1
00:00:04,390 --> 00:00:02,389
i'm katherine hamilton from nasa's

2
00:00:06,470 --> 00:00:04,400
office of communications we're here at

3
00:00:08,950 --> 00:00:06,480
the flight robotics laboratory flat

4
00:00:10,870 --> 00:00:08,960
floor at marshall space flight center to

5
00:00:12,789 --> 00:00:10,880
provide you an exciting update about the

6
00:00:15,110 --> 00:00:12,799
first launch of the space launch system

7
00:00:16,390 --> 00:00:15,120
rocket in the orion spacecraft and the

8
00:00:18,310 --> 00:00:16,400
science and technology that we'll be

9
00:00:19,590 --> 00:00:18,320
sending along to find out more about

10
00:00:21,189 --> 00:00:19,600
deep space

11
00:00:23,990 --> 00:00:21,199
we will have two parts to today's

12
00:00:26,470 --> 00:00:24,000
program first we'll open with marshall

13
00:00:28,630 --> 00:00:26,480

center director todd may and nasa deputy

14
00:00:29,990 --> 00:00:28,640
administrator david newman

15
00:00:31,429 --> 00:00:30,000
then i will announce the panel of

16
00:00:33,110 --> 00:00:31,439
representatives here on the stage to

17
00:00:34,470 --> 00:00:33,120
provide more details about today's

18
00:00:36,150 --> 00:00:34,480
announcement

19
00:00:37,510 --> 00:00:36,160
in the second part of the program we'll

20
00:00:39,190 --> 00:00:37,520
give you a behind-the-scenes look at

21
00:00:41,430 --> 00:00:39,200
some cool hardware that will be on that

22
00:00:43,510 --> 00:00:41,440
first flight with a mission of its own

23
00:00:46,069 --> 00:00:43,520
to learn more about an asteroid and test

24
00:00:47,430 --> 00:00:46,079
its solar sail technology

25
00:00:49,029 --> 00:00:47,440
there will be a question and answer

26
00:00:50,549 --> 00:00:49,039
period at the end of each part of the

27
00:00:52,630 --> 00:00:50,559
program for media representatives

28
00:00:54,310 --> 00:00:52,640
present in the room as well as those on

29
00:00:55,350 --> 00:00:54,320
the phone and following us on social

30
00:00:57,270 --> 00:00:55,360
media

31
00:01:01,110 --> 00:00:57,280
for those joining us online you can ask

32
00:01:02,709 --> 00:01:01,120
questions using the hashtag asknasa

33
00:01:04,229 --> 00:01:02,719
at the conclusion of the panel's remarks

34
00:01:06,230 --> 00:01:04,239
i'll provide additional details about

35
00:01:08,390 --> 00:01:06,240
the question and answer period

36
00:01:16,710 --> 00:01:08,400
and now to start us off with a few words

37
00:01:20,149 --> 00:01:18,230
hey thank you it's good to have you all

38
00:01:21,270 --> 00:01:20,159

here today and uh

39
00:01:23,030 --> 00:01:21,280
good to see

40
00:01:24,710 --> 00:01:23,040
all the folks that want to learn about

41
00:01:26,870 --> 00:01:24,720
the capability that

42
00:01:29,590 --> 00:01:26,880
we're bringing to the agency

43
00:01:31,830 --> 00:01:29,600
thank you for joining us today

44
00:01:34,149 --> 00:01:31,840
this is a briefing to announce secondary

45
00:01:36,710 --> 00:01:34,159
payloads for the first launch of the

46
00:01:39,670 --> 00:01:36,720
space launch system the largest and most

47
00:01:41,670 --> 00:01:39,680
powerful rocket ever built

48
00:01:44,069 --> 00:01:41,680
you're about to learn about exciting

49
00:01:46,230 --> 00:01:44,079
capabilities of sls above above and

50
00:01:48,230 --> 00:01:46,240
beyond its primary mission

51
00:01:50,149 --> 00:01:48,240
and that primary mission is to launch

52
00:01:52,230 --> 00:01:50,159
the orion spacecraft

53
00:01:55,030 --> 00:01:52,240
into space beyond the moon

54
00:01:57,270 --> 00:01:55,040
and onto mars it's the only rocket and

55
00:01:59,590 --> 00:01:57,280
spacecraft equipped to send humans and

56
00:02:01,030 --> 00:01:59,600
supplies required for deep space

57
00:02:02,389 --> 00:02:01,040
exploration

58
00:02:04,550 --> 00:02:02,399
the first mission will be called

59
00:02:06,709 --> 00:02:04,560
exploration mission number one

60
00:02:08,229 --> 00:02:06,719
and it'll be a proving ground mission

61
00:02:10,229 --> 00:02:08,239
whose goal is to demonstrate the

62
00:02:12,630 --> 00:02:10,239
integrated performance of the sls and

63
00:02:14,790 --> 00:02:12,640

orion before we put crews on it for the

64
00:02:17,110 --> 00:02:14,800
first crude flight

65
00:02:20,630 --> 00:02:17,120
because of the robust capability of the

66
00:02:24,470 --> 00:02:22,229
we have a unique opportunity to

67
00:02:27,110 --> 00:02:24,480
transport small spacecraft and

68
00:02:28,390 --> 00:02:27,120
technology experiments on board the very

69
00:02:31,110 --> 00:02:28,400
same mission

70
00:02:32,550 --> 00:02:31,120
today you're going to hear about 13

71
00:02:34,790 --> 00:02:32,560
small satellites that we're going to

72
00:02:37,190 --> 00:02:34,800
send out into space on this mission with

73
00:02:41,270 --> 00:02:37,200
the extra capability we have beyond that

74
00:02:42,790 --> 00:02:41,280
needed to launch orion beyond the moon

75
00:02:44,470 --> 00:02:42,800
here at marshall we manage the space

76
00:02:45,990 --> 00:02:44,480
launch system program

77
00:02:49,190 --> 00:02:46,000
and we're tasked with integrating these

78
00:02:51,030 --> 00:02:49,200
payloads into the vehicle for the agency

79
00:02:52,949 --> 00:02:51,040
we're also privileged to have two of the

80
00:02:55,030 --> 00:02:52,959
principal investigators

81
00:02:57,270 --> 00:02:55,040
the lunar flashlight and the near earth

82
00:02:59,910 --> 00:02:57,280
asteroid scout mission and to manage one

83
00:03:01,670 --> 00:02:59,920
of those missions here at the center

84
00:03:03,830 --> 00:03:01,680
all of the data from these missions and

85
00:03:06,710 --> 00:03:03,840
these experiments will be used to help

86
00:03:08,390 --> 00:03:06,720
us on our journey to mars

87
00:03:10,710 --> 00:03:08,400
and now i'd like to

88
00:03:14,229 --> 00:03:10,720

introduce you to dr david newman our

89
00:03:16,149 --> 00:03:14,239
deputy administrator and someone who is

90
00:03:17,430 --> 00:03:16,159
very familiar with innovation and

91
00:03:18,949 --> 00:03:17,440
technology

92
00:03:20,869 --> 00:03:18,959
in her own right

93
00:03:22,790 --> 00:03:20,879
she's in washington dc

94
00:03:25,270 --> 00:03:22,800
and she will tell you more about the

95
00:03:28,710 --> 00:03:25,280
importance of transporting these small

96
00:03:30,550 --> 00:03:28,720
satellites on the sls and how the snt

97
00:03:32,789 --> 00:03:30,560
the science and technology gleaned from

98
00:03:34,789 --> 00:03:32,799
these missions will advance us on our

99
00:03:44,229 --> 00:03:34,799
journey to mars please help me in

100
00:03:48,869 --> 00:03:46,550
thank you morning everyone

101
00:03:51,350 --> 00:03:48,879
and first my um honor and

102
00:03:53,190 --> 00:03:51,360
congratulations to director todd may

103
00:04:01,110 --> 00:03:53,200
marshall space flight center's 13th

104
00:04:04,789 --> 00:04:02,630
todd throughout your entire career you

105
00:04:07,110 --> 00:04:04,799
have consistently and persistently

106
00:04:08,550 --> 00:04:07,120
helped us advance exploration so we're

107
00:04:10,149 --> 00:04:08,560
so proud of you and really look forward

108
00:04:11,270 --> 00:04:10,159
to working with you in this new role as

109
00:04:13,030 --> 00:04:11,280
director

110
00:04:15,589 --> 00:04:13,040
it's great to be here rocket city i love

111
00:04:17,670 --> 00:04:15,599
coming back to huntsville today get to

112
00:04:18,789 --> 00:04:17,680
highlight another step on our journey to

113
00:04:21,030 --> 00:04:18,799

mars

114
00:04:23,749 --> 00:04:21,040
and our continued progress toward that

115
00:04:24,950 --> 00:04:23,759
first flight of sls the space launch

116
00:04:27,350 --> 00:04:24,960
system

117
00:04:29,270 --> 00:04:27,360
in our journey to mars there are many

118
00:04:31,430 --> 00:04:29,280
facets and it's really important to note

119
00:04:33,670 --> 00:04:31,440
that this team marshall is right at the

120
00:04:34,950 --> 00:04:33,680
core we say it goes through the path to

121
00:04:36,710 --> 00:04:34,960
mars goes right through through

122
00:04:38,790 --> 00:04:36,720
huntsville and right through marshall so

123
00:04:41,830 --> 00:04:38,800
this amazing work on the development and

124
00:04:43,510 --> 00:04:41,840
testing of sls and this first mission as

125
00:04:44,950 --> 00:04:43,520
you we know is going to be about a

126
00:04:46,710 --> 00:04:44,960
little bit more than propulsion it's

127
00:04:48,790 --> 00:04:46,720
also going to be about what science what

128
00:04:50,150 --> 00:04:48,800
technology can we do and that's why

129
00:04:51,670 --> 00:04:50,160
we're all here today for this very

130
00:04:56,230 --> 00:04:51,680
exciting announcement

131
00:04:57,670 --> 00:04:56,240
cubesats cubesats six units like a box

132
00:05:00,070 --> 00:04:57,680
they're really at the cutting edge of

133
00:05:02,230 --> 00:05:00,080
technology they used to just be a dream

134
00:05:04,230 --> 00:05:02,240
today they're developed and they're

135
00:05:06,070 --> 00:05:04,240
efficient they're cost effective they're

136
00:05:07,510 --> 00:05:06,080
really showing us how to do exploration

137
00:05:10,230 --> 00:05:07,520
in a new way

138
00:05:12,469 --> 00:05:10,240

during exploration mission one em-1 as

139
00:05:14,790 --> 00:05:12,479
we call it nasa will expand our science

140
00:05:17,189 --> 00:05:14,800
and exploration capabilities

141
00:05:19,670 --> 00:05:17,199
by sending 13 of these small cubesat

142
00:05:21,350 --> 00:05:19,680
class payloads into orbit and these the

143
00:05:23,110 --> 00:05:21,360
design and the advanced technology that

144
00:05:24,950 --> 00:05:23,120
will be flying is really setting the

145
00:05:27,510 --> 00:05:24,960
stage for a few our future human

146
00:05:28,790 --> 00:05:27,520
exploration missions these 13 cubesats

147
00:05:31,029 --> 00:05:28,800
that will fly

148
00:05:32,629 --> 00:05:31,039
they're called secondary payloads and

149
00:05:34,310 --> 00:05:32,639
they're going to showcase they're really

150
00:05:36,550 --> 00:05:34,320
at the intersection i like to think of

151
00:05:38,469 --> 00:05:36,560
it as being the synergy of what we can

152
00:05:40,469 --> 00:05:38,479
do scientifically in technology so this

153
00:05:42,150 --> 00:05:40,479
is where it's a really good look of how

154
00:05:43,990 --> 00:05:42,160
much science and technology we can cram

155
00:05:45,350 --> 00:05:44,000
into that very small package and you're

156
00:05:47,270 --> 00:05:45,360
going to be amazed when you hear all the

157
00:05:49,749 --> 00:05:47,280
details coming up but it really is

158
00:05:51,590 --> 00:05:49,759
helping us advance our journey sls and

159
00:05:53,110 --> 00:05:51,600
their orion spacecraft they're going to

160
00:05:54,070 --> 00:05:53,120
take people

161
00:05:56,309 --> 00:05:54,080
further

162
00:05:57,749 --> 00:05:56,319
than we've ever taken people in human

163
00:05:59,749 --> 00:05:57,759

history

164
00:06:02,390 --> 00:05:59,759
further than we've ever been in over

165
00:06:04,390 --> 00:06:02,400
four decades out into deep space and

166
00:06:06,790 --> 00:06:04,400
onward to mars

167
00:06:09,430 --> 00:06:06,800
so these technology missions and deep

168
00:06:11,670 --> 00:06:09,440
space are really something to to pause

169
00:06:13,270 --> 00:06:11,680
reflect on we're not just talking about

170
00:06:14,790 --> 00:06:13,280
it we're doing it and starting right

171
00:06:17,749 --> 00:06:14,800
here

172
00:06:19,270 --> 00:06:17,759
sls is designed and it has a flexible

173
00:06:21,670 --> 00:06:19,280
and evolvable

174
00:06:23,830 --> 00:06:21,680
architecture that's really important the

175
00:06:26,070 --> 00:06:23,840
crew and cargo missions

176
00:06:28,710 --> 00:06:26,080
they enable very large science

177
00:06:31,189 --> 00:06:28,720
experiments technology critically

178
00:06:32,950 --> 00:06:31,199
technolo technology demonstrations for

179
00:06:35,830 --> 00:06:32,960
exploring the universe so thinking way

180
00:06:37,830 --> 00:06:35,840
way out and also they carry smaller

181
00:06:40,309 --> 00:06:37,840
secondary paid loads and capabilities so

182
00:06:42,150 --> 00:06:40,319
we can test things out on these cubesats

183
00:06:43,749 --> 00:06:42,160
so as an aerospace engineer myself

184
00:06:45,189 --> 00:06:43,759
that's really important

185
00:06:47,749 --> 00:06:45,199
in systems engineering thinking about

186
00:06:49,510 --> 00:06:47,759
the flexibility how can we carry all

187
00:06:51,749 --> 00:06:49,520
kinds of different payloads from small

188
00:06:54,629 --> 00:06:51,759

to large all kinds of science all kinds

189
00:06:57,270 --> 00:06:54,639
of technology that's really a new way to

190
00:06:59,749 --> 00:06:57,280
look at evolvable flexible space systems

191
00:07:01,589 --> 00:06:59,759
that's really what sls demonstrates em-1

192
00:07:03,350 --> 00:07:01,599
exploration mission 1 it's a proving

193
00:07:05,029 --> 00:07:03,360
ground mission as todd mentioned what

194
00:07:07,909 --> 00:07:05,039
does that mean well we're going out to

195
00:07:11,350 --> 00:07:07,919
deep space this orbit leaves earth it

196
00:07:13,350 --> 00:07:11,360
goes to lunar orbit past lunar orbit

197
00:07:15,350 --> 00:07:13,360
the view from there it's pretty

198
00:07:17,029 --> 00:07:15,360
spectacular when we look back on our own

199
00:07:19,589 --> 00:07:17,039
spaceship earth

200
00:07:22,150 --> 00:07:19,599
so these cubesats that were chosen have

201
00:07:23,430 --> 00:07:22,160
the ability and they really have amazing

202
00:07:26,150 --> 00:07:23,440
capabilities on board you're going to

203
00:07:27,589 --> 00:07:26,160
hear more about the key information and

204
00:07:29,350 --> 00:07:27,599
it really increases increases

205
00:07:31,029 --> 00:07:29,360
effectiveness and improves the design

206
00:07:32,870 --> 00:07:31,039
and subsequent robotic and human

207
00:07:34,150 --> 00:07:32,880
missions so these are precursors but

208
00:07:35,670 --> 00:07:34,160
they do their own science and they're in

209
00:07:37,110 --> 00:07:35,680
their own right

210
00:07:39,110 --> 00:07:37,120
and perhaps

211
00:07:40,629 --> 00:07:39,120
one of the most exciting things to me is

212
00:07:42,550 --> 00:07:40,639
what's going to be called the nasa's

213
00:07:44,150 --> 00:07:42,560

cube quest challenge

214
00:07:45,589 --> 00:07:44,160
those ones haven't flown yet because the

215
00:07:47,909 --> 00:07:45,599
innovators are still working on them

216
00:07:49,990 --> 00:07:47,919
today they're going to help test out

217
00:07:51,589 --> 00:07:50,000
spacecraft propulsion and communication

218
00:07:53,670 --> 00:07:51,599
techniques so they're still in

219
00:07:55,110 --> 00:07:53,680
competition working on those so we'll

220
00:07:56,869 --> 00:07:55,120
just keep rolling out these great

221
00:07:58,309 --> 00:07:56,879
announcements so that's a really amazing

222
00:08:00,629 --> 00:07:58,319
challenge that you're going to hear more

223
00:08:02,309 --> 00:08:00,639
about so this is a very exciting

224
00:08:04,150 --> 00:08:02,319
opportunity it's an incredible

225
00:08:06,230 --> 00:08:04,160
announcement i'm so glad to be here in

226
00:08:08,629 --> 00:08:06,240
person with everyone i look forward to

227
00:08:10,390 --> 00:08:08,639
the continued progress of sls and the

228
00:08:12,629 --> 00:08:10,400
wonderful news like today's which is

229
00:08:14,790 --> 00:08:12,639
helping us really bring to life make it

230
00:08:16,790 --> 00:08:14,800
make it tangible to celebrate the

231
00:08:18,950 --> 00:08:16,800
developments of exploration and to

232
00:08:20,230 --> 00:08:18,960
highlight the future missions that are

233
00:08:29,110 --> 00:08:20,240
happening here today at the marshall

234
00:08:32,230 --> 00:08:30,790
thank you dr newman

235
00:08:34,389 --> 00:08:32,240
joining us here on the stage today to

236
00:08:36,149 --> 00:08:34,399
talk with us more about our deep

237
00:08:38,389 --> 00:08:36,159
deep space exploration journey and

238
00:08:40,949 --> 00:08:38,399

exciting science and technology along

239
00:08:43,029 --> 00:08:40,959
for the ride are mr bill hill deputy

240
00:08:45,829 --> 00:08:43,039
associate administrator for exploration

241
00:08:47,910 --> 00:08:45,839
systems development at nasa headquarters

242
00:08:49,269 --> 00:08:47,920
mr michael sieblum chief technologist

243
00:08:51,750 --> 00:08:49,279
for the science

244
00:08:54,230 --> 00:08:51,760
mission directorate at nasa headquarters

245
00:08:56,870 --> 00:08:54,240
mr jim cockrell cubequest program

246
00:08:59,269 --> 00:08:56,880
administrator at ames research center

247
00:09:00,790 --> 00:08:59,279
and dr detendra joshi technology

248
00:09:03,509 --> 00:09:00,800
integration lead for the advanced

249
00:09:05,350 --> 00:09:03,519
exploration systems division at nasa

250
00:09:07,190 --> 00:09:05,360
headquarters

251
00:09:09,190 --> 00:09:07,200
at this time we'll begin with our first

252
00:09:11,030 --> 00:09:09,200
panel member mr bill hill

253
00:09:13,990 --> 00:09:11,040
good morning and thanks for being here

254
00:09:17,990 --> 00:09:14,000
with us to uh to celebrate this uh

255
00:09:21,269 --> 00:09:18,000
this great uh endeavor we're

256
00:09:22,550 --> 00:09:21,279
about to get on the journey to mars

257
00:09:24,230 --> 00:09:22,560
this is going to be part of it our

258
00:09:26,070 --> 00:09:24,240
cubesats

259
00:09:27,750 --> 00:09:26,080
exploration systems development is

260
00:09:31,430 --> 00:09:27,760
making great progress

261
00:09:33,829 --> 00:09:31,440
toward our first test flight in 2018 the

262
00:09:35,829 --> 00:09:33,839
expiration

263
00:09:38,070 --> 00:09:35,839

exploration mission won

264
00:09:40,070 --> 00:09:38,080
the space launch system

265
00:09:43,030 --> 00:09:40,080
orion and the ground systems that

266
00:09:46,470 --> 00:09:43,040
support both pre-launch and recovery are

267
00:09:48,389 --> 00:09:46,480
making great progress in 2015

268
00:09:50,870 --> 00:09:48,399
we saw the completion of seven of seven

269
00:09:53,509 --> 00:09:50,880
planned

270
00:09:55,750 --> 00:09:53,519
engine tests at stennis

271
00:09:57,430 --> 00:09:55,760
we saw a solid rocket booster test that

272
00:09:58,870 --> 00:09:57,440
was very successful we have another one

273
00:10:01,430 --> 00:09:58,880
this year

274
00:10:03,829 --> 00:10:01,440
coming up in may

275
00:10:06,389 --> 00:10:03,839
we got the vertical assembly

276
00:10:07,269 --> 00:10:06,399
center at maf the largest

277
00:10:10,230 --> 00:10:07,279
single

278
00:10:12,069 --> 00:10:10,240
weld tool in the in the universe

279
00:10:14,069 --> 00:10:12,079
up and running and working and we're

280
00:10:15,990 --> 00:10:14,079
making great progress on our confidence

281
00:10:18,230 --> 00:10:16,000
wells as well as

282
00:10:20,150 --> 00:10:18,240
soon to be welding the exploration

283
00:10:21,750 --> 00:10:20,160
mission one

284
00:10:23,269 --> 00:10:21,760
hardware

285
00:10:25,910 --> 00:10:23,279
we also saw

286
00:10:27,269 --> 00:10:25,920
the completion of the orion

287
00:10:28,630 --> 00:10:27,279
pressure vessel and we saw that

288
00:10:31,910 --> 00:10:28,640

delivered

289
00:10:32,949 --> 00:10:31,920
from maf to ksc yesterday and we'll

290
00:10:35,190 --> 00:10:32,959
begin

291
00:10:37,190 --> 00:10:35,200
very soon outfitting that but today

292
00:10:39,350 --> 00:10:37,200
we're here to talk about the cubesats

293
00:10:42,150 --> 00:10:39,360
that we're planning to fly

294
00:10:43,110 --> 00:10:42,160
and deploy on e-m1

295
00:10:45,030 --> 00:10:43,120
as

296
00:10:47,269 --> 00:10:45,040
dr newman said these are secondary

297
00:10:49,110 --> 00:10:47,279
payloads our primary mission obviously

298
00:10:51,829 --> 00:10:49,120
is the flight test integrated flight

299
00:10:53,990 --> 00:10:51,839
test of orion and and the space launch

300
00:10:56,470 --> 00:10:54,000
system as well as the ground systems

301
00:10:58,870 --> 00:10:56,480
that support pre-launch and recovery

302
00:11:01,430 --> 00:10:58,880
we have selected 13 cubesats for for

303
00:11:04,230 --> 00:11:01,440
those uh mission

304
00:11:07,110 --> 00:11:04,240
we could select up to 17 we've got those

305
00:11:10,710 --> 00:11:07,120
positions we started with 11 and decided

306
00:11:12,310 --> 00:11:10,720
to we had sufficient resources uh to do

307
00:11:14,310 --> 00:11:12,320
13.

308
00:11:16,389 --> 00:11:14,320
working both within nasa and with our

309
00:11:19,430 --> 00:11:16,399
international partners as well as we

310
00:11:21,190 --> 00:11:19,440
made offers to uh

311
00:11:24,389 --> 00:11:21,200
the intelligence community and because

312
00:11:27,670 --> 00:11:24,399
of our trajectory toward the moon uh

313
00:11:29,750 --> 00:11:27,680

they declined that uh that offer

314
00:11:31,910 --> 00:11:29,760
exploration systems development internal

315
00:11:33,670 --> 00:11:31,920
to my organization conducted a

316
00:11:36,310 --> 00:11:33,680
feasibility study of all the candidates

317
00:11:37,910 --> 00:11:36,320
and we had more than 13

318
00:11:40,870 --> 00:11:37,920
proposed

319
00:11:44,069 --> 00:11:40,880
looking at the mission profile and

320
00:11:45,670 --> 00:11:44,079
and they down selected to these 13

321
00:11:47,670 --> 00:11:45,680
presented them to me

322
00:11:49,990 --> 00:11:47,680
for approval which i did and then we

323
00:11:52,870 --> 00:11:50,000
took them to our uh agency flight

324
00:11:55,190 --> 00:11:52,880
planning board uh recently and uh had

325
00:11:57,350 --> 00:11:55,200
them approved for uh flight

326
00:12:00,150 --> 00:11:57,360
10 of the cubesats were selected from

327
00:12:01,990 --> 00:12:00,160
in-house through competitive processes

328
00:12:03,670 --> 00:12:02,000
such as the cubequest

329
00:12:05,910 --> 00:12:03,680
challenge and the next

330
00:12:08,069 --> 00:12:05,920
step broad area announcement

331
00:12:09,829 --> 00:12:08,079
three are international

332
00:12:12,150 --> 00:12:09,839
cubesats that we're looking at in

333
00:12:14,069 --> 00:12:12,160
negotiations today

334
00:12:16,790 --> 00:12:14,079
to get those on board we won't be

335
00:12:18,870 --> 00:12:16,800
talking about those today we'll find a

336
00:12:20,230 --> 00:12:18,880
future uh

337
00:12:22,389 --> 00:12:20,240
future

338
00:12:23,670 --> 00:12:22,399

occasion to celebrate those and announce

339
00:12:25,030 --> 00:12:23,680
those

340
00:12:26,550 --> 00:12:25,040
but each of these cubesats are

341
00:12:29,509 --> 00:12:26,560
complementary

342
00:12:31,509 --> 00:12:29,519
to our objectives for human exploration

343
00:12:34,949 --> 00:12:31,519
and objectives for

344
00:12:37,350 --> 00:12:34,959
em-1 kind of at a smaller level and they

345
00:12:39,350 --> 00:12:37,360
as dr newman said press

346
00:12:42,069 --> 00:12:39,360
technology and science and and provide

347
00:12:43,509 --> 00:12:42,079
us a capability that we might not other

348
00:12:45,509 --> 00:12:43,519
otherwise have

349
00:12:47,990 --> 00:12:45,519
exploration drives science and science

350
00:12:52,470 --> 00:12:48,000
drives exploration and technology so

351
00:12:54,150 --> 00:12:52,480
with that i'm going to pass it on to jim

352
00:12:56,310 --> 00:12:54,160
hi um

353
00:12:58,230 --> 00:12:56,320
science mission directorate is really

354
00:13:01,030 --> 00:12:58,240
excited to be part of this opportunity

355
00:13:03,910 --> 00:13:01,040
to fly cubesats on the sls

356
00:13:06,629 --> 00:13:03,920
today's cubesats represent a culmination

357
00:13:09,110 --> 00:13:06,639
of over 10 years of development mostly

358
00:13:11,190 --> 00:13:09,120
by the academic community

359
00:13:14,389 --> 00:13:11,200
the early missions that

360
00:13:15,750 --> 00:13:14,399
occurred back in the 2004-2005

361
00:13:18,389 --> 00:13:15,760
time frame

362
00:13:20,389 --> 00:13:18,399
were largely for educational purposes

363
00:13:21,430 --> 00:13:20,399

and when there was a science payload

364
00:13:23,350 --> 00:13:21,440
they

365
00:13:24,870 --> 00:13:23,360
tended to be somewhat pedestrian in

366
00:13:27,190 --> 00:13:24,880
nature

367
00:13:30,230 --> 00:13:27,200
today we have a convergence of the

368
00:13:33,670 --> 00:13:30,240
technology for miniaturization of

369
00:13:35,509 --> 00:13:33,680
instruments and also advancements in

370
00:13:37,190 --> 00:13:35,519
platform capabilities

371
00:13:40,310 --> 00:13:37,200
that have come together that have really

372
00:13:42,550 --> 00:13:40,320
enabled us to have a new

373
00:13:44,790 --> 00:13:42,560
science platform

374
00:13:47,189 --> 00:13:44,800
cubesats and other types of small

375
00:13:50,949 --> 00:13:47,199
satellites offer

376
00:13:52,870 --> 00:13:50,959
new opportunities for researchers to

377
00:13:54,870 --> 00:13:52,880
place their instruments in space and

378
00:13:57,670 --> 00:13:54,880
we're not talking about

379
00:13:59,509 --> 00:13:57,680
investigators just at the large more

380
00:14:01,189 --> 00:13:59,519
familiar institutions we're really

381
00:14:04,230 --> 00:14:01,199
talking about

382
00:14:06,949 --> 00:14:04,240
new investigators from uh

383
00:14:09,750 --> 00:14:06,959
universities that have never before done

384
00:14:11,110 --> 00:14:09,760
business with nasa we're seeing this

385
00:14:14,069 --> 00:14:11,120
now in

386
00:14:17,590 --> 00:14:14,079
our our most recent solicitations

387
00:14:19,910 --> 00:14:17,600
so it's great to see uh young

388
00:14:21,350 --> 00:14:19,920

a very young and diverse set of

389
00:14:24,389 --> 00:14:21,360
researchers

390
00:14:26,629 --> 00:14:24,399
involved it it really does uh inspire

391
00:14:27,750 --> 00:14:26,639
the next generation

392
00:14:30,310 --> 00:14:27,760
um

393
00:14:32,629 --> 00:14:30,320
so in the science mission directorate we

394
00:14:33,750 --> 00:14:32,639
plan to continue to

395
00:14:36,310 --> 00:14:33,760
invest

396
00:14:38,150 --> 00:14:36,320
in technologies for miniaturization of

397
00:14:41,030 --> 00:14:38,160
science instruments through

398
00:14:42,230 --> 00:14:41,040
our dozen or so technology programs

399
00:14:44,790 --> 00:14:42,240
and also

400
00:14:47,189 --> 00:14:44,800
we will encourage the collection of

401
00:14:48,710 --> 00:14:47,199
scientific data from these observing

402
00:14:51,829 --> 00:14:48,720
platforms through

403
00:14:52,870 --> 00:14:51,839
uh our research solicitations

404
00:14:55,509 --> 00:14:52,880
um

405
00:14:57,990 --> 00:14:55,519
so today uh i just wanted to introduce

406
00:15:00,310 --> 00:14:58,000
two of our um

407
00:15:01,990 --> 00:15:00,320
or the two science payloads that will

408
00:15:04,470 --> 00:15:02,000
fly on the sls

409
00:15:06,550 --> 00:15:04,480
the first is the lunar hydrogen mapper

410
00:15:09,509 --> 00:15:06,560
or luna h map

411
00:15:12,550 --> 00:15:09,519
and the other is the uh

412
00:15:13,910 --> 00:15:12,560
cubesat mission for

413
00:15:17,189 --> 00:15:13,920

science

414
00:15:20,949 --> 00:15:17,199
for investigating solar particles

415
00:15:22,550 --> 00:15:20,959
the first mission is luna h map

416
00:15:24,710 --> 00:15:22,560
there's an image of it now on your

417
00:15:26,629 --> 00:15:24,720
screen

418
00:15:28,790 --> 00:15:26,639
if we could go back to the to the first

419
00:15:31,430 --> 00:15:28,800
image please that's it

420
00:15:33,749 --> 00:15:31,440
um so you can see that uh this is the

421
00:15:36,710 --> 00:15:33,759
entire spacecraft this is luna h map the

422
00:15:43,110 --> 00:15:36,720
size of a shoe box uh with the uh rather

423
00:15:47,110 --> 00:15:44,629
the purpose of the mission is to

424
00:15:49,749 --> 00:15:47,120
characterize the distribution of

425
00:15:52,150 --> 00:15:49,759
hydrogen that exists in the permanent

426
00:15:54,949 --> 00:15:52,160
shadows of the south pole of the moon

427
00:15:57,269 --> 00:15:54,959
and the craters and and on the plains

428
00:15:58,629 --> 00:15:57,279
um because of the investments we've made

429
00:16:01,110 --> 00:15:58,639
in technology

430
00:16:04,310 --> 00:16:01,120
uh this mission uh which will carry a

431
00:16:06,829 --> 00:16:04,320
neutron spectrometer uh and also

432
00:16:09,509 --> 00:16:06,839
an imager will give us

433
00:16:12,710 --> 00:16:09,519
unprecedented horizontal resolution of

434
00:16:15,030 --> 00:16:12,720
the distribution of hydrogen

435
00:16:17,110 --> 00:16:15,040
roughly seven and a half kilometers per

436
00:16:20,069 --> 00:16:17,120
pixel is what we're expecting

437
00:16:23,990 --> 00:16:20,079
and if you could go to the next chart

438
00:16:25,509 --> 00:16:24,000

you'll see the planned orbits in the

439
00:16:26,310 --> 00:16:25,519
in the red

440
00:16:32,150 --> 00:16:26,320
the

441
00:16:34,629 --> 00:16:32,160
that has a dozen or so

442
00:16:35,670 --> 00:16:34,639
miniature thrusters to provide attitude

443
00:16:39,670 --> 00:16:35,680
control

444
00:16:44,710 --> 00:16:39,680
this will give us more than 140 orbits

445
00:16:46,870 --> 00:16:44,720
over its planned 60-day life cycle

446
00:16:49,350 --> 00:16:46,880
there'll be a vertex 5 field

447
00:16:51,509 --> 00:16:49,360
programmable gate array processor for

448
00:16:54,470 --> 00:16:51,519
the science data processing

449
00:16:56,470 --> 00:16:54,480
and they're going to be using jpl's iris

450
00:16:59,350 --> 00:16:56,480
x-band radio for

451
00:17:02,230 --> 00:16:59,360
downlink communications so it really is

452
00:17:03,829 --> 00:17:02,240
a convergence of a lot of technologies

453
00:17:05,510 --> 00:17:03,839
the neutron spectrometer was

454
00:17:07,350 --> 00:17:05,520
miniaturized and these platform

455
00:17:10,069 --> 00:17:07,360
technologies to provide the

456
00:17:12,309 --> 00:17:10,079
communications and the um

457
00:17:14,309 --> 00:17:12,319
the thermal control all of these things

458
00:17:16,549 --> 00:17:14,319
have come together to give us

459
00:17:19,029 --> 00:17:16,559
a very cost effective

460
00:17:21,669 --> 00:17:19,039
science mission

461
00:17:26,549 --> 00:17:24,150
the next mission on the next chart

462
00:17:28,470 --> 00:17:26,559
is uh cusp this is a

463
00:17:31,190 --> 00:17:28,480

also a 6u

464
00:17:33,750 --> 00:17:31,200
cubesat so it's 2 is roughly the size of

465
00:17:35,510 --> 00:17:33,760
a of a shoe box

466
00:17:38,390 --> 00:17:35,520
cusp will study the this is a

467
00:17:40,390 --> 00:17:38,400
heliophysics mission this will study the

468
00:17:43,350 --> 00:17:40,400
characteristics of solar and

469
00:17:45,909 --> 00:17:43,360
interplanetary particles and will also

470
00:17:47,669 --> 00:17:45,919
contribute to our knowledge of space

471
00:17:51,750 --> 00:17:47,679
weather forecasting

472
00:17:54,390 --> 00:17:51,760
by by examining uh super thermal

473
00:17:55,350 --> 00:17:54,400
particles and to better understand their

474
00:17:59,190 --> 00:17:55,360
role

475
00:18:00,390 --> 00:17:59,200
in contributing to geomagnetic storms

476
00:18:03,190 --> 00:18:00,400
this

477
00:18:05,909 --> 00:18:03,200
mission contains three instruments

478
00:18:08,230 --> 00:18:05,919
the suprathermal ion spectrograph and

479
00:18:10,789 --> 00:18:08,240
the miniaturized electron proton

480
00:18:13,270 --> 00:18:10,799
telescope these two instruments will

481
00:18:15,750 --> 00:18:13,280
characterize the energy levels of these

482
00:18:17,750 --> 00:18:15,760
particles at different uh different

483
00:18:20,070 --> 00:18:17,760
portions of the energy spectrum

484
00:18:23,110 --> 00:18:20,080
and also a vector helium magnetometer to

485
00:18:25,190 --> 00:18:23,120
help characterize the magnetic fields so

486
00:18:27,110 --> 00:18:25,200
both of these are

487
00:18:30,230 --> 00:18:27,120
highly cost effective scientific

488
00:18:33,590 --> 00:18:30,240

missions that are enabled by our

489
00:18:35,350 --> 00:18:33,600
investments in technology and also by

490
00:18:36,390 --> 00:18:35,360
the contributions from our academic

491
00:18:39,750 --> 00:18:36,400
community

492
00:18:43,029 --> 00:18:40,830
good

493
00:18:45,990 --> 00:18:43,039
morning have the privilege of

494
00:18:48,549 --> 00:18:46,000
administering the cube quest challenge

495
00:18:51,110 --> 00:18:48,559
cubequest challenge is stmd's centennial

496
00:18:54,070 --> 00:18:51,120
challenge program's first ever in space

497
00:18:56,150 --> 00:18:54,080
competition for prizes

498
00:18:58,950 --> 00:18:56,160
the contest is open to any

499
00:19:01,590 --> 00:18:58,960
non-government u.s based team that

500
00:19:03,830 --> 00:19:01,600
chooses to enter at no cost

501
00:19:05,510 --> 00:19:03,840
the teams will compete through a series

502
00:19:06,950 --> 00:19:05,520
of events on the ground that we call

503
00:19:07,830 --> 00:19:06,960
ground tournaments

504
00:19:09,669 --> 00:19:07,840
and

505
00:19:12,470 --> 00:19:09,679
the team selected a ground tournament

506
00:19:14,230 --> 00:19:12,480
four will be offered a free ride on the

507
00:19:15,669 --> 00:19:14,240
em1 launch

508
00:19:19,190 --> 00:19:15,679
there are three slots that have been

509
00:19:19,909 --> 00:19:19,200
allocated to the cube quest challenge

510
00:19:21,909 --> 00:19:19,919
the

511
00:19:23,510 --> 00:19:21,919
two years events of events that leading

512
00:19:25,029 --> 00:19:23,520
up to the launch are called ground

513
00:19:26,870 --> 00:19:25,039

tournaments

514
00:19:29,110 --> 00:19:26,880
coincidentally ground tournament two

515
00:19:31,110 --> 00:19:29,120
registration deadline is this friday

516
00:19:33,110 --> 00:19:31,120
february 5th

517
00:19:35,190 --> 00:19:33,120
during the ground tournaments the teams

518
00:19:37,590 --> 00:19:35,200
are judged by a panel of judges for

519
00:19:41,029 --> 00:19:37,600
technical excellence and compliance with

520
00:19:43,110 --> 00:19:41,039
the challenge rules and requirements

521
00:19:44,390 --> 00:19:43,120
and

522
00:19:46,470 --> 00:19:44,400
there are

523
00:19:48,710 --> 00:19:46,480
four of these ground tournament events

524
00:19:52,310 --> 00:19:48,720
leading up to the down select for the

525
00:19:55,110 --> 00:19:52,320
three that will be chosen to launch

526
00:19:57,909 --> 00:19:55,120
at after launch this fund doesn't end

527
00:20:00,630 --> 00:19:57,919
there the cubesats once dispensed in a

528
00:20:03,270 --> 00:20:00,640
translunar injection trajectory

529
00:20:05,669 --> 00:20:03,280
will go on to compete for in-space

530
00:20:09,029 --> 00:20:05,679
prizes and this is the first ever in

531
00:20:11,110 --> 00:20:09,039
space challenge offered by nasa

532
00:20:12,710 --> 00:20:11,120
those teams that elect to enter lunar

533
00:20:17,270 --> 00:20:12,720
orbit

534
00:20:19,590 --> 00:20:17,280
win a share of one and a half million

535
00:20:21,110 --> 00:20:19,600
dollars prize

536
00:20:22,070 --> 00:20:21,120
some teams and if you go to the next

537
00:20:23,830 --> 00:20:22,080
slide

538
00:20:26,310 --> 00:20:23,840

rather than going to lunar orbit they

539
00:20:28,630 --> 00:20:26,320
can proceed on to a range from earth of

540
00:20:31,110 --> 00:20:28,640
4 million kilometers now that's more

541
00:20:33,430 --> 00:20:31,120
than 10 times the distance between the

542
00:20:35,270 --> 00:20:33,440
earth and the moon

543
00:20:37,510 --> 00:20:35,280
we call the

544
00:20:39,669 --> 00:20:37,520
this the deep space derby

545
00:20:41,350 --> 00:20:39,679
going to 4 million kilometers as opposed

546
00:20:43,430 --> 00:20:41,360
to getting into lunar orbit which we

547
00:20:45,110 --> 00:20:43,440
call the lunar derby

548
00:20:47,350 --> 00:20:45,120
now whether in the lunar derby or the

549
00:20:49,990 --> 00:20:47,360
deep space derby from lunar orbit or

550
00:20:52,549 --> 00:20:50,000
from 4 million kilometers the teams then

551
00:20:55,110 --> 00:20:52,559
proceed to compete for accomplishments

552
00:20:58,230 --> 00:20:55,120
in communications achievements

553
00:21:04,789 --> 00:20:58,240
and for longevity the last cubesat we

554
00:21:07,669 --> 00:21:05,590
there's

555
00:21:10,230 --> 00:21:07,679
a total of five million dollars prizes

556
00:21:12,149 --> 00:21:10,240
that will be awarded in the sen in the

557
00:21:15,029 --> 00:21:12,159
cube quest challenge

558
00:21:16,070 --> 00:21:15,039
and in order to win those prizes

559
00:21:18,789 --> 00:21:16,080
our teams are going to have to

560
00:21:20,230 --> 00:21:18,799
demonstrate advancements in propulsions

561
00:21:22,390 --> 00:21:20,240
capabilities

562
00:21:24,870 --> 00:21:22,400
communications technology

563
00:21:27,350 --> 00:21:24,880

and in order to navigate around the moon

564
00:21:28,950 --> 00:21:27,360
or distances of 4 million kilometers

565
00:21:31,110 --> 00:21:28,960
these little cube sets that are

566
00:21:33,590 --> 00:21:31,120
briefcase sized are going to have to

567
00:21:37,110 --> 00:21:33,600
advance their capabilities in autonomous

568
00:21:38,950 --> 00:21:37,120
operations and power management and

569
00:21:41,510 --> 00:21:38,960
navigation beyond

570
00:21:43,669 --> 00:21:41,520
the constraints of low earth orbit

571
00:21:45,830 --> 00:21:43,679
these are the kinds of capabilities that

572
00:21:48,230 --> 00:21:45,840
cubesats are going to need as nasa

573
00:21:50,070 --> 00:21:48,240
proceeds on its journey to mars

574
00:21:51,669 --> 00:21:50,080
the capabilities that our teams are

575
00:21:53,669 --> 00:21:51,679
advancing

576
00:21:55,909 --> 00:21:53,679
some teams are proposing doing laser

577
00:21:58,630 --> 00:21:55,919
communications from long distances other

578
00:22:00,630 --> 00:21:58,640
teams are advancing electric propulsion

579
00:22:02,390 --> 00:22:00,640
perhaps solar sails

580
00:22:04,470 --> 00:22:02,400
new kinds of electric propulsion new

581
00:22:06,230 --> 00:22:04,480
kinds of chemical propulsion these are

582
00:22:08,950 --> 00:22:06,240
the kinds of capabilities that cubesats

583
00:22:10,950 --> 00:22:08,960
will need to be precursors for

584
00:22:13,190 --> 00:22:10,960
mars missions in the future or for

585
00:22:15,029 --> 00:22:13,200
exploration man's exploration and deep

586
00:22:17,590 --> 00:22:15,039
space

587
00:22:19,669 --> 00:22:17,600
and because by virtue of being small

588
00:22:22,230 --> 00:22:19,679

lightweight and made

589
00:22:24,710 --> 00:22:22,240
of affordable parts we can accomplish

590
00:22:28,149 --> 00:22:24,720
nasa's future science and exploration

591
00:22:30,070 --> 00:22:28,159
missions more affordably with cubesats

592
00:22:32,310 --> 00:22:30,080
currently in the ground tournaments we

593
00:22:33,909 --> 00:22:32,320
have 12 teams registered

594
00:22:36,549 --> 00:22:33,919
two-thirds of those teams are from

595
00:22:37,750 --> 00:22:36,559
universities one-third are from small

596
00:22:39,669 --> 00:22:37,760
businesses

597
00:22:41,909 --> 00:22:39,679
in ground tournament one we even had one

598
00:22:43,750 --> 00:22:41,919
team that was a high school team

599
00:22:45,990 --> 00:22:43,760
and one of our teams is a single

600
00:22:48,070 --> 00:22:46,000
individual retired engineer

601
00:22:52,549 --> 00:22:48,080
so the competition is open to anyone who

602
00:22:55,270 --> 00:22:52,559
chooses to enter at no cost to the teams

603
00:22:57,750 --> 00:22:55,280
our cubequest challenge teams are they

604
00:23:00,230 --> 00:22:57,760
we consider them citizen inventors and

605
00:23:01,750 --> 00:23:00,240
we're excited to see how they're pushing

606
00:23:04,630 --> 00:23:01,760
the state of the art of these small

607
00:23:06,789 --> 00:23:04,640
satellites and we know that the teams

608
00:23:10,470 --> 00:23:06,799
are excited to contribute to

609
00:23:13,909 --> 00:23:10,480
nasa's exploration goals for science and

610
00:23:18,230 --> 00:23:13,919
for a future journey to mars

611
00:23:20,630 --> 00:23:19,510
in order to

612
00:23:22,549 --> 00:23:20,640
enable

613
00:23:25,029 --> 00:23:22,559

future missions that are robust and

614
00:23:27,750 --> 00:23:25,039
sustainable we need to have a good idea

615
00:23:29,110 --> 00:23:27,760
of what our destination looks like

616
00:23:31,110 --> 00:23:29,120
to that end

617
00:23:33,430 --> 00:23:31,120
we develop strategic knowledge gaps

618
00:23:34,789 --> 00:23:33,440
which is more or less a repository of

619
00:23:37,909 --> 00:23:34,799
information

620
00:23:39,750 --> 00:23:37,919
that you need of your destinations based

621
00:23:42,470 --> 00:23:39,760
on what we know today

622
00:23:44,149 --> 00:23:42,480
the next five cubesats i'm going to talk

623
00:23:46,630 --> 00:23:44,159
about address

624
00:23:50,630 --> 00:23:46,640
these knowledge gaps that

625
00:23:55,669 --> 00:23:50,640
we need to find out more about and

626
00:24:01,909 --> 00:23:58,390
so behind me you see a

627
00:24:05,750 --> 00:24:01,919
solar sail this is half size sale

628
00:24:08,070 --> 00:24:05,760
which will actually propel uh a cubesat

629
00:24:10,789 --> 00:24:08,080
to an asteroid

630
00:24:12,549 --> 00:24:10,799
this this particular uh mission is

631
00:24:13,510 --> 00:24:12,559
called the near-earth asteroid scout

632
00:24:15,669 --> 00:24:13,520
mission

633
00:24:18,390 --> 00:24:15,679
which will go and do a reconnaissance

634
00:24:20,950 --> 00:24:18,400
mission with with an asteroid about 100

635
00:24:22,950 --> 00:24:20,960
meters in diameter

636
00:24:25,029 --> 00:24:22,960
while it photographs it we will get an

637
00:24:27,430 --> 00:24:25,039
understanding of what is the surface

638
00:24:29,590 --> 00:24:27,440

characterization what is the morphology

639
00:24:30,870 --> 00:24:29,600
asteroids have a spin rate which we need

640
00:24:33,190 --> 00:24:30,880
to understand

641
00:24:34,630 --> 00:24:33,200
what is the dust or the debris that it

642
00:24:37,510 --> 00:24:34,640
emits out

643
00:24:40,149 --> 00:24:37,520
all these things actually will help us

644
00:24:42,310 --> 00:24:40,159
design future human spacecrafts that

645
00:24:45,190 --> 00:24:42,320
will afford us a safe mission

646
00:24:46,870 --> 00:24:45,200
so this acts as a precursor scout

647
00:24:50,470 --> 00:24:46,880
mission in order to

648
00:24:53,590 --> 00:24:50,480
understand and reduce our uncertainty in

649
00:24:57,190 --> 00:24:53,600
actually enabling a human mission

650
00:25:00,870 --> 00:24:59,830
one of the biggest problems of deep

651
00:25:02,470 --> 00:25:00,880
space

652
00:25:04,470 --> 00:25:02,480
human missions that would we would

653
00:25:05,750 --> 00:25:04,480
encounter is radiation

654
00:25:07,750 --> 00:25:05,760
we haven't gone

655
00:25:10,870 --> 00:25:07,760
beyond the low earth orbit in the last

656
00:25:15,590 --> 00:25:13,029
this particular cubesat mission which is

657
00:25:18,230 --> 00:25:15,600
called a biosentinel and

658
00:25:20,070 --> 00:25:18,240
it it will be a 18-month long mission

659
00:25:22,710 --> 00:25:20,080
into deep space

660
00:25:25,029 --> 00:25:22,720
it will carry with it

661
00:25:27,590 --> 00:25:25,039
genetically modified yeast

662
00:25:30,149 --> 00:25:27,600
just like the baker's yeast you use

663
00:25:31,750 --> 00:25:30,159

and with with media we will activate it

664
00:25:33,990 --> 00:25:31,760
periodically

665
00:25:36,470 --> 00:25:34,000
and see the effect of the radiation

666
00:25:39,110 --> 00:25:36,480
damage both the solar particles and the

667
00:25:41,430 --> 00:25:39,120
galactic cosmic rays

668
00:25:43,269 --> 00:25:41,440
this also carries a miniaturized sensor

669
00:25:45,830 --> 00:25:43,279
which not only tells you how much

670
00:25:47,750 --> 00:25:45,840
radiation you got hit by but what kind

671
00:25:49,990 --> 00:25:47,760
of radiation

672
00:25:51,990 --> 00:25:50,000
how does that help us understanding that

673
00:25:54,310 --> 00:25:52,000
radiation damage will help us develop

674
00:25:56,950 --> 00:25:54,320
preventive strategies for future human

675
00:25:58,710 --> 00:25:56,960
missions to enable safe human space

676
00:26:01,350 --> 00:25:58,720
flight

677
00:26:03,269 --> 00:26:01,360
next one please

678
00:26:05,269 --> 00:26:03,279
you see another lunar mission here and

679
00:26:07,510 --> 00:26:05,279
let me just give you a context my

680
00:26:08,789 --> 00:26:07,520
colleague mr c bloom talked about a

681
00:26:12,789 --> 00:26:08,799
lunar mission

682
00:26:14,470 --> 00:26:12,799
before the lunar corners reconnaissance

683
00:26:19,029 --> 00:26:14,480
orbiter the chandrayaan mission with

684
00:26:21,110 --> 00:26:19,039
india selena mission with japan we had a

685
00:26:22,950 --> 00:26:21,120
clementine mission before that so one

686
00:26:24,310 --> 00:26:22,960
would naturally ask why so many lunar

687
00:26:26,950 --> 00:26:24,320
missions what are you trying to glean

688
00:26:28,310 --> 00:26:26,960

through all those missions had

689
00:26:30,789 --> 00:26:28,320
instruments that

690
00:26:32,230 --> 00:26:30,799
help us understand the water or the

691
00:26:33,990 --> 00:26:32,240
hydroxide

692
00:26:35,990 --> 00:26:34,000
characterization

693
00:26:38,230 --> 00:26:36,000
these cubesats that i'm going to talk

694
00:26:39,190 --> 00:26:38,240
about with the one which dr c bloom and

695
00:26:41,269 --> 00:26:39,200
this one

696
00:26:43,909 --> 00:26:41,279
this is called the lunar flashlight

697
00:26:45,430 --> 00:26:43,919
which has actually lasers in a very

698
00:26:47,909 --> 00:26:45,440
narrow bandwidth

699
00:26:49,430 --> 00:26:47,919
it will make several passes around the

700
00:26:51,590 --> 00:26:49,440
moon and

701
00:26:54,070 --> 00:26:51,600
look for

702
00:26:55,110 --> 00:26:54,080
volatiles and water species in the cold

703
00:26:56,950 --> 00:26:55,120
wraps

704
00:26:59,430 --> 00:26:56,960
it will give us a very good map of what

705
00:27:02,470 --> 00:26:59,440
the speciation of that water is whether

706
00:27:05,510 --> 00:27:02,480
it's water ice whether it is

707
00:27:06,630 --> 00:27:05,520
water in a form that we can use

708
00:27:09,750 --> 00:27:06,640
and

709
00:27:12,149 --> 00:27:09,760
how it helps us is in a future mission

710
00:27:13,430 --> 00:27:12,159
we have to start living off the land

711
00:27:15,750 --> 00:27:13,440
where we go

712
00:27:18,389 --> 00:27:15,760
so it helps us in you

713
00:27:21,350 --> 00:27:18,399

mapping out sites for in-situ resource

714
00:27:23,909 --> 00:27:21,360
utilization

715
00:27:28,630 --> 00:27:23,919
next one please

716
00:27:30,470 --> 00:27:28,640
we challenged industry and academia

717
00:27:32,870 --> 00:27:30,480
and this was a new way of doing business

718
00:27:34,710 --> 00:27:32,880
for nasa through our next step broad

719
00:27:37,029 --> 00:27:34,720
agency announcement where we we

720
00:27:39,190 --> 00:27:37,039
challenge the partners hey you do your

721
00:27:40,950 --> 00:27:39,200
own internal research and development

722
00:27:44,950 --> 00:27:40,960
and then we will take it

723
00:27:46,710 --> 00:27:44,960
with nasa in order to affect the mission

724
00:27:47,990 --> 00:27:46,720
the mission you see here is lockheed

725
00:27:49,750 --> 00:27:48,000
martin's

726
00:27:51,590 --> 00:27:49,760
through their own internal

727
00:27:52,950 --> 00:27:51,600
research and development activities they

728
00:27:55,430 --> 00:27:52,960
developed a

729
00:27:56,389 --> 00:27:55,440
cubesat which will do a lunar flyby and

730
00:27:58,630 --> 00:27:56,399
actually

731
00:28:00,950 --> 00:27:58,640
do a thermography and surface

732
00:28:04,230 --> 00:28:00,960
characterization after that one lunar

733
00:28:06,310 --> 00:28:04,240
flyby it does maneuvers which

734
00:28:08,070 --> 00:28:06,320
will address some of the uh strategic

735
00:28:10,230 --> 00:28:08,080
knowledge gaps that are pertinent to

736
00:28:12,870 --> 00:28:10,240
eventual mars mission

737
00:28:15,990 --> 00:28:12,880
next one please

738
00:28:17,269 --> 00:28:16,000

this is a lunar flashlight it

739
00:28:19,350 --> 00:28:17,279
also has

740
00:28:20,870 --> 00:28:19,360
mike talked of a neutron spectrometer

741
00:28:23,350 --> 00:28:20,880
and earlier mentioned of laser

742
00:28:26,630 --> 00:28:23,360
spectroscopy this has an infrared

743
00:28:28,950 --> 00:28:26,640
spectrometer which is very compact

744
00:28:30,870 --> 00:28:28,960
it's it's called the lunar ice cube

745
00:28:33,909 --> 00:28:30,880
development activity with guarded space

746
00:28:36,630 --> 00:28:33,919
flight led by morid state university

747
00:28:38,549 --> 00:28:36,640
busek and goddard space flight center

748
00:28:39,830 --> 00:28:38,559
this particular infrared spectrometer

749
00:28:42,149 --> 00:28:39,840
will

750
00:28:44,549 --> 00:28:42,159
actually help delineate

751
00:28:46,950 --> 00:28:44,559
the water species whether it's water

752
00:28:49,029 --> 00:28:46,960
water ice and

753
00:28:51,590 --> 00:28:49,039
and make several passes and make us help

754
00:28:53,830 --> 00:28:51,600
a composite mop so all these are

755
00:28:55,590 --> 00:28:53,840
complementary missions the missions

756
00:28:56,710 --> 00:28:55,600
which we talked about earlier which went

757
00:28:59,350 --> 00:28:56,720
to moon

758
00:29:00,950 --> 00:28:59,360
were sizes of refrigerators this is one

759
00:29:03,190 --> 00:29:00,960
of the compartments where you store

760
00:29:05,669 --> 00:29:03,200
vegetables in a refrigerator so that's

761
00:29:07,830 --> 00:29:05,679
the kind of scale with almost a similar

762
00:29:10,149 --> 00:29:07,840
capability and delineating more

763
00:29:12,070 --> 00:29:10,159

information thank you

764
00:29:14,149 --> 00:29:12,080
thank you all we will now open the

765
00:29:15,830 --> 00:29:14,159
program for questions i will rotate

766
00:29:17,510 --> 00:29:15,840
questions from those in the room and

767
00:29:19,590 --> 00:29:17,520
those on the phone as well as those

768
00:29:21,590 --> 00:29:19,600
submitting questions online using the

769
00:29:23,269 --> 00:29:21,600
hashtag asknasa

770
00:29:25,029 --> 00:29:23,279
for those here on site please raise your

771
00:29:27,909 --> 00:29:25,039
hand and someone with a mic will come to

772
00:29:30,149 --> 00:29:27,919
you please identify yourself by name and

773
00:29:32,789 --> 00:29:30,159
affiliation and indicate to whom your

774
00:29:35,029 --> 00:29:32,799
question is directed and please ask only

775
00:29:36,470 --> 00:29:35,039
one question each to allow everyone the

776
00:29:38,230 --> 00:29:36,480
opportunity to get their questions

777
00:29:41,430 --> 00:29:38,240
answered

778
00:29:43,510 --> 00:29:41,440
first question

779
00:29:45,350 --> 00:29:43,520
hi i'm josh barrett with channel 31 here

780
00:29:46,870 --> 00:29:45,360
in huntsville uh my question for you are

781
00:29:49,750 --> 00:29:46,880
you hoping to set a precedent with these

782
00:29:51,510 --> 00:29:49,760
13 cubesats on later exploration

783
00:29:53,110 --> 00:29:51,520
missions so when they're going further

784
00:29:55,430 --> 00:29:53,120
out into asteroids you could potentially

785
00:29:57,990 --> 00:29:55,440
even launch missions out towards those

786
00:30:01,510 --> 00:29:58,000
asteroids as well

787
00:30:04,310 --> 00:30:01,520
well i guess we could um you know we

788
00:30:06,549 --> 00:30:04,320

these cubesats don't weigh or don't have

789
00:30:07,590 --> 00:30:06,559
a great deal of mass and we believe

790
00:30:10,710 --> 00:30:07,600
we've got

791
00:30:12,789 --> 00:30:10,720
sufficient capability to to take them

792
00:30:15,430 --> 00:30:12,799
wherever we want

793
00:30:17,909 --> 00:30:15,440
limitations are right now we're putting

794
00:30:21,590 --> 00:30:17,919
these cubesats on the orion stage

795
00:30:23,669 --> 00:30:21,600
adapter which interfaces between

796
00:30:26,470 --> 00:30:23,679
the interim cryo propulsion system and

797
00:30:29,269 --> 00:30:26,480
the orion uh

798
00:30:32,950 --> 00:30:29,279
adapter or or interface

799
00:30:34,789 --> 00:30:32,960
so that's a nice easy interface

800
00:30:37,990 --> 00:30:34,799
that goes on a different trajectory than

801
00:30:40,789 --> 00:30:38,000
orion will will separate first and then

802
00:30:42,389 --> 00:30:40,799
and then deploy these uh cubesats

803
00:30:43,830 --> 00:30:42,399
we'll take a look at it

804
00:30:46,549 --> 00:30:43,840
one of the great things about this

805
00:30:49,029 --> 00:30:46,559
opportunity with e-m1 is

806
00:30:51,510 --> 00:30:49,039
we are for the first time going outside

807
00:30:53,669 --> 00:30:51,520
of low earth orbit we've deployed

808
00:30:55,590 --> 00:30:53,679
cubesats from iss and deployed cubesats

809
00:30:57,669 --> 00:30:55,600
from

810
00:30:59,190 --> 00:30:57,679
expendable launch vehicles

811
00:31:01,509 --> 00:30:59,200
this is the first time we're actually

812
00:31:03,830 --> 00:31:01,519
going beyond low earth orbit and being

813
00:31:05,990 --> 00:31:03,840

able to deploy those so we look forward

814
00:31:09,830 --> 00:31:06,000
to the future and potentially be able to

815
00:31:11,430 --> 00:31:09,840
do the same thing as we go further out

816
00:31:17,509 --> 00:31:11,440
thank you

817
00:31:17,519 --> 00:31:23,269
over here

818
00:31:27,029 --> 00:31:26,070
hi i'm lee roop with al.com here in

819
00:31:28,549 --> 00:31:27,039
huntsville thanks for coming to

820
00:31:31,750 --> 00:31:28,559
huntsville to do this just kind of

821
00:31:34,310 --> 00:31:31,760
follow up on what josh asked

822
00:31:36,310 --> 00:31:34,320
you know if you did do these on future

823
00:31:38,230 --> 00:31:36,320
missions

824
00:31:39,830 --> 00:31:38,240
is this something where young scientists

825
00:31:41,830 --> 00:31:39,840
can come up with their own ideas for

826
00:31:43,990 --> 00:31:41,840
what they would like to

827
00:31:46,630 --> 00:31:44,000
experiment on out in deep space or is

828
00:31:48,630 --> 00:31:46,640
this something where future missions

829
00:31:50,789 --> 00:31:48,640
would have to

830
00:31:53,590 --> 00:31:50,799
you know be related to strategic

831
00:31:56,070 --> 00:31:53,600
questions that nasa already has

832
00:31:58,070 --> 00:31:56,080
well i think i'll let my colleagues here

833
00:31:59,990 --> 00:31:58,080
talk to that as well but

834
00:32:02,310 --> 00:32:00,000
i think the way we approach it we give

835
00:32:03,909 --> 00:32:02,320
opportunities to almost anybody and come

836
00:32:05,909 --> 00:32:03,919
up with your own idea

837
00:32:07,830 --> 00:32:05,919
um we'll look at the compatibility with

838
00:32:09,350 --> 00:32:07,840

the mission but uh

839
00:32:12,149 --> 00:32:09,360
i'll let you all

840
00:32:13,990 --> 00:32:12,159
so nasa actually does that already we

841
00:32:16,710 --> 00:32:14,000
have something called the cubesat launch

842
00:32:19,509 --> 00:32:16,720
initiative where we look for

843
00:32:21,430 --> 00:32:19,519
a space on on spacecrafts that are going

844
00:32:24,789 --> 00:32:21,440
to different orbits

845
00:32:26,870 --> 00:32:24,799
and high school students

846
00:32:30,789 --> 00:32:26,880
universities they develop cubesats for

847
00:32:32,710 --> 00:32:30,799
that what what is different here is we

848
00:32:34,149 --> 00:32:32,720
have over the last couple of years

849
00:32:35,509 --> 00:32:34,159
developed capabilities for

850
00:32:37,029 --> 00:32:35,519
communications

851
00:32:39,430 --> 00:32:37,039
for uh

852
00:32:41,190 --> 00:32:39,440
you know the transponders the antennae

853
00:32:44,470 --> 00:32:41,200
the gimballed areas

854
00:32:46,950 --> 00:32:44,480
the propulsion systems here

855
00:32:49,269 --> 00:32:46,960
that will that is technology people can

856
00:32:51,269 --> 00:32:49,279
use now to go into deep space than just

857
00:32:53,750 --> 00:32:51,279
a low earth orbit and a mission of

858
00:32:56,230 --> 00:32:53,760
months maybe this will afford you years

859
00:32:58,630 --> 00:32:56,240
of observation

860
00:33:01,190 --> 00:32:58,640
so i just add to that yes um we're

861
00:33:02,710 --> 00:33:01,200
calling all uh young folks so uh the

862
00:33:04,549 --> 00:33:02,720
makers and and the dreamers you know

863
00:33:06,870 --> 00:33:04,559

think about your your good ideas it's

864
00:33:09,190 --> 00:33:06,880
perfect to start with this generation

865
00:33:11,110 --> 00:33:09,200
and uh from high school or beyond give

866
00:33:15,830 --> 00:33:11,120
us your good ideas and we'll try to

867
00:33:15,840 --> 00:33:20,710
next question

868
00:33:25,350 --> 00:33:23,029
uh scott johnson with the

869
00:33:27,509 --> 00:33:25,360
space side and space flight insider i

870
00:33:29,350 --> 00:33:27,519
know you have some models over here to

871
00:33:31,669 --> 00:33:29,360
one side of the stage

872
00:33:34,789 --> 00:33:31,679
i was just wondering if someone could

873
00:33:37,269 --> 00:33:34,799
maybe reference those and explain

874
00:33:39,350 --> 00:33:37,279
a little bit more about the deployment

875
00:33:41,430 --> 00:33:39,360
of the cubesats i mean what happens

876
00:33:43,269 --> 00:33:41,440
mechanically that sort of thing later

877
00:33:44,950 --> 00:33:43,279
we'll actually be talking about that

878
00:33:49,430 --> 00:33:44,960
exactly that in more detail in the

879
00:33:49,440 --> 00:33:54,549
any other questions in the room here

880
00:33:57,909 --> 00:33:55,830
all right we'll conclude our question

881
00:33:59,750 --> 00:33:57,919
and answer session for now we'll have a

882
00:37:42,550 --> 00:33:59,760
short video and then we'll continue with

883
00:37:45,589 --> 00:37:43,750
good morning

884
00:37:47,430 --> 00:37:45,599
i'm kim newton from the public affairs

885
00:37:49,670 --> 00:37:47,440
office at nasa's marshall space flight

886
00:37:51,510 --> 00:37:49,680
center i'd like to welcome everyone to

887
00:37:53,510 --> 00:37:51,520
the second part of our program where

888
00:37:55,829 --> 00:37:53,520

you'll learn more about the first flight

889
00:37:57,990 --> 00:37:55,839
of the space launch system and the 13

890
00:38:01,349 --> 00:37:58,000
payloads selected and how they will

891
00:38:03,829 --> 00:38:01,359
launch and deploy you'll also hear from

892
00:38:06,870 --> 00:38:03,839
experts about the near-earth asteroid

893
00:38:08,550 --> 00:38:06,880
project or nia scout and how this small

894
00:38:10,710 --> 00:38:08,560
satellite will reconnaissance an

895
00:38:13,270 --> 00:38:10,720
asteroid using a solar cell much like

896
00:38:16,150 --> 00:38:13,280
the giant one behind us and return that

897
00:38:17,829 --> 00:38:16,160
data back to scientists here on earth

898
00:38:20,230 --> 00:38:17,839
i'd like to start out by introducing our

899
00:38:21,589 --> 00:38:20,240
briefers today we have chris creverly to

900
00:38:24,069 --> 00:38:21,599
our far left

901
00:38:26,870 --> 00:38:24,079
chris is the manager of the spacecraft

902
00:38:29,030 --> 00:38:26,880
payload integration and evolution office

903
00:38:31,109 --> 00:38:29,040
for the space launch system at marshall

904
00:38:32,390 --> 00:38:31,119
space flight center here in huntsville

905
00:38:35,109 --> 00:38:32,400
alabama

906
00:38:37,190 --> 00:38:35,119
joining chris is leslie mcnutt

907
00:38:39,910 --> 00:38:37,200
leslie is the project manager for the

908
00:38:41,750 --> 00:38:39,920
nia scout project for the program for

909
00:38:42,630 --> 00:38:41,760
the flight programs and partnerships

910
00:38:44,069 --> 00:38:42,640
office

911
00:38:45,109 --> 00:38:44,079
also at the marshall center here in

912
00:38:48,150 --> 00:38:45,119
huntsville

913
00:38:50,390 --> 00:38:48,160

and next to leslie is les johnson les is

914
00:38:52,710 --> 00:38:50,400
the solar cell principal investigator

915
00:38:54,470 --> 00:38:52,720
for the nia scout project located at

916
00:38:56,630 --> 00:38:54,480
marshall also

917
00:38:59,109 --> 00:38:56,640
we'll hear opening remarks from chris

918
00:39:01,190 --> 00:38:59,119
leslie and les then we'll take questions

919
00:39:03,030 --> 00:39:01,200
from reporters in the audience

920
00:39:04,390 --> 00:39:03,040
next we'll take questions from reporters

921
00:39:06,950 --> 00:39:04,400
on the phone

922
00:39:09,510 --> 00:39:06,960
and you can also ask questions using the

923
00:39:11,510 --> 00:39:09,520
hashtag asknasa

924
00:39:13,910 --> 00:39:11,520
if you're following us on twitter now

925
00:39:14,790 --> 00:39:13,920
i'll turn it over to chris chris thank

926
00:39:18,310 --> 00:39:14,800
you kim

927
00:39:20,630 --> 00:39:18,320
so 14 months ago we sent orion on a test

928
00:39:22,069 --> 00:39:20,640
mission on the heaviest launch vehicle

929
00:39:24,630 --> 00:39:22,079
the most powerful launch vehicle that we

930
00:39:26,710 --> 00:39:24,640
had at the time the delta iv heavy that

931
00:39:29,750 --> 00:39:26,720
vehicle was able to carry orion to an

932
00:39:31,510 --> 00:39:29,760
orbit of 3 500 miles above the earth

933
00:39:33,589 --> 00:39:31,520
but now that we have the exploration

934
00:39:35,430 --> 00:39:33,599
class vehicle the space launch system

935
00:39:36,670 --> 00:39:35,440
we're actually going to take orion

936
00:39:39,990 --> 00:39:36,680
beyond the moon

937
00:39:42,150 --> 00:39:40,000
275 000 miles away from the earth

938
00:39:44,390 --> 00:39:42,160

to a place that we haven't been in years

939
00:39:45,190 --> 00:39:44,400
actually beyond where humans have ever

940
00:39:47,589 --> 00:39:45,200
been

941
00:39:50,150 --> 00:39:47,599
and with this capability we actually

942
00:39:52,710 --> 00:39:50,160
have more capacity on this spacecraft

943
00:39:55,349 --> 00:39:52,720
and so engineers were able to say we can

944
00:39:57,349 --> 00:39:55,359
outfit this vehicle and carry more more

945
00:39:59,349 --> 00:39:57,359
science more payloads along with us and

946
00:40:01,270 --> 00:39:59,359
that's where we are today we've been

947
00:40:02,550 --> 00:40:01,280
looking forward to this day for some

948
00:40:04,309 --> 00:40:02,560
time we've been working behind the

949
00:40:06,470 --> 00:40:04,319
scenes to come up with these these

950
00:40:08,790 --> 00:40:06,480
cubesats and offer these opportunities

951
00:40:11,750 --> 00:40:08,800
and it's this is unprecedented to take a

952
00:40:14,470 --> 00:40:11,760
cubesat class payload thousands of miles

953
00:40:16,710 --> 00:40:14,480
away from the earth out into deep space

954
00:40:19,349 --> 00:40:16,720
and to actually conduct science but even

955
00:40:21,510 --> 00:40:19,359
with these small payloads we're starting

956
00:40:23,430 --> 00:40:21,520
to pave the way for payloads that are

957
00:40:24,790 --> 00:40:23,440
small and large to go on the space

958
00:40:27,670 --> 00:40:24,800
launch system

959
00:40:29,589 --> 00:40:27,680
so it takes a very large rocket to to to

960
00:40:30,790 --> 00:40:29,599
get that energy to go all the way out to

961
00:40:33,109 --> 00:40:30,800
deep space

962
00:40:36,230 --> 00:40:33,119
so the rocket itself the space launch

963
00:40:38,630 --> 00:40:36,240

system is 323 feet tall about 10 feet

964
00:40:41,030 --> 00:40:38,640
shorter than the saturn v but 20 percent

965
00:40:43,349 --> 00:40:41,040
more more thrust than the saturn v

966
00:40:45,750 --> 00:40:43,359
rocket had with apollo and it starts at

967
00:40:48,150 --> 00:40:45,760
the bottom with the four hydrogen oxygen

968
00:40:50,550 --> 00:40:48,160
engines the rs25s

969
00:40:53,030 --> 00:40:50,560
the solid rocket boosters five segment

970
00:40:55,589 --> 00:40:53,040
boosters both of which we derived from

971
00:40:58,309 --> 00:40:55,599
the space shuttle program to to bring to

972
00:41:01,030 --> 00:40:58,319
the space launch system a brand new core

973
00:41:02,870 --> 00:41:01,040
stage 220 feet tall and then hiding

974
00:41:04,630 --> 00:41:02,880
behind this cone is an upper stage

975
00:41:05,670 --> 00:41:04,640
called the interim cryogenic propulsion

976
00:41:08,069 --> 00:41:05,680
stage

977
00:41:10,069 --> 00:41:08,079
and you see the orion vehicle of course

978
00:41:12,309 --> 00:41:10,079
here the service module and underneath

979
00:41:14,230 --> 00:41:12,319
the shroud of the orion vehicle and what

980
00:41:16,550 --> 00:41:14,240
connects it is a five foot segment

981
00:41:18,309 --> 00:41:16,560
called the orion stage adapter and in

982
00:41:20,150 --> 00:41:18,319
that five foot segment and it's mocked

983
00:41:22,069 --> 00:41:20,160
up right here and this is full scale

984
00:41:25,030 --> 00:41:22,079
this is what you would see if you were

985
00:41:28,470 --> 00:41:25,040
standing inside the orion stage adapter

986
00:41:31,829 --> 00:41:28,480
5 feet tall 18 feet in diameter and this

987
00:41:33,030 --> 00:41:31,839
is a full-scale deployer of of the

988
00:41:35,430 --> 00:41:33,040

cubesats

989
00:41:38,309 --> 00:41:35,440
and you can see in the model we had room

990
00:41:40,550 --> 00:41:38,319
within the orion stage adapter to put 13

991
00:41:42,710 --> 00:41:40,560
of these cubesats in and then one extra

992
00:41:44,790 --> 00:41:42,720
spot for the avionics deployer

993
00:41:47,829 --> 00:41:44,800
and that's what we're going to be taking

994
00:41:50,790 --> 00:41:47,839
up into the deep space now this is the

995
00:41:51,910 --> 00:41:50,800
second of the orion stage adapters

996
00:41:53,270 --> 00:41:51,920
actually built right here at the

997
00:41:54,550 --> 00:41:53,280
marshall space flight center about three

998
00:41:57,750 --> 00:41:54,560
blocks away

999
00:42:00,470 --> 00:41:57,760
so the first one flew on eft-1 14 months

1000
00:42:03,430 --> 00:42:00,480
ago connecting orion to the delta iv

1001
00:42:04,710 --> 00:42:03,440
launch vehicle so this vehicle and

1002
00:42:06,390 --> 00:42:04,720
everything that you're seeing here

1003
00:42:07,589 --> 00:42:06,400
things that we're starting to produce

1004
00:42:08,950 --> 00:42:07,599
right here

1005
00:42:11,270 --> 00:42:08,960
but i want to talk to you a little bit

1006
00:42:13,109 --> 00:42:11,280
about the exploration mission one

1007
00:42:14,870 --> 00:42:13,119
and let's i think we have a short video

1008
00:42:18,950 --> 00:42:14,880
that we can show and depict what that

1009
00:42:26,230 --> 00:42:20,630
so the vehicle blasts off all four

1010
00:42:30,710 --> 00:42:28,230
the boosters as they did on shuttle burn

1011
00:42:34,309 --> 00:42:30,720
for about two and a half minutes

1012
00:42:40,950 --> 00:42:35,910
the core stage carries the entire

1013
00:42:45,589 --> 00:42:43,030

as main engine cut off

1014
00:42:47,030 --> 00:42:45,599
the the spacecraft will depart

1015
00:42:48,870 --> 00:42:47,040
and then the interim cryogenic

1016
00:42:51,190 --> 00:42:48,880
propulsion stage will light its rl1

1017
00:42:54,150 --> 00:42:51,200
engine sending the spacecraft on into

1018
00:42:55,990 --> 00:42:54,160
deep space on towards the moon

1019
00:42:57,670 --> 00:42:56,000
about 11 minutes later

1020
00:43:00,309 --> 00:42:57,680
the engine will cut off

1021
00:43:02,150 --> 00:43:00,319
will it orion know that it's safe to to

1022
00:43:03,990 --> 00:43:02,160
to separate

1023
00:43:06,150 --> 00:43:04,000
they will separate on their own power

1024
00:43:08,069 --> 00:43:06,160
and about 30 minutes later

1025
00:43:11,030 --> 00:43:08,079
we will start doing a disposal burn with

1026
00:43:15,109 --> 00:43:13,030
once it gets to a safe distance then

1027
00:43:16,630 --> 00:43:15,119
we'll the avionics deployer will turn on

1028
00:43:18,309 --> 00:43:16,640
and it will start deploying each of

1029
00:43:20,150 --> 00:43:18,319
these cubesats

1030
00:43:22,470 --> 00:43:20,160
one at a time with a little spring

1031
00:43:24,550 --> 00:43:22,480
ejection system to come outside of the

1032
00:43:29,910 --> 00:43:24,560
system and you're seeing right now where

1033
00:43:34,069 --> 00:43:32,309
once these systems deploy they get a

1034
00:43:36,069 --> 00:43:34,079
safe distance away from each other and

1035
00:43:38,710 --> 00:43:36,079
from the upper stage some of them will

1036
00:43:40,069 --> 00:43:38,720
turn on some novel propulsion like solar

1037
00:43:41,829 --> 00:43:40,079
cells like you see behind me and you'll

1038
00:43:43,910 --> 00:43:41,839

hear more about

1039
00:43:45,910 --> 00:43:43,920
some of these will go around the moon

1040
00:43:47,349 --> 00:43:45,920
one will actually go to an asteroid and

1041
00:43:50,069 --> 00:43:47,359
others will be studying the environment

1042
00:43:53,270 --> 00:43:50,079
around deep space

1043
00:43:54,950 --> 00:43:53,280
but we have worked in this field

1044
00:43:56,390 --> 00:43:54,960
for several several years the marshall

1045
00:43:57,750 --> 00:43:56,400
space flight center has been leaders in

1046
00:43:59,589 --> 00:43:57,760
working with science and technology

1047
00:44:01,829 --> 00:43:59,599
payloads and taking those up on the

1048
00:44:04,150 --> 00:44:01,839
space shuttle in the space station

1049
00:44:06,069 --> 00:44:04,160
and the space launch system program

1050
00:44:07,109 --> 00:44:06,079
asked some experts in the field our

1051
00:44:09,030 --> 00:44:07,119
flight

1052
00:44:10,790 --> 00:44:09,040
programs and partnerships office to

1053
00:44:12,630 --> 00:44:10,800
integrate this for us and they've been

1054
00:44:14,630 --> 00:44:12,640
doing so so i'm going to introduce you

1055
00:44:16,550 --> 00:44:14,640
to leslie mcnutt who is one of those

1056
00:44:17,829 --> 00:44:16,560
experts she's the project manager for

1057
00:44:19,589 --> 00:44:17,839
nia scout and she's going to tell you

1058
00:44:20,470 --> 00:44:19,599
more about her mission leslie thanks

1059
00:44:22,309 --> 00:44:20,480
chris

1060
00:44:24,230 --> 00:44:22,319
so near earth asteroid scout or nia

1061
00:44:28,069 --> 00:44:24,240
scout one of the 13 payloads that are

1062
00:44:31,270 --> 00:44:28,079
hitching a ride on sls so nia scout just

1063
00:44:33,030 --> 00:44:31,280

like you've heard is a 6u cubesat it's

1064
00:44:35,030 --> 00:44:33,040
about the size of a large shoebox and

1065
00:44:37,510 --> 00:44:35,040
will weigh no more than 30 pounds so

1066
00:44:39,030 --> 00:44:37,520
within that constraint is a fully

1067
00:44:40,230 --> 00:44:39,040
functioning spacecraft it's pretty

1068
00:44:42,790 --> 00:44:40,240
incredible

1069
00:44:46,150 --> 00:44:42,800
and so you can imagine volume and mass

1070
00:44:47,990 --> 00:44:46,160
are quite precious in that small area so

1071
00:44:49,750 --> 00:44:48,000
it's it's the most complicated game of

1072
00:44:52,069 --> 00:44:49,760
test rush you've ever played but a whole

1073
00:44:53,670 --> 00:44:52,079
lot of fun for the team so nia scout's

1074
00:44:56,069 --> 00:44:53,680
going to give you both science and

1075
00:44:57,910 --> 00:44:56,079
technology objectives for science we're

1076
00:44:59,829 --> 00:44:57,920
going to image an asteroid specifically

1077
00:45:01,750 --> 00:44:59,839
in 1991 vg

1078
00:45:04,069 --> 00:45:01,760
we're going to go by close enough within

1079
00:45:05,750 --> 00:45:04,079
about one kilometer and slow enough to

1080
00:45:07,349 --> 00:45:05,760
see a whole rotation of that asteroid

1081
00:45:09,190 --> 00:45:07,359
we're going to learn a lot about it

1082
00:45:11,349 --> 00:45:09,200
we're going to be able to fill in some

1083
00:45:13,670 --> 00:45:11,359
of those gaps that scientists have about

1084
00:45:15,430 --> 00:45:13,680
asteroids and then that will be

1085
00:45:17,589 --> 00:45:15,440
applicable to future missions to

1086
00:45:20,150 --> 00:45:17,599
asteroids for really any number of

1087
00:45:21,829 --> 00:45:20,160
things including human exploration

1088
00:45:24,710 --> 00:45:21,839

the next thing that nia scout's going to

1089
00:45:26,710 --> 00:45:24,720
do is show you a whole new exploration

1090
00:45:29,030 --> 00:45:26,720
platform it's a reconnaissance platform

1091
00:45:30,790 --> 00:45:29,040
with its first target being an asteroid

1092
00:45:33,349 --> 00:45:30,800
that platform is enabled by our

1093
00:45:36,390 --> 00:45:33,359
propulsion the solar sail so behind me

1094
00:45:37,990 --> 00:45:36,400
you see a half scale solar cell so our

1095
00:45:40,790 --> 00:45:38,000
flight unit is going to be twice this

1096
00:45:42,950 --> 00:45:40,800
size so why are we in this facility you

1097
00:45:45,349 --> 00:45:42,960
might ask this is the flat floor

1098
00:45:48,150 --> 00:45:45,359
facility and as you might imagine the

1099
00:45:50,150 --> 00:45:48,160
solar shell is not designed to deploy in

1100
00:45:51,430 --> 00:45:50,160
earth's gravity so how could we test

1101
00:45:53,670 --> 00:45:51,440
that out

1102
00:45:56,230 --> 00:45:53,680
on the flat floor we were able to use

1103
00:45:58,470 --> 00:45:56,240
air bearing technology kind of like a

1104
00:45:59,910 --> 00:45:58,480
puck on an air hockey table so as we

1105
00:46:01,430 --> 00:45:59,920
deployed the solar cell it could just

1106
00:46:03,030 --> 00:46:01,440
glide across the floor and we could

1107
00:46:05,190 --> 00:46:03,040
check out exactly how that deployment

1108
00:46:07,109 --> 00:46:05,200
would work because this is a pretty big

1109
00:46:08,790 --> 00:46:07,119
sale this um

1110
00:46:11,190 --> 00:46:08,800
the sale that we're trying to build

1111
00:46:12,630 --> 00:46:11,200
twice this size we really need to figure

1112
00:46:13,510 --> 00:46:12,640
out how best to make that deployment

1113
00:46:15,990 --> 00:46:13,520

work

1114
00:46:18,550 --> 00:46:16,000
so 36 square meters that's what's behind

1115
00:46:20,470 --> 00:46:18,560
me the flight unit will be 86 square

1116
00:46:21,990 --> 00:46:20,480
meters and it's all going to fold up

1117
00:46:24,069 --> 00:46:22,000
onto this spool

1118
00:46:25,589 --> 00:46:24,079
so that's pretty incredible right

1119
00:46:26,870 --> 00:46:25,599
so to tell you more about the solar cell

1120
00:46:29,030 --> 00:46:26,880
and how it's going to function is les

1121
00:46:31,190 --> 00:46:29,040
johnson he is the principal investigator

1122
00:46:32,950 --> 00:46:31,200
for nia scout solar sales

1123
00:46:34,870 --> 00:46:32,960
thanks leslie

1124
00:46:36,710 --> 00:46:34,880
yeah the nia scout is going to give us

1125
00:46:37,990 --> 00:46:36,720
and demonstrate a new capability for

1126
00:46:39,430 --> 00:46:38,000
exploration

1127
00:46:41,670 --> 00:46:39,440
and it's going to be low-cost

1128
00:46:43,109 --> 00:46:41,680
reconnaissance of an asteroid and why

1129
00:46:44,630 --> 00:46:43,119
that's important is because someday

1130
00:46:46,550 --> 00:46:44,640
we're going to want to send people to

1131
00:46:48,150 --> 00:46:46,560
asteroids and it's a good idea to get a

1132
00:46:50,230 --> 00:46:48,160
lay of the land shot before you get

1133
00:46:51,990 --> 00:46:50,240
there with people as jatendra explained

1134
00:46:54,069 --> 00:46:52,000
earlier we want to know more about the

1135
00:46:55,910 --> 00:46:54,079
target what it looks like what is its

1136
00:46:57,670 --> 00:46:55,920
spin rate does it have dust around it

1137
00:47:00,069 --> 00:46:57,680
and the sail is going to provide the

1138
00:47:02,230 --> 00:47:00,079

propulsion system to let us do that

1139
00:47:03,670 --> 00:47:02,240
coming up on your screen is an animation

1140
00:47:05,430 --> 00:47:03,680
of the mission sequence and i'll walk

1141
00:47:07,190 --> 00:47:05,440
you through what happens as nia scout

1142
00:47:08,630 --> 00:47:07,200
goes to its target

1143
00:47:10,630 --> 00:47:08,640
the first thing that will happen is

1144
00:47:12,550 --> 00:47:10,640
we'll be one among the 13 payloads that

1145
00:47:15,109 --> 00:47:12,560
are ejected and our small cubesat will

1146
00:47:17,430 --> 00:47:15,119
be deployed as it moves away from the

1147
00:47:19,430 --> 00:47:17,440
sls it'll go toward the moon

1148
00:47:22,069 --> 00:47:19,440
and deploy its solar panels so we can

1149
00:47:23,829 --> 00:47:22,079
generate power and call home and give a

1150
00:47:25,910 --> 00:47:23,839
status check of all the systems onboard

1151
00:47:27,190 --> 00:47:25,920
the spacecraft before we begin our

1152
00:47:28,630 --> 00:47:27,200
actual mission

1153
00:47:30,870 --> 00:47:28,640
after we've been around the moon we're

1154
00:47:33,510 --> 00:47:30,880
going to deploy the solar sail we'll do

1155
00:47:34,950 --> 00:47:33,520
that by deploying four 24-foot booms

1156
00:47:36,630 --> 00:47:34,960
which will pull out the sail which will

1157
00:47:39,589 --> 00:47:36,640
be a larger version of what you see here

1158
00:47:41,750 --> 00:47:39,599
beside behind us and that will provide

1159
00:47:43,750 --> 00:47:41,760
the propulsion system that will take nia

1160
00:47:46,309 --> 00:47:43,760
scout to the asteroid

1161
00:47:48,309 --> 00:47:46,319
we'll then do another lunar flyby get a

1162
00:47:51,109 --> 00:47:48,319
little bit of a gravity kick from the

1163
00:47:53,349 --> 00:47:51,119

moon to send us on our trajectory well

1164
00:47:55,670 --> 00:47:53,359
one of the questions people have is well

1165
00:47:58,150 --> 00:47:55,680
how does a solar sail work

1166
00:47:59,990 --> 00:47:58,160
well a solar sail doesn't use wind it

1167
00:48:02,630 --> 00:48:00,000
uses sunlight

1168
00:48:04,150 --> 00:48:02,640
and this is a piece of the kind of the

1169
00:48:06,309 --> 00:48:04,160
sail that we're going to be flying it's

1170
00:48:07,750 --> 00:48:06,319
about two and a half microns thick

1171
00:48:10,150 --> 00:48:07,760
that's about the thickness of a human

1172
00:48:12,390 --> 00:48:10,160
hair it's a plastic it's got aluminum on

1173
00:48:14,390 --> 00:48:12,400
it to give it lots of light reflectivity

1174
00:48:16,549 --> 00:48:14,400
and what happens is as you're in space

1175
00:48:17,829 --> 00:48:16,559
and you unfurl this the light reflects

1176
00:48:19,270 --> 00:48:17,839
from the sail

1177
00:48:21,270 --> 00:48:19,280
and even though light doesn't have rest

1178
00:48:23,510 --> 00:48:21,280
mass it does have momentum so imagine

1179
00:48:25,670 --> 00:48:23,520
light particles of light uh photons as

1180
00:48:27,990 --> 00:48:25,680
being like little uh ping-pong balls

1181
00:48:29,750 --> 00:48:28,000
bouncing off of this and together they

1182
00:48:32,549 --> 00:48:29,760
impart a little bit of their momentum

1183
00:48:36,470 --> 00:48:32,559
and the sail will recoil and move

1184
00:48:38,470 --> 00:48:36,480
we steer by tipping and tilting the sail

1185
00:48:41,030 --> 00:48:38,480
and changing the angle with which the

1186
00:48:43,190 --> 00:48:41,040
light reflects from the sail what that

1187
00:48:46,069 --> 00:48:43,200
does is it changes the net direction of

1188
00:48:47,910 --> 00:48:46,079

the force or the thrust that allows us

1189
00:48:49,270 --> 00:48:47,920
to steer the sail in the direction that

1190
00:48:51,670 --> 00:48:49,280
we want to go

1191
00:48:53,430 --> 00:48:51,680
now this force is a very small force

1192
00:48:55,270 --> 00:48:53,440
it's it's much less than an ounce per

1193
00:48:57,589 --> 00:48:55,280
football field you would never notice it

1194
00:48:59,910 --> 00:48:57,599
you can't feel this pressure but as long

1195
00:49:01,910 --> 00:48:59,920
as the sun is shining and our sail is

1196
00:49:04,309 --> 00:49:01,920
deployed near the sun we're going to get

1197
00:49:06,790 --> 00:49:04,319
constant acceleration from that

1198
00:49:08,549 --> 00:49:06,800
leslie mentioned that mass is king here

1199
00:49:11,190 --> 00:49:08,559
the key to this is a lightweight

1200
00:49:13,589 --> 00:49:11,200
low-cost spacecraft now when we get near

1201
00:49:15,270 --> 00:49:13,599
the asteroid we have a camera on board

1202
00:49:17,109 --> 00:49:15,280
we're going to image the asteroid we're

1203
00:49:19,030 --> 00:49:17,119
going to cover about 85 percent of its

1204
00:49:20,230 --> 00:49:19,040
surface we're going to send that data

1205
00:49:21,990 --> 00:49:20,240
back home

1206
00:49:23,990 --> 00:49:22,000
understand more about what this future

1207
00:49:25,750 --> 00:49:24,000
target is and demonstrate this

1208
00:49:28,950 --> 00:49:25,760
capability that could be used to visit

1209
00:49:30,549 --> 00:49:28,960
many asteroids relatively inexpensively

1210
00:49:32,870 --> 00:49:30,559
so you put it all together and

1211
00:49:35,109 --> 00:49:32,880
exploration mission one is going to give

1212
00:49:38,470 --> 00:49:35,119
us an integrated capability in the

1213
00:49:40,790 --> 00:49:38,480

proving ground to take the orion capsule

1214
00:49:43,190 --> 00:49:40,800
the space launch system and demonstrate

1215
00:49:45,510 --> 00:49:43,200
its capabilities and along for the ride

1216
00:49:47,750 --> 00:49:45,520
will be a new capability for low-cost

1217
00:49:50,309 --> 00:49:47,760
interplanetary science and exploration

1218
00:49:52,470 --> 00:49:50,319
by deploying these cubesats

1219
00:49:55,430 --> 00:49:52,480
in the future solar sails could be made

1220
00:49:57,829 --> 00:49:55,440
much larger to do other science missions

1221
00:49:58,630 --> 00:49:57,839
they have the potential to to study the

1222
00:50:00,309 --> 00:49:58,640
sun

1223
00:50:01,829 --> 00:50:00,319
and to go to vantage points that are

1224
00:50:04,390 --> 00:50:01,839
currently impossible with other

1225
00:50:06,470 --> 00:50:04,400
propulsion systems so i see a a bright

1226
00:50:09,030 --> 00:50:06,480
future no pun intended

1227
00:50:10,790 --> 00:50:09,040
for solar sails as this first flight for

1228
00:50:14,069 --> 00:50:10,800
the united states into interplanetary

1229
00:50:15,190 --> 00:50:14,079
space with our largest solar sail ever

1230
00:50:18,630 --> 00:50:15,200
thank you

1231
00:50:20,549 --> 00:50:18,640
now we'll take questions from reporters

1232
00:50:22,390 --> 00:50:20,559
here in the audience and then we'll take

1233
00:50:25,910 --> 00:50:22,400
questions from reporters on the phone if

1234
00:50:28,230 --> 00:50:25,920
you're on the phone please hit star one

1235
00:50:30,870 --> 00:50:28,240
so that you can be entered in the q a q

1236
00:50:31,910 --> 00:50:30,880
and then we'll go to social so please

1237
00:50:33,990 --> 00:50:31,920
limit your

1238
00:50:36,630 --> 00:50:34,000

questions to one at this time and please

1239
00:50:39,510 --> 00:50:36,640
announce your name and media affiliation

1240
00:50:40,470 --> 00:50:39,520
so we'll start here in the room

1241
00:50:44,950 --> 00:50:40,480
josh

1242
00:50:47,270 --> 00:50:44,960
is is one of your goals going to be

1243
00:50:55,030 --> 00:50:47,280
identifying candidates for the proposed

1244
00:51:00,150 --> 00:50:57,750
really our goal is to we've got this one

1245
00:51:02,710 --> 00:51:00,160
target asteroid to learn what we can

1246
00:51:04,549 --> 00:51:02,720
about that asteroid now

1247
00:51:05,750 --> 00:51:04,559
that's the thing there's a lot of things

1248
00:51:08,230 --> 00:51:05,760
that scientists don't know about

1249
00:51:09,910 --> 00:51:08,240
asteroids so based on information

1250
00:51:12,390 --> 00:51:09,920
gleaned from this mission it could

1251
00:51:14,870 --> 00:51:12,400
potentially affect um

1252
00:51:16,150 --> 00:51:14,880
the missions you then choose um after

1253
00:51:17,829 --> 00:51:16,160
this mission

1254
00:51:19,510 --> 00:51:17,839
yeah we're not going to be in time to

1255
00:51:21,430 --> 00:51:19,520
affect the decision i think for the for

1256
00:51:25,430 --> 00:51:21,440
the asteroid redirect mission but for

1257
00:51:31,670 --> 00:51:27,030
any other questions

1258
00:51:36,309 --> 00:51:34,150
hi lee group with ale.com again

1259
00:51:37,510 --> 00:51:36,319
just looking at your sail and the way

1260
00:51:38,630 --> 00:51:37,520
you pulled it out there unless it looks

1261
00:51:40,549 --> 00:51:38,640
kind of

1262
00:51:43,030 --> 00:51:40,559
flimsy a little thin

1263
00:51:45,430 --> 00:51:43,040

uh how how strong is it and what happens

1264
00:51:47,109 --> 00:51:45,440
if something pokes a hole in it well

1265
00:51:48,150 --> 00:51:47,119
this material is very lightweight and

1266
00:51:50,150 --> 00:51:48,160
that's one of the revolutions that

1267
00:51:52,309 --> 00:51:50,160
allows nia scout to happen is this is a

1268
00:51:53,510 --> 00:51:52,319
polyamide it's called cp1 it's very

1269
00:51:54,950 --> 00:51:53,520
lightweight but it's pretty robust i

1270
00:51:56,630 --> 00:51:54,960
mean i could damage it if i wanted to

1271
00:51:58,790 --> 00:51:56,640
tear it but just handling won't damage

1272
00:51:59,990 --> 00:51:58,800
it and there is no doubt that when we're

1273
00:52:01,990 --> 00:52:00,000
in deep space we're going to get hit by

1274
00:52:03,670 --> 00:52:02,000
micrometeors it's going to happen

1275
00:52:05,190 --> 00:52:03,680
but the thing is it's so thin and

1276
00:52:06,309 --> 00:52:05,200
they're traveling so fast when they hit

1277
00:52:08,309 --> 00:52:06,319
it they're going to poke just a little

1278
00:52:09,670 --> 00:52:08,319
teeny tiny hole in it and not deposit

1279
00:52:11,430 --> 00:52:09,680
much energy

1280
00:52:13,829 --> 00:52:11,440
the same micrometeoroid hitting a block

1281
00:52:15,190 --> 00:52:13,839
of aluminum would stop and deposit all

1282
00:52:17,670 --> 00:52:15,200
of its energy of motion it would be like

1283
00:52:19,829 --> 00:52:17,680
an explosion and be a lot of damage but

1284
00:52:22,309 --> 00:52:19,839
for us it'll just poke a little pinhole

1285
00:52:24,390 --> 00:52:22,319
and in the off chance that we get a tear

1286
00:52:26,549 --> 00:52:24,400
we're like a parachute we have rip stop

1287
00:52:29,510 --> 00:52:26,559
and so if there is a tear the rip stop

1288
00:52:33,430 --> 00:52:29,520

should stop it before it gets too big

1289
00:52:37,829 --> 00:52:35,829
all right let's go to social media

1290
00:52:39,109 --> 00:52:37,839
thank you christopher lair nasa marshall

1291
00:52:41,109 --> 00:52:39,119
space flight center here and one of our

1292
00:52:43,430 --> 00:52:41,119
questions online is from jrake at

1293
00:52:46,150 --> 00:52:43,440
youngjae rake asked what materials or

1294
00:52:50,950 --> 00:52:46,160
support will or does nasa supply each

1295
00:52:53,829 --> 00:52:52,470
so well i can

1296
00:52:55,589 --> 00:52:53,839
i'll let chris talk about any

1297
00:52:56,870 --> 00:52:55,599
integration

1298
00:52:58,309 --> 00:52:56,880
type support

1299
00:53:01,349 --> 00:52:58,319
at least

1300
00:53:04,950 --> 00:53:01,359
we're a team that is nasa-funded

1301
00:53:06,870 --> 00:53:04,960
so supported by heo and aes so we get

1302
00:53:10,309 --> 00:53:06,880
that sort of support from nasa

1303
00:53:12,549 --> 00:53:10,319
i know that from sls we get a large

1304
00:53:13,829 --> 00:53:12,559
amount of support as far as

1305
00:53:16,790 --> 00:53:13,839
requirements from the vehicle and

1306
00:53:19,510 --> 00:53:16,800
integration needs and so we we talk

1307
00:53:22,309 --> 00:53:19,520
daily with those individuals to help us

1308
00:53:23,030 --> 00:53:22,319
on the path to the vehicle

1309
00:53:25,589 --> 00:53:23,040
so

1310
00:53:27,589 --> 00:53:25,599
each one of the the the groups the

1311
00:53:30,069 --> 00:53:27,599
mission directorates put out their their

1312
00:53:31,990 --> 00:53:30,079
own call and then they they self-fund

1313
00:53:33,750 --> 00:53:32,000

each of those and they they're funded at

1314
00:53:35,829 --> 00:53:33,760
different levels but what mr

1315
00:53:37,829 --> 00:53:35,839
gerstenmaier and mr hill have have

1316
00:53:40,390 --> 00:53:37,839
offered is that we will cover the

1317
00:53:43,750 --> 00:53:40,400
integration cost to putting it on to the

1318
00:53:46,230 --> 00:53:43,760
vehicle so we we built in-house uh these

1319
00:53:48,470 --> 00:53:46,240
uh the apparatus to hold the deployer

1320
00:53:49,990 --> 00:53:48,480
and we ask every one of the units to use

1321
00:53:53,190 --> 00:53:50,000
the same deployer so that we can be

1322
00:53:56,790 --> 00:53:53,200
consistent on this first flight

1323
00:53:58,069 --> 00:53:56,800
okay any other questions in the room

1324
00:54:00,390 --> 00:53:58,079
all right

1325
00:54:02,710 --> 00:54:00,400
this concludes today's second part of

1326
00:54:05,750 --> 00:54:02,720
the program if you would like to learn

1327
00:54:08,069 --> 00:54:05,760
more about sls orion or nia scout visit

1328
00:54:10,069 --> 00:54:08,079
www.nasa.gov

1329
00:54:12,390 --> 00:54:10,079
or you can see the url that will come up

1330
00:54:14,470 --> 00:54:12,400
on your screen for uh the materials that