 00:20:19,360

elsing is going to be needed to again

547

00:20:23,669 --> 00:20:22,640

get from this first crew vehicle to

548

00:20:25,430 --> 00:20:23,679

what other systems are going to be

549

00:20:26,789 --> 00:20:25,440

needed to enable a mars type mission

550

00:20:28,230 --> 00:20:26,799

obviously it's not just this little

551

00:20:30,070 --> 00:20:28,240

capsule that's going to

552

00:20:32,390 --> 00:20:30,080

make that journey um

553

00:20:34,390 --> 00:20:32,400

how much more is needed to to

554

00:20:35,830 --> 00:20:34,400

to do a mission to mars or or land

555

00:20:37,669 --> 00:20:35,840

anywhere

556

00:20:39,909 --> 00:20:37,679

good question so orion

557

00:20:42,310 --> 00:20:39,919

uh can fit in all these architectures

558

00:20:44,149 --> 00:20:42,320

the part it provides really is the

559

00:20:46,710 --> 00:20:44,159

providing a safe place for the crew to

560

00:20:48,870 --> 00:20:46,720

operate and it gets them out of earth

561

00:20:50,230 --> 00:20:48,880

orbit and then eventually back safely on

562

00:20:53,110 --> 00:20:50,240

the ground so that's the part it

563

00:20:54,950 --> 00:20:53,120

provides and it provides a capability

564

00:20:57,029 --> 00:20:54,960

to support the crew for a certain number

565

00:20:58,630 --> 00:20:57,039

of days four people for 21 days gives

566

00:21:01,029 --> 00:20:58,640

you a sense but when you're going all

567

00:21:03,750 --> 00:21:01,039

the way to mars which can be

568

00:21:05,270 --> 00:21:03,760

you know nine months to a year one way

569

00:21:07,669 --> 00:21:05,280

you're going to need a bigger hab module

570

00:21:09,510 --> 00:21:07,679

obviously more supplies and bigger

571

00:21:10,710 --> 00:21:09,520

propellant systems to do that so that's

572

00:21:12,390 --> 00:21:10,720

the part that would need to be added

573

00:21:14,149 --> 00:21:12,400

later

574

00:21:16,870 --> 00:21:14,159

yeah sorry let me add another thing

575

00:21:18,149 --> 00:21:16,880

james it's really important to me as

576  
00:21:20,390 --> 00:21:18,159  
administrator

577  
00:21:21,430 --> 00:21:20,400  
in order to get humans to mars that's

578  
00:21:24,070 --> 00:21:21,440  
hard

579  
00:21:26,390 --> 00:21:24,080  
so we need to we need to we all need to

580  
00:21:28,149 --> 00:21:26,400  
agree with that whether you accept my

581  
00:21:29,830 --> 00:21:28,159  
statement there or not

582  
00:21:31,270 --> 00:21:29,840  
is immaterial to be quite honest it's

583  
00:21:34,149 --> 00:21:31,280  
hard to do this

584  
00:21:35,830 --> 00:21:34,159  
um we have to be able to guarantee that

585  
00:21:37,750 --> 00:21:35,840  
we can safely

586  
00:21:39,510 --> 00:21:37,760  
get humans through the the environment

587  
00:21:41,350 --> 00:21:39,520  
of radiation and everything else and we

588  
00:21:43,270 --> 00:21:41,360

have a we work with a matrix two

589

00:21:45,430 --> 00:21:43,280

matrices as a matter of fact one of them

590

00:21:47,990 --> 00:21:45,440

deals with a human body with our human

591

00:21:49,669 --> 00:21:48,000

performance and human survival and our

592

00:21:51,830 --> 00:21:49,679

matrix says that using the international

593

00:21:55,029 --> 00:21:51,840

space station is the dominant platform

594

00:21:57,270 --> 00:21:55,039

for development of of procedures and

595

00:22:00,070 --> 00:21:57,280

protective devices and the like we're

596

00:22:02,149 --> 00:22:00,080

probably out to 2026

597

00:22:04,149 --> 00:22:02,159

before we buy down enough risk that

598

00:22:06,149 --> 00:22:04,159

we're willing to ethically put humans on

599

00:22:10,230 --> 00:22:06,159

a spacecraft and try to send them to

600

00:22:12,470 --> 00:22:10,240

mars we're probably out to 2025 2026

601  
00:22:14,710 --> 00:22:12,480  
from a technological perspective

602  
00:22:16,789 --> 00:22:14,720  
before we have we have the knowledge on

603  
00:22:19,669 --> 00:22:16,799  
the environmental system because unlike

604  
00:22:20,630 --> 00:22:19,679  
space station where if an ammonia pump

605  
00:22:23,110 --> 00:22:20,640  
breaks

606  
00:22:26,549 --> 00:22:23,120  
we put it on a you know something on a

607  
00:22:28,870 --> 00:22:26,559  
spacex dragon or a cygnus or a progress

608  
00:22:30,789 --> 00:22:28,880  
and we send up a component we can't do

609  
00:22:33,510 --> 00:22:30,799  
that on the way to mars so

610  
00:22:36,390 --> 00:22:33,520  
mark's got to have i've got to give him

611  
00:22:38,470 --> 00:22:36,400  
a capability to build a much more

612  
00:22:40,710 --> 00:22:38,480  
resilient environmental control and life

613  
00:22:42,950 --> 00:22:40,720

support system than we have today we

614

00:22:44,390 --> 00:22:42,960

don't have it yet it's in development

615

00:22:46,789 --> 00:22:44,400

and a lot of it's being tested on the

616

00:22:49,029 --> 00:22:46,799

international space station so uh that's

617

00:22:51,430 --> 00:22:49,039

the that's the part of those of us who

618

00:22:53,190 --> 00:22:51,440

are here on this side of the line

619

00:22:54,789 --> 00:22:53,200

we recognize the challenges we have

620

00:22:57,350 --> 00:22:54,799

ahead and that's why there's not this

621

00:22:59,590 --> 00:22:57,360

loss of of momentum that that you asked

622

00:23:00,789 --> 00:22:59,600

about earlier but for the outside you

623

00:23:02,310 --> 00:23:00,799

want to know okay

624

00:23:04,070 --> 00:23:02,320

i see this vehicle why can't we just put

625

00:23:06,470 --> 00:23:04,080

humans in it next week

626  
00:23:08,710 --> 00:23:06,480  
because it's not ready it is it is we

627  
00:23:11,350 --> 00:23:08,720  
don't have the all the technology that

628  
00:23:13,990 --> 00:23:11,360  
we want and need nor do we have the

629  
00:23:17,669 --> 00:23:14,000  
knowledge that we want and need to make

630  
00:23:19,430 --> 00:23:17,679  
that trip uh survivable by humans so so

631  
00:23:23,270 --> 00:23:19,440  
there are a lot of gaps that have to be

632  
00:23:24,390 --> 00:23:23,280  
filled between now and then

633  
00:23:25,909 --> 00:23:24,400  
we're also getting a lot of good

634  
00:23:29,190 --> 00:23:25,919  
questions from social media i've got a

635  
00:23:31,029 --> 00:23:29,200  
couple here at christy marshall ask what

636  
00:23:33,830 --> 00:23:31,039  
data will be collected during the test

637  
00:23:35,990 --> 00:23:33,840  
flight and in a related question at tech

638  
00:23:37,750 --> 00:23:36,000

guy king asked what the cat will the

639

00:23:41,110 --> 00:23:37,760

capsule carry more sensors than a normal

640

00:23:45,590 --> 00:23:43,990

yeah for uh for eft one and we're

641

00:23:47,269 --> 00:23:45,600

looking at for the

642

00:23:50,149 --> 00:23:47,279

first two

643

00:23:52,470 --> 00:23:50,159

exploration mission vehicles for eft one

644

00:23:54,950 --> 00:23:52,480

we're flying 1200 additional sensors

645

00:23:55,669 --> 00:23:54,960

from the nominal set that we would look

646

00:23:58,149 --> 00:23:55,679

at

647

00:23:59,830 --> 00:23:58,159

on each of our vehicles so we're heavily

648

00:24:02,830 --> 00:23:59,840

instrumented

649

00:24:04,710 --> 00:24:02,840

in vibration in

650

00:24:07,190 --> 00:24:04,720

temperatures uh to make sure that we

651  
00:24:09,909 --> 00:24:07,200  
understand the environments um

652  
00:24:11,350 --> 00:24:09,919  
and all of the event timing to make sure

653  
00:24:12,630 --> 00:24:11,360  
all of the events happen when they're

654  
00:24:15,269 --> 00:24:12,640  
supposed to be happening so we're

655  
00:24:18,230 --> 00:24:15,279  
heavily instrumented uh for this vehicle

656  
00:24:21,990 --> 00:24:18,240  
and that has taken up quite a bit of the

657  
00:24:23,590 --> 00:24:22,000  
computer space we've actually added some

658  
00:24:25,269 --> 00:24:23,600  
development flight instrumentation

659  
00:24:31,029 --> 00:24:25,279  
computers just to handle the volume of

660  
00:24:36,470 --> 00:24:33,990  
hi um i have a question from mr guyer um

661  
00:24:39,669 --> 00:24:36,480  
is orion still considered a backup for

662  
00:24:41,990 --> 00:24:39,679  
commercial crew and if so at what point

663  
00:24:43,669 --> 00:24:42,000

in the testing program will

664

00:24:45,909 --> 00:24:43,679

what you need to do to prepare for a

665

00:24:48,710 --> 00:24:45,919

space station mission kind of diverge

666

00:24:50,789 --> 00:24:48,720

what you're doing for the primary

667

00:24:53,350 --> 00:24:50,799

goal of the spacecraft which is to do

668

00:24:54,390 --> 00:24:53,360

the deep space exploration

669

00:24:55,510 --> 00:24:54,400

off the hook

670

00:25:00,549 --> 00:24:55,520

no

671

00:25:02,149 --> 00:25:00,559

commercial vehicles for for a number of

672

00:25:05,350 --> 00:25:02,159

reasons one is

673

00:25:07,430 --> 00:25:05,360

we made a commitment to industry that we

674

00:25:09,830 --> 00:25:07,440

would not compete with them

675

00:25:12,710 --> 00:25:09,840

uh if we had if we had said we're going

676  
00:25:15,430 --> 00:25:12,720  
to keep orion as a backup

677  
00:25:17,750 --> 00:25:15,440  
there were serious doubts as to whether

678  
00:25:18,710 --> 00:25:17,760  
industry would have made the investment

679  
00:25:20,549 --> 00:25:18,720  
at all

680  
00:25:22,789 --> 00:25:20,559  
in a commercial crew vehicle because

681  
00:25:24,149 --> 00:25:22,799  
their assumption was okay if nasa is

682  
00:25:25,750 --> 00:25:24,159  
going to build a vehicle to go to low

683  
00:25:27,510 --> 00:25:25,760  
earth orbit what is nasa going to want

684  
00:25:30,470 --> 00:25:27,520  
to use naturally they're going to want

685  
00:25:32,789 --> 00:25:30,480  
to use their own vehicle so orion while

686  
00:25:34,789 --> 00:25:32,799  
it can or will be capable of going to

687  
00:25:36,549 --> 00:25:34,799  
the international space station is not

688  
00:25:38,789 --> 00:25:36,559

designed to do that not intended to do

689

00:25:39,830 --> 00:25:38,799

that and in no way do we intend to

690

00:25:42,310 --> 00:25:39,840

compete

691

00:25:43,350 --> 00:25:42,320

with our industry partners and it's a

692

00:25:46,950 --> 00:25:43,360

bad

693

00:25:48,630 --> 00:25:46,960

when we have to send orion to the

694

00:25:49,590 --> 00:25:48,640

international space station because it

695

00:25:51,190 --> 00:25:49,600

means

696

00:25:53,350 --> 00:25:51,200

either we've lost

697

00:25:54,470 --> 00:25:53,360

each of the vehicles that was designed

698

00:25:56,549 --> 00:25:54,480

to do that

699

00:25:59,510 --> 00:25:56,559

some through some accident or they

700

00:26:01,430 --> 00:25:59,520

failed or something so we don't want to

701  
00:26:03,190 --> 00:26:01,440  
have to rely on orion to do that it

702  
00:26:05,350 --> 00:26:03,200  
means industry it means american

703  
00:26:07,669 --> 00:26:05,360  
industry has failed and i don't think

704  
00:26:09,990 --> 00:26:07,679  
any of us wants to see that so so get

705  
00:26:11,350 --> 00:26:10,000  
orion going to the international space

706  
00:26:14,070 --> 00:26:11,360  
station out of your mind i don't care

707  
00:26:16,710 --> 00:26:14,080  
what anybody says that is not our intent

708  
00:26:19,269 --> 00:26:16,720  
it's not being built that way uh it

709  
00:26:21,669 --> 00:26:19,279  
would be a waste of the taxpayers money

710  
00:26:23,669 --> 00:26:21,679  
you know for me to ask mark to configure

711  
00:26:25,590 --> 00:26:23,679  
orion to go to the international space

712  
00:26:32,390 --> 00:26:25,600  
station just bluntly

713  
00:26:36,950 --> 00:26:34,470

i i have a question for colonel cabana

714

00:26:38,950 --> 00:26:36,960

could can you address the safety of

715

00:26:40,950 --> 00:26:38,960

orion as a former space shuttle

716

00:26:43,990 --> 00:26:40,960

commander how much safer would it be

717

00:26:46,070 --> 00:26:44,000

than one of the shuttles that you flew

718

00:26:47,909 --> 00:26:46,080

i'd fly on it on this four hour flight

719

00:26:48,789 --> 00:26:47,919

if it would get me out of a few meetings

720

00:26:50,149 --> 00:26:48,799

but

721

00:26:52,789 --> 00:26:50,159

it

722

00:26:54,070 --> 00:26:52,799

orion is safe in in many ways you know

723

00:26:55,350 --> 00:26:54,080

one of the things that we looked at

724

00:26:58,070 --> 00:26:55,360

after uh

725

00:26:59,669 --> 00:26:58,080

colombia and the team here just did a

726

00:27:02,070 --> 00:26:59,679

phenomenal job we were talking this

727

00:27:03,830 --> 00:27:02,080

morning how clean atlantis was after it

728

00:27:06,230 --> 00:27:03,840

came back after the final space shuttle

729

00:27:07,750 --> 00:27:06,240

mission but having the capsule up on top

730

00:27:09,909 --> 00:27:07,760

of the rocket out of that debris

731

00:27:12,870 --> 00:27:09,919

environment having an escape system on

732

00:27:14,549 --> 00:27:12,880

the capsule that can get the crew

733

00:27:17,269 --> 00:27:14,559

from anytime from

734

00:27:19,669 --> 00:27:17,279

liftoff to main engine cut off safely

735

00:27:22,710 --> 00:27:19,679

back to earth with no black zones

736

00:27:24,789 --> 00:27:22,720

this is going to be a much safer vehicle

737

00:27:27,990 --> 00:27:24,799

in the launch environment than the the

738

00:27:30,070 --> 00:27:28,000

shuttle was so uh i think the team is

739

00:27:36,630 --> 00:27:30,080

just doing an outstanding job and

740

00:27:41,590 --> 00:27:38,470

we have time for uh one more if there's

741

00:27:44,789 --> 00:27:42,950

go ahead james

742

00:27:47,190 --> 00:27:44,799

i'll narrow it to one uh uh

743

00:27:50,310 --> 00:27:47,200

general bolden justin excuse me in the

744

00:27:52,149 --> 00:27:50,320

context of uh the discussion about orion

745

00:27:54,230 --> 00:27:52,159

as a potential backup vehicle can can

746

00:27:56,070 --> 00:27:54,240

you say is nasa committed to

747

00:27:58,630 --> 00:27:56,080

multiple commercial crew awards uh

748

00:28:00,789 --> 00:27:58,640

coming up this summer how many uh should

749

00:28:01,990 --> 00:28:00,799

we expect and let me without getting in

750

00:28:03,110 --> 00:28:02,000

trouble here

751

00:28:05,110 --> 00:28:03,120

and trying to get into bill

752

00:28:07,029 --> 00:28:05,120

gerstenmaier's

753

00:28:08,950 --> 00:28:07,039

job bill gerstenmaier is the head of

754

00:28:11,430 --> 00:28:08,960

human exploration is the source election

755

00:28:14,310 --> 00:28:11,440

official so i won't even venture to try

756

00:28:16,470 --> 00:28:14,320

to guess our desire is to have multiple

757

00:28:18,470 --> 00:28:16,480

providers why because

758

00:28:19,669 --> 00:28:18,480

it it maintains

759

00:28:22,149 --> 00:28:19,679

competition

760

00:28:24,070 --> 00:28:22,159

so it holds the cost down

761

00:28:26,789 --> 00:28:24,080

it gives us

762

00:28:29,430 --> 00:28:26,799

reliability and redundancy if we only

763

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

have one us provider then we're back to

764

00:28:33,110 --> 00:28:31,039

where we were before where we have

765

00:28:35,190 --> 00:28:33,120

shuttle and soyuz and we know what

766

00:28:37,909 --> 00:28:35,200

that's like we don't want to be there so

767

00:28:40,230 --> 00:28:37,919

our commitment is to try to have more

768

00:28:42,470 --> 00:28:40,240

than one provider the budget will

769

00:28:43,430 --> 00:28:42,480

determine that to a great extent

770

00:28:45,990 --> 00:28:43,440

and

771

00:28:48,149 --> 00:28:46,000

more than one doesn't mean

772

00:28:50,070 --> 00:28:48,159

fractions like we've seen somewhat so

773

00:28:51,590 --> 00:28:50,080

far right i mean it's either full or

774

00:28:52,950 --> 00:28:51,600

it's not right

775

00:28:57,190 --> 00:28:52,960

you're getting into

776

00:28:58,789 --> 00:28:57,200

what do we call this uh

777

00:29:01,110 --> 00:28:58,799

i don't want to go there let me let me

778

00:29:03,269 --> 00:29:01,120

not do that because i don't know

779

00:29:05,669 --> 00:29:03,279

i will i will infringe upon something

780

00:29:07,909 --> 00:29:05,679

that's going to get me in in in legal

781

00:29:09,909 --> 00:29:07,919

problems but let's just say

782

00:29:11,190 --> 00:29:09,919

more than one provider means when we

783

00:29:13,510 --> 00:29:11,200

start flying

784

00:29:17,590 --> 00:29:13,520

humans on commercial spacecraft like in

785

00:29:20,230 --> 00:29:17,600

2017 ideally i would like to have

786

00:29:23,110 --> 00:29:20,240

two people at least who can provide

787

00:29:25,269 --> 00:29:23,120

transportation for our crew either today

788

00:29:26,630 --> 00:29:25,279

or pretty soon after that so that's

789

00:29:29,029 --> 00:29:26,640

that's all i'm going to say and stay out

790

00:29:30,549 --> 00:29:29,039

of acquisition and procurement problems

791

00:29:31,990 --> 00:29:30,559

okay and i hope you i hope you

792

00:29:33,990 --> 00:29:32,000

appreciate the

793

00:29:37,269 --> 00:29:34,000

the subtlety there all right

794

00:29:41,029 --> 00:29:39,029

okay well i would like to thank our

795

00:29:43,110 --> 00:29:41,039

participants for

796

00:29:44,310 --> 00:29:43,120

talking today and also thank you all for

797

00:29:45,430 --> 00:29:44,320

joining us

798

00:29:51,029 --> 00:29:45,440

you can follow

799

00:29:56,789 --> 00:29:53,990

orion and for information on all the

800

00:29:58,870 --> 00:29:56,799

progress we're making to send humans on

801

00:30:02,149 --> 00:29:58,880

the path to mars you can visit