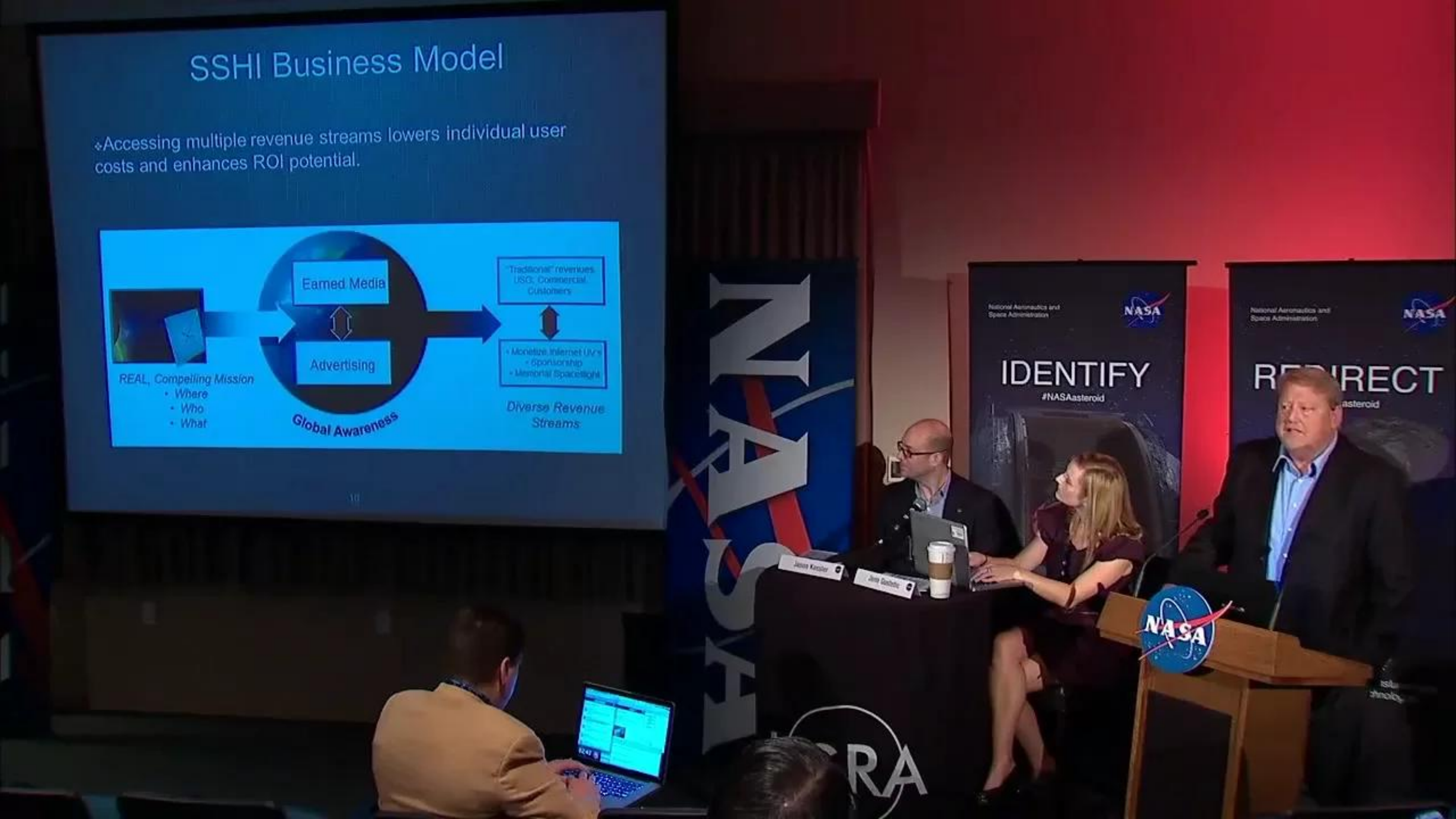
SSHI Business Model
Accessing multiple revenue streams lowers individual user costs and enhances ROI potential.
Earned Media
Advertising
Global Awareness
"Traditional" revenues
USG, Commercial
Customers
• Monetize Internet Viz's
• Sponsorship
• Memorial Spaceflight
Diverse Revenue Streams
REAL, Compelling Mission
• Where
• Who
• What
IDENTIFY
#NASAasteroid
NASA

1
00:00:05,190 --> 00:00:03,750
coming to you live

2
00:00:08,310 --> 00:00:05,200
from

3
00:00:10,470 --> 00:00:08,320
houston texas at the idea synthesis

4
00:00:12,950 --> 00:00:10,480
workshop

5
00:00:16,150 --> 00:00:12,960
at the lunar and planetary institute

6
00:00:18,070 --> 00:00:16,160
my name is jason kessler i am a co-lead

7
00:00:19,189 --> 00:00:18,080
for the partnership and participatory

8
00:00:21,269 --> 00:00:19,199
engagement

9
00:00:23,590 --> 00:00:21,279
session this morning

10
00:00:25,670 --> 00:00:23,600
i am the program executive of the

11
00:00:27,670 --> 00:00:25,680
asteroid grand challenge based in

12
00:00:29,349 --> 00:00:27,680
headquarters

13
00:00:30,870 --> 00:00:29,359

my partner in crime

14
00:00:32,630 --> 00:00:30,880
jen gastetic

15
00:00:34,790 --> 00:00:32,640
is the program exec

16
00:00:37,030 --> 00:00:34,800
for prizes and challenges

17
00:00:39,030 --> 00:00:37,040
and we're joined by joe gard as martyr

18
00:00:43,990 --> 00:00:39,040
moderator who's based here at the

19
00:00:48,470 --> 00:00:46,389
get things started it's good to be back

20
00:00:50,310 --> 00:00:48,480
we were here at the end of october and

21
00:00:52,630 --> 00:00:50,320
had a little hiatus

22
00:00:54,630 --> 00:00:52,640
uh and i i'm really grateful for

23
00:00:56,549 --> 00:00:54,640
everybody that was willing to

24
00:00:57,910 --> 00:00:56,559
travel back and join us in person we

25
00:00:59,110 --> 00:00:57,920
have a number of folks that will be

26
00:01:01,029 --> 00:00:59,120
doing so

27
00:01:03,750 --> 00:01:01,039
virtually as well

28
00:01:05,189 --> 00:01:03,760
and really look forward to a lively

29
00:01:08,469 --> 00:01:05,199
discussion

30
00:01:09,990 --> 00:01:08,479
you can see up up front now is the

31
00:01:11,510 --> 00:01:10,000
agenda that we've got and the way we've

32
00:01:13,590 --> 00:01:11,520
got it organized

33
00:01:15,590 --> 00:01:13,600
there are three sections

34
00:01:18,550 --> 00:01:15,600
we'll start with mike o'hara from

35
00:01:20,310 --> 00:01:18,560
aerojet bonazz from goddard and charlie

36
00:01:22,710 --> 00:01:20,320
chaffer

37
00:01:24,789 --> 00:01:22,720
they'll all have 10 minutes each and

38
00:01:27,830 --> 00:01:24,799

then we'll we'll open it up to 15

39
00:01:30,069 --> 00:01:27,840
minutes of questions for each of them

40
00:01:33,350 --> 00:01:30,079
have a 10 minute break

41
00:01:36,630 --> 00:01:33,360
followed by chris lewicki scott sevcik

42
00:01:37,510 --> 00:01:36,640
david gump eric mum

43
00:01:41,109 --> 00:01:37,520
again

44
00:01:43,270 --> 00:01:41,119
open it up to 15 minutes of questions

45
00:01:45,749 --> 00:01:43,280
followed by another break

46
00:01:46,630 --> 00:01:45,759
then we'll have david gustin margaret

47
00:01:48,789 --> 00:01:46,640
race

48
00:01:51,830 --> 00:01:48,799
jill lapore tony freeman

49
00:01:54,550 --> 00:01:51,840
and jean-claude pidboof

50
00:01:56,469 --> 00:01:54,560
again 15 minutes of questions after

51
00:01:58,069 --> 00:01:56,479
their presentations

52
00:02:00,310 --> 00:01:58,079
um

53
00:02:03,190 --> 00:02:00,320
again a break and then we want to open

54
00:02:05,590 --> 00:02:03,200
it up into a lively conversation the

55
00:02:08,630 --> 00:02:05,600
idea here really is to

56
00:02:10,229 --> 00:02:08,640
take these ideas and

57
00:02:12,710 --> 00:02:10,239
pull apart

58
00:02:14,710 --> 00:02:12,720
how we might be able to move forward

59
00:02:16,390 --> 00:02:14,720
in the planning for both the mission and

60
00:02:18,750 --> 00:02:16,400
the grand challenge

61
00:02:22,070 --> 00:02:18,760
i'd like to direct you to the hashtag

62
00:02:23,990 --> 00:02:22,080
asteroidpartners if you're following us

63
00:02:24,869 --> 00:02:24,000

online

64
00:02:27,190 --> 00:02:24,879
and

65
00:02:28,949 --> 00:02:27,200
join in with questions through that or

66
00:02:30,630 --> 00:02:28,959
through the ustream

67
00:02:33,030 --> 00:02:30,640
live chat

68
00:02:36,070 --> 00:02:33,040
to set the stage real quickly

69
00:02:38,309 --> 00:02:36,080
you've probably seen this slide it's uh

70
00:02:39,589 --> 00:02:38,319
the venn diagram of the asteroid

71
00:02:41,750 --> 00:02:39,599
initiative

72
00:02:42,550 --> 00:02:41,760
it's it's made up of both

73
00:02:46,470 --> 00:02:42,560
the

74
00:02:48,470 --> 00:02:46,480
asteroid grand challenge

75
00:02:50,070 --> 00:02:48,480
uh we were really excited when the rfi

76
00:02:51,190 --> 00:02:50,080
got released that we were able to

77
00:02:53,750 --> 00:02:51,200
include

78
00:02:55,190 --> 00:02:53,760
uh this section that we're speaking

79
00:02:57,589 --> 00:02:55,200
about today and that's the partnership

80
00:02:59,830 --> 00:02:57,599
and participatory engagement how can we

81
00:03:02,149 --> 00:02:59,840
in both the mission and the grand

82
00:03:04,470 --> 00:03:02,159
challenge figure out

83
00:03:06,550 --> 00:03:04,480
ways to bring in new fresh ideas and

84
00:03:10,309 --> 00:03:06,560
innovate on

85
00:03:13,190 --> 00:03:10,319
some concepts to help us do this better

86
00:03:14,470 --> 00:03:13,200
it's obvious that the overlap is in

87
00:03:16,229 --> 00:03:14,480
the

88
00:03:17,430 --> 00:03:16,239

neo-observation

89
00:03:20,949 --> 00:03:17,440
and

90
00:03:22,149 --> 00:03:20,959
manipulation or engagement around uh an

91
00:03:24,229 --> 00:03:22,159
asteroid

92
00:03:25,990 --> 00:03:24,239
but excitingly there there's

93
00:03:28,949 --> 00:03:26,000
opportunities for partnership and

94
00:03:31,670 --> 00:03:28,959
engagement both in the mission

95
00:03:34,789 --> 00:03:31,680
whether it's the robotic piece or the

96
00:03:37,430 --> 00:03:34,799
crude mission aspects as well as the

97
00:03:39,430 --> 00:03:37,440
underpinnings of the grand challenge to

98
00:03:42,309 --> 00:03:39,440
enable us to do the work that we've

99
00:03:44,710 --> 00:03:42,319
already doing uh better and accelerate

100
00:03:47,990 --> 00:03:44,720
that work

101
00:03:49,910 --> 00:03:48,000
so a couple of desired outcomes to

102
00:03:51,670 --> 00:03:49,920
set the stage uh

103
00:03:53,270 --> 00:03:51,680
for this morning

104
00:03:55,270 --> 00:03:53,280
um

105
00:03:58,229 --> 00:03:55,280
i think it's important that we get a

106
00:04:00,630 --> 00:03:58,239
shared understanding uh

107
00:04:03,030 --> 00:04:00,640
of of how this partnership effort can

108
00:04:04,869 --> 00:04:03,040
really benefit both the mission uh and

109
00:04:07,030 --> 00:04:04,879
the grand challenge

110
00:04:09,509 --> 00:04:07,040
ultimately again we're really wanting to

111
00:04:11,589 --> 00:04:09,519
have a rich dialogue and and i'm hoping

112
00:04:13,830 --> 00:04:11,599
that the structure that we've set for

113
00:04:15,350 --> 00:04:13,840

for this this session today is going to

114
00:04:18,390 --> 00:04:15,360
enable that and if it turns out that

115
00:04:21,990 --> 00:04:18,400
we're not having the discussion uh i'm

116
00:04:23,909 --> 00:04:22,000
certainly open uh to changing the uh

117
00:04:25,830 --> 00:04:23,919
schedule around a bit so that we can get

118
00:04:27,350 --> 00:04:25,840
into the conversation that that's really

119
00:04:29,430 --> 00:04:27,360
going to lead to

120
00:04:35,430 --> 00:04:29,440
the findings that that both the mission

121
00:04:39,670 --> 00:04:36,870
ultimately

122
00:04:41,189 --> 00:04:39,680
the idea is to be able to

123
00:04:44,629 --> 00:04:41,199
feed this into

124
00:04:47,270 --> 00:04:44,639
the session tomorrow the plenary session

125
00:04:49,990 --> 00:04:47,280
and that can then be pulled into the

126
00:04:52,070 --> 00:04:50,000
mission planning moving forward and as

127
00:04:54,150 --> 00:04:52,080
as jen and i continue to work on this

128
00:04:56,390 --> 00:04:54,160
co-created implementation plan for the

129
00:04:58,870 --> 00:04:56,400
grand challenge

130
00:05:01,029 --> 00:04:58,880
this really is our first step of of

131
00:05:02,710 --> 00:05:01,039
engaging

132
00:05:05,110 --> 00:05:02,720
and then ultimately we want to be able

133
00:05:06,710 --> 00:05:05,120
to find

134
00:05:07,670 --> 00:05:06,720
what our next steps and actions are

135
00:05:09,110 --> 00:05:07,680
going to be

136
00:05:10,950 --> 00:05:09,120
and so we really want to have the

137
00:05:12,710 --> 00:05:10,960
discussion to pull out the salient

138
00:05:14,629 --> 00:05:12,720

points that we can then move forward

139
00:05:18,629 --> 00:05:14,639
with

140
00:05:22,790 --> 00:05:20,950
another word char i had to do it

141
00:05:24,629 --> 00:05:22,800
just to kind of set the tone i know it's

142
00:05:26,790 --> 00:05:24,639
early for some and those that are around

143
00:05:29,830 --> 00:05:26,800
the world maybe it's really late

144
00:05:31,909 --> 00:05:29,840
but just to set the context of

145
00:05:34,629 --> 00:05:31,919
what we were talking about here

146
00:05:36,390 --> 00:05:34,639
i'm not going to read through all this

147
00:05:38,469 --> 00:05:36,400
but these were the questions that we

148
00:05:41,670 --> 00:05:38,479
asked in the rfi

149
00:05:44,230 --> 00:05:41,680
uh and these for the most part uh are

150
00:05:47,110 --> 00:05:44,240
what are going to be discussed today not

151
00:05:49,749 --> 00:05:47,120
every presenter focused on all the these

152
00:05:52,150 --> 00:05:49,759
uh bullets uh because that was not the

153
00:05:54,230 --> 00:05:52,160
requirements but this is what we sent

154
00:05:55,350 --> 00:05:54,240
out in the rfi to kind of trigger the

155
00:05:58,150 --> 00:05:55,360
thinking

156
00:06:02,230 --> 00:05:59,189
so

157
00:06:04,070 --> 00:06:02,240
let us from there

158
00:06:05,830 --> 00:06:04,080
turn it over to our first speaker so

159
00:06:08,390 --> 00:06:05,840
that we can get started it's going to be

160
00:06:09,590 --> 00:06:08,400
michael o'hara from aerojet rocketdyne

161
00:06:25,510 --> 00:06:09,600
talking about

162
00:06:29,990 --> 00:06:27,350
good morning

163
00:06:32,390 --> 00:06:30,000

oh thank you for having me here

164
00:06:34,950 --> 00:06:32,400
uh i am the director for civil space

165
00:06:40,390 --> 00:06:34,960
propulsion i work in washington dc and

166
00:06:43,270 --> 00:06:41,510
what is

167
00:06:46,870 --> 00:06:43,280
participatory engagement what does it

168
00:06:49,749 --> 00:06:46,880
mean to us at aerojet rocketdyne

169
00:06:51,670 --> 00:06:49,759
well it's really three categories in the

170
00:06:54,230 --> 00:06:51,680
way we see it it's broad and diverse

171
00:06:55,749 --> 00:06:54,240
participation sustained multi-mission

172
00:06:58,550 --> 00:06:55,759
engagement and doing business

173
00:07:00,629 --> 00:06:58,560
differently it's kind of timely for us

174
00:07:02,710 --> 00:07:00,639
as most of you might be aware

175
00:07:05,110 --> 00:07:02,720
we just had an acquisition of rocketdyne

176
00:07:07,670 --> 00:07:05,120
so we're internally looking

177
00:07:10,309 --> 00:07:07,680
at ways to do business cheaper more

178
00:07:13,350 --> 00:07:10,319
effectively and meet the cost the costs

179
00:07:14,469 --> 00:07:13,360
and customer needs as we move forward

180
00:07:16,550 --> 00:07:14,479
under the broad and diverse

181
00:07:18,309 --> 00:07:16,560
participation we see participation

182
00:07:21,350 --> 00:07:18,319
definitely with the community

183
00:07:23,350 --> 00:07:21,360
other agencies noaa nasa faa

184
00:07:24,870 --> 00:07:23,360
the commercial space entrepreneurials

185
00:07:26,550 --> 00:07:24,880
and that whole business segment that's

186
00:07:28,550 --> 00:07:26,560
rapidly growing

187
00:07:31,029 --> 00:07:28,560
universities international space

188
00:07:33,510 --> 00:07:31,039

agencies and industrial partners

189
00:07:36,390 --> 00:07:33,520
private government observation of

190
00:07:38,230 --> 00:07:36,400
observatories laboratories congress

191
00:07:40,790 --> 00:07:38,240
and for this particular endeavor the

192
00:07:43,670 --> 00:07:40,800
united nations this was a world issue

193
00:07:45,510 --> 00:07:43,680
potentially with asteroids and there is

194
00:07:47,670 --> 00:07:45,520
international interest

195
00:07:50,550 --> 00:07:47,680
sustained multi-mission engagement a

196
00:07:52,309 --> 00:07:50,560
single mission does not result in real

197
00:07:55,189 --> 00:07:52,319
engagement opportunities we cannot

198
00:07:57,189 --> 00:07:55,199
afford one-off programs anymore

199
00:07:58,550 --> 00:07:57,199
multiple missions on time scales

200
00:08:00,550 --> 00:07:58,560
consistent with the needs of the

201
00:08:02,950 --> 00:08:00,560
community so we need to be able to do

202
00:08:04,950 --> 00:08:02,960
things and touch the community and bring

203
00:08:07,350 --> 00:08:04,960
them in and engage them and of course we

204
00:08:09,909 --> 00:08:07,360
have to be cost effective

205
00:08:12,390 --> 00:08:09,919
broad market applications

206
00:08:13,909 --> 00:08:12,400
beyond intended primary objectives so

207
00:08:15,909 --> 00:08:13,919
like i said we can't do one else

208
00:08:18,309 --> 00:08:15,919
whatever we do we have to have a broader

209
00:08:21,589 --> 00:08:18,319
scope in mind get the most bang for the

210
00:08:22,710 --> 00:08:21,599
buck to keep these things going

211
00:08:24,390 --> 00:08:22,720
repeated

212
00:08:26,629 --> 00:08:24,400
broad community and public engagement

213
00:08:29,029 --> 00:08:26,639

through workshops industrial conferences

214
00:08:30,629 --> 00:08:29,039
industry association xprize competition

215
00:08:32,389 --> 00:08:30,639
it's a lot like

216
00:08:35,990 --> 00:08:32,399
a shape and capture

217
00:08:38,230 --> 00:08:36,000
if you're a bed person a lot of the same

218
00:08:40,630 --> 00:08:38,240
theories the same objectives

219
00:08:43,269 --> 00:08:40,640
need to apply to what we're doing here

220
00:08:45,269 --> 00:08:43,279
and of course doing business differently

221
00:08:49,110 --> 00:08:45,279
offer incentives to participate in

222
00:08:52,630 --> 00:08:49,120
appropriate for each community prize ip

223
00:08:54,470 --> 00:08:52,640
ownership uh property ownership etc etc

224
00:08:56,790 --> 00:08:54,480
minimize or reduce the barriers to

225
00:08:59,430 --> 00:08:56,800
participation and schedule costs you

226
00:09:02,070 --> 00:08:59,440
know we need to get things going a lot

227
00:09:04,870 --> 00:09:02,080
quicker it costs industry a lot of money

228
00:09:07,269 --> 00:09:04,880
to respond to things and you know a lot

229
00:09:09,509 --> 00:09:07,279
of time and energy and from the agency

230
00:09:12,070 --> 00:09:09,519
perspective it would really help us if

231
00:09:14,389 --> 00:09:12,080
they could expedite things and not be so

232
00:09:16,230 --> 00:09:14,399
demanding but yet be reactive and

233
00:09:17,990 --> 00:09:16,240
proactive and move things along much

234
00:09:20,070 --> 00:09:18,000
quicker quicker it will reduce the

235
00:09:21,269 --> 00:09:20,080
overall cost

236
00:09:23,430 --> 00:09:21,279
we need to

237
00:09:25,030 --> 00:09:23,440
emphasize applicability of technology

238
00:09:28,310 --> 00:09:25,040

development paths to multiple

239
00:09:30,710 --> 00:09:28,320
exploration goals and non-users so you

240
00:09:32,790 --> 00:09:30,720
know spin-offs yeah i'm a former langley

241
00:09:35,269 --> 00:09:32,800
guy and uh was involved in a lot of

242
00:09:36,870 --> 00:09:35,279
spin-offs in my work there so the more

243
00:09:38,470 --> 00:09:36,880
bang for the buck that we can do with

244
00:09:40,550 --> 00:09:38,480
these programs

245
00:09:41,990 --> 00:09:40,560
the more we're going to bring in people

246
00:09:43,910 --> 00:09:42,000
and we need to leverage industries

247
00:09:46,310 --> 00:09:43,920
investments of existing available high

248
00:09:49,030 --> 00:09:46,320
trl capability to expedite the program

249
00:09:51,350 --> 00:09:49,040
so if there's something in a hopper that

250
00:09:53,509 --> 00:09:51,360
has a reasonably high trl let's not go

251
00:09:55,750 --> 00:09:53,519
back to the drawing board you know let's

252
00:09:57,750 --> 00:09:55,760
use what we have let's take minimal

253
00:09:59,750 --> 00:09:57,760
resources to get it to the tro level

254
00:10:01,350 --> 00:09:59,760
that we need to move things forward but

255
00:10:03,430 --> 00:10:01,360
most importantly participatory

256
00:10:05,670 --> 00:10:03,440
engagement requires affordable sustained

257
00:10:08,150 --> 00:10:05,680
and multi-mission opportunities for

258
00:10:10,310 --> 00:10:08,160
participation in diverse

259
00:10:12,069 --> 00:10:10,320
communities

260
00:10:14,310 --> 00:10:12,079
how does aerojet rocketdyne approach

261
00:10:16,389 --> 00:10:14,320
participatory engagement well we look at

262
00:10:18,550 --> 00:10:16,399
how we can do things differently

263
00:10:20,310 --> 00:10:18,560

affordability of contained missions with

264
00:10:22,710 --> 00:10:20,320
multiple player involvement the more

265
00:10:25,030 --> 00:10:22,720
people we can bring in the more

266
00:10:26,710 --> 00:10:25,040
the more congressional uh you know

267
00:10:28,550 --> 00:10:26,720
advocacy we can get the more people who

268
00:10:30,630 --> 00:10:28,560
touch more you know people that are on

269
00:10:33,350 --> 00:10:30,640
the payroll you know it's a different

270
00:10:35,670 --> 00:10:33,360
environment guys you know we can't have

271
00:10:37,030 --> 00:10:35,680
a one big program and minimal

272
00:10:38,470 --> 00:10:37,040
participation

273
00:10:39,829 --> 00:10:38,480
we're going to have to share everything

274
00:10:42,069 --> 00:10:39,839
and that's one thing that aerojet

275
00:10:44,230 --> 00:10:42,079
rocketdyne we're looking at doing is

276
00:10:45,990 --> 00:10:44,240
expanding and bringing in as much

277
00:10:47,990 --> 00:10:46,000
expertise and people and things we can

278
00:10:49,269 --> 00:10:48,000
do to help our programs

279
00:10:50,710 --> 00:10:49,279
be sustained

280
00:10:52,949 --> 00:10:50,720
what are we doing

281
00:10:55,910 --> 00:10:52,959
to help others do things broad scope of

282
00:10:57,350 --> 00:10:55,920
applicability so you know whatever we do

283
00:10:59,590 --> 00:10:57,360
it needs to be

284
00:11:01,590 --> 00:10:59,600
applicable to multiple things it's all

285
00:11:03,509 --> 00:11:01,600
about bang for the buck and if we can

286
00:11:05,269 --> 00:11:03,519
keep that in mind i think we're going to

287
00:11:07,190 --> 00:11:05,279
have a good chance of things

288
00:11:09,670 --> 00:11:07,200

and we need to focus on the industrial

289
00:11:12,630 --> 00:11:09,680
return so you know i have board of

290
00:11:14,949 --> 00:11:12,640
directors you know we have stockholders

291
00:11:17,190 --> 00:11:14,959
as much as i love my job we all don't do

292
00:11:19,350 --> 00:11:17,200
it for free so we have to be able to

293
00:11:21,269 --> 00:11:19,360
sell what we do inside as much as

294
00:11:22,870 --> 00:11:21,279
outside

295
00:11:24,710 --> 00:11:22,880
we need to focus engagement on

296
00:11:27,670 --> 00:11:24,720
technology science and policy we

297
00:11:29,910 --> 00:11:27,680
definitely need to have a stem component

298
00:11:31,990 --> 00:11:29,920
component the entrepreneurial space

299
00:11:34,310 --> 00:11:32,000
folks the venture capitalist media

300
00:11:36,710 --> 00:11:34,320
outreach campaigns we need to do things

301
00:11:38,550 --> 00:11:36,720
differently than we have been doing

302
00:11:40,790 --> 00:11:38,560
and things we're doing will ultimately

303
00:11:43,350 --> 00:11:40,800
support going to mars so you know the

304
00:11:45,430 --> 00:11:43,360
objective is to get to mars and we can't

305
00:11:48,310 --> 00:11:45,440
do it cut right out of the box so we got

306
00:11:50,629 --> 00:11:48,320
to take step by step so whatever we do

307
00:11:52,230 --> 00:11:50,639
has to build to an objective and that

308
00:11:55,750 --> 00:11:52,240
objective for us the way we see is

309
00:11:59,750 --> 00:11:58,710
so what do we do once there is a program

310
00:12:01,829 --> 00:11:59,760
well we need to promote the

311
00:12:03,910 --> 00:12:01,839
affordability okay so right now this is

312
00:12:06,790 --> 00:12:03,920
the least expensive path to exploration

313
00:12:07,990 --> 00:12:06,800

beyond low earth orbit there's no lander

314
00:12:10,710 --> 00:12:08,000
required

315
00:12:12,310 --> 00:12:10,720
uh it tests several key technologies in

316
00:12:15,030 --> 00:12:12,320
a realistic environment that have

317
00:12:16,790 --> 00:12:15,040
applicability to a mars mission

318
00:12:20,629 --> 00:12:16,800
how do we use asteroids once it's in

319
00:12:22,870 --> 00:12:20,639
place well broad export exploitation is

320
00:12:25,509 --> 00:12:22,880
the key to reduce cost and to engage

321
00:12:28,069 --> 00:12:25,519
non-traditional entities entrepreneurs

322
00:12:29,430 --> 00:12:28,079
uh google prize for asteroids resource

323
00:12:31,990 --> 00:12:29,440
utilization

324
00:12:33,509 --> 00:12:32,000
engage universities cubesat missions to

325
00:12:36,230 --> 00:12:33,519
asteroids

326
00:12:37,990 --> 00:12:36,240
students suggestions and experiments and

327
00:12:39,990 --> 00:12:38,000
engage the scientific community it's

328
00:12:41,829 --> 00:12:40,000
going to be imperative that the science

329
00:12:43,590 --> 00:12:41,839
and human space guys work together for

330
00:12:45,750 --> 00:12:43,600
whatever we do and leverage each other

331
00:12:48,069 --> 00:12:45,760
from the most outcome

332
00:12:50,310 --> 00:12:48,079
and of course we need to keep this sold

333
00:12:52,550 --> 00:12:50,320
like any program you win we need to work

334
00:12:55,350 --> 00:12:52,560
to keep it sold in this environment

335
00:12:57,430 --> 00:12:55,360
and it this program asserts nasa as a

336
00:13:00,150 --> 00:12:57,440
leader in space exploration which we all

337
00:13:02,069 --> 00:13:00,160
want a defined mission will occur

338
00:13:04,069 --> 00:13:02,079

encourage infusion of young talent which

339
00:13:05,750 --> 00:13:04,079
we all need in this industry and

340
00:13:07,110 --> 00:13:05,760
encourage interest in science and

341
00:13:08,870 --> 00:13:07,120
engineering

342
00:13:10,629 --> 00:13:08,880
the technologies developed can be used

343
00:13:12,310 --> 00:13:10,639
for cargo transportation for human

344
00:13:15,030 --> 00:13:12,320
missions to mars

345
00:13:17,829 --> 00:13:15,040
and it's sls and orion logistics support

346
00:13:19,110 --> 00:13:17,839
you know it it gives the program

347
00:13:20,389 --> 00:13:19,120
something to do

348
00:13:22,310 --> 00:13:20,399
in the near term

349
00:13:24,550 --> 00:13:22,320
and keeps things moving

350
00:13:26,310 --> 00:13:24,560
and enables a mission cadence that will

351
00:13:29,190 --> 00:13:26,320
maintain public engagement with its

352
00:13:33,590 --> 00:13:31,509
approach is critical to the vision

353
00:13:34,629 --> 00:13:33,600
so for us because we're a propulsion

354
00:13:36,629 --> 00:13:34,639
company

355
00:13:37,990 --> 00:13:36,639
we've been working with the architecture

356
00:13:40,310 --> 00:13:38,000
specifically

357
00:13:42,389 --> 00:13:40,320
oh sorry okay

358
00:13:44,069 --> 00:13:42,399
sorry about that so we have in-space

359
00:13:45,509 --> 00:13:44,079
transportation

360
00:13:47,829 --> 00:13:45,519
efficient movement of assets and

361
00:13:49,990 --> 00:13:47,839
supplies and multiple customer

362
00:13:52,069 --> 00:13:50,000
applicability

363
00:13:53,990 --> 00:13:52,079

aerojet rocking sustainability space

364
00:13:55,590 --> 00:13:54,000
transportation approach for exploration

365
00:13:58,310 --> 00:13:55,600
as you can see it's cross-cutting what

366
00:14:01,269 --> 00:13:58,320
we want to do and our piece to this

367
00:14:03,350 --> 00:14:01,279
can apply to dod orbit raising robotic

368
00:14:06,310 --> 00:14:03,360
missions sls orion

369
00:14:08,629 --> 00:14:06,320
planetary defense satellite servicing

370
00:14:10,550 --> 00:14:08,639
repositioning of assets and situational

371
00:14:12,629 --> 00:14:10,560
awareness

372
00:14:14,230 --> 00:14:12,639
you can contact myself mike o'hara or

373
00:14:15,990 --> 00:14:14,240
joe cassidy be happy to answer any

374
00:14:23,670 --> 00:14:16,000
questions

375
00:14:32,389 --> 00:14:26,710
next up is bo naz from goddard

376
00:14:35,670 --> 00:14:33,590
okay well i'm going to tell you a little

377
00:14:37,350 --> 00:14:35,680
bit about some work that

378
00:14:39,269 --> 00:14:37,360
we've been doing at nasa goddard for the

379
00:14:41,829 --> 00:14:39,279
last few years

380
00:14:43,750 --> 00:14:41,839
on satellite servicing partnerships i'm

381
00:14:45,350 --> 00:14:43,760
not going to talk a lot about the

382
00:14:47,990 --> 00:14:45,360
satellite servicing activity because

383
00:14:49,750 --> 00:14:48,000
that's not why we're here

384
00:14:51,030 --> 00:14:49,760
but maybe try and make some parallels to

385
00:14:53,030 --> 00:14:51,040
what's going on here and what we've been

386
00:14:54,150 --> 00:14:53,040
trying to do with servicing and and tell

387
00:14:55,750 --> 00:14:54,160
you about

388
00:14:58,230 --> 00:14:55,760

the partnership approach that we've been

389
00:14:59,910 --> 00:14:58,240
working towards

390
00:15:01,990 --> 00:14:59,920
and then talk a little bit about you

391
00:15:03,590 --> 00:15:02,000
know just my perspective on on some of

392
00:15:06,069 --> 00:15:03,600
the partnership opportunities that might

393
00:15:08,230 --> 00:15:06,079
be available for this mission

394
00:15:10,389 --> 00:15:08,240
um so as i said i'm from the satellite

395
00:15:13,750 --> 00:15:10,399
servicing capabilities office we've been

396
00:15:14,949 --> 00:15:13,760
working since 2011 on a public-private

397
00:15:16,310 --> 00:15:14,959
partnership

398
00:15:18,069 --> 00:15:16,320
to do satellite servicing in

399
00:15:19,910 --> 00:15:18,079
geosynchronous orbit

400
00:15:21,910 --> 00:15:19,920
okay so um

401
00:15:24,310 --> 00:15:21,920
there's some parallels here there's some

402
00:15:25,670 --> 00:15:24,320
complete differences here

403
00:15:28,150 --> 00:15:25,680
we've talked a lot about how we need to

404
00:15:30,389 --> 00:15:28,160
do cots like things and bring

405
00:15:32,310 --> 00:15:30,399
private industry in to make nasa

406
00:15:33,990 --> 00:15:32,320
emissions cheaper and more

407
00:15:35,990 --> 00:15:34,000
sustainable

408
00:15:37,110 --> 00:15:36,000
satellite servicing is kind of a similar

409
00:15:38,710 --> 00:15:37,120
concept

410
00:15:41,509 --> 00:15:38,720
we know there's a strong commercial

411
00:15:42,949 --> 00:15:41,519
market existing for satellite servicing

412
00:15:45,110 --> 00:15:42,959
we know there's some technology

413
00:15:47,189 --> 00:15:45,120

development that still needs to happen

414
00:15:48,790 --> 00:15:47,199
our goal is to work with private

415
00:15:51,030 --> 00:15:48,800
industry

416
00:15:53,350 --> 00:15:51,040
to develop the final stages of that

417
00:15:55,030 --> 00:15:53,360
technology and go fly missions that are

418
00:15:57,110 --> 00:15:55,040
beneficial to both the government and

419
00:15:58,150 --> 00:15:57,120
the commercial partner

420
00:15:59,829 --> 00:15:58,160
so

421
00:16:03,350 --> 00:15:59,839
the

422
00:16:05,509 --> 00:16:03,360
that we've

423
00:16:07,350 --> 00:16:05,519
put together is one where there's a lot

424
00:16:08,710 --> 00:16:07,360
of skin in the game from both sides

425
00:16:10,550 --> 00:16:08,720
there's not a lot of government

426
00:16:12,470 --> 00:16:10,560
intervention in what happens on the

427
00:16:14,150 --> 00:16:12,480
private sector side

428
00:16:17,670 --> 00:16:14,160
and there's

429
00:16:19,110 --> 00:16:17,680
a guarantee that the private sector has

430
00:16:20,389 --> 00:16:19,120
rights to their

431
00:16:22,629 --> 00:16:20,399
intellectual property that they've

432
00:16:24,949 --> 00:16:22,639
developed in this partnership so i think

433
00:16:27,829 --> 00:16:24,959
those are important things

434
00:16:29,350 --> 00:16:27,839
this is definitely a mission-based

435
00:16:30,629 --> 00:16:29,360
partnership

436
00:16:33,829 --> 00:16:30,639
and

437
00:16:35,990 --> 00:16:33,839
unlike the the asteroid industry mining

438
00:16:37,670 --> 00:16:36,000

industry it's a very mature customer

439
00:16:39,829 --> 00:16:37,680
base there's a direct return on

440
00:16:40,949 --> 00:16:39,839
investment uh in the in the immediate

441
00:16:43,670 --> 00:16:40,959
future

442
00:16:46,069 --> 00:16:43,680
so so maybe there's not direct parallel

443
00:16:47,189 --> 00:16:46,079
we'll have to talk more about that

444
00:16:50,069 --> 00:16:47,199
so the

445
00:16:52,310 --> 00:16:50,079
the approach is a cooperative research

446
00:16:54,310 --> 00:16:52,320
and development agreement or creda

447
00:16:55,749 --> 00:16:54,320
combined with a standard far running in

448
00:17:00,629 --> 00:16:55,759
parallel

449
00:17:04,150 --> 00:17:02,310
work with the partner to develop the

450
00:17:05,189 --> 00:17:04,160
technologies necessary to complete the

451
00:17:06,630 --> 00:17:05,199
mission

452
00:17:08,789 --> 00:17:06,640
we do that

453
00:17:11,829 --> 00:17:08,799
mostly through the crata

454
00:17:14,390 --> 00:17:11,839
we have a we have a separate far that is

455
00:17:16,470 --> 00:17:14,400
enables us to do some bartering and and

456
00:17:18,150 --> 00:17:16,480
some exchange of money but but not a

457
00:17:20,390 --> 00:17:18,160
whole lot most of the work is done under

458
00:17:21,590 --> 00:17:20,400
the cooperative research agreement and

459
00:17:23,829 --> 00:17:21,600
it's kind of

460
00:17:25,189 --> 00:17:23,839
much more like a 50 50 split of the cost

461
00:17:26,630 --> 00:17:25,199
of going into this

462
00:17:28,789 --> 00:17:26,640
so what that does for the government is

463
00:17:30,870 --> 00:17:28,799

it enables us to fly missions cheaper on

464
00:17:32,710 --> 00:17:30,880
the government side but it also

465
00:17:34,710 --> 00:17:32,720
forces industry

466
00:17:39,190 --> 00:17:34,720
or enables industry depending on how you

467
00:17:39,200 --> 00:17:43,830
open new markets

468
00:17:47,270 --> 00:17:44,830
okay

469
00:17:50,230 --> 00:17:47,280
so i'm not going to talk a lot about

470
00:17:52,230 --> 00:17:50,240
krata if you um i encourage you to go

471
00:17:54,630 --> 00:17:52,240
look at it um

472
00:17:57,430 --> 00:17:54,640
it's an alternative to space act that we

473
00:18:01,029 --> 00:17:57,440
found more suitable um for this step for

474
00:18:02,230 --> 00:18:01,039
the for the servicing type of activity

475
00:18:05,830 --> 00:18:02,240
so

476
00:18:08,070 --> 00:18:05,840
areas where the government and industry

477
00:18:10,630 --> 00:18:08,080
can partner

478
00:18:12,390 --> 00:18:10,640
clearly there's a lot of work in solar

479
00:18:14,150 --> 00:18:12,400
arrays and electric propulsion and so

480
00:18:15,750 --> 00:18:14,160
here's the question does the government

481
00:18:17,430 --> 00:18:15,760
need to pay for the entire development

482
00:18:19,990 --> 00:18:17,440
does the government need to pay for the

483
00:18:23,990 --> 00:18:20,000
entire build cycle and test cycle is

484
00:18:25,029 --> 00:18:24,000
there some commercial interest in in uh

485
00:18:27,029 --> 00:18:25,039
entity

486
00:18:28,870 --> 00:18:27,039
who has something to gain financially by

487
00:18:31,430 --> 00:18:28,880
having a

488
00:18:32,710 --> 00:18:31,440

space flight proven system and selling

489
00:18:34,310 --> 00:18:32,720
it to

490
00:18:36,390 --> 00:18:34,320
maybe commercial industry or maybe the

491
00:18:38,710 --> 00:18:36,400
government is there investment that

492
00:18:40,070 --> 00:18:38,720
partner a partner could make

493
00:18:42,230 --> 00:18:40,080
that could help the government make this

494
00:18:45,190 --> 00:18:42,240
mission more affordable is there

495
00:18:47,350 --> 00:18:45,200
asteroid boulder capture mechanisms

496
00:18:49,830 --> 00:18:47,360
capture capture mechanisms i don't i

497
00:18:52,310 --> 00:18:49,840
don't know that that that there is

498
00:18:54,150 --> 00:18:52,320
are there mining tools i don't know that

499
00:18:54,950 --> 00:18:54,160
there are

500
00:18:56,230 --> 00:18:54,960
so

501
00:18:58,870 --> 00:18:56,240
but certainly these are the kind of

502
00:19:00,310 --> 00:18:58,880
things that a partner could

503
00:19:02,789 --> 00:19:00,320
invest in

504
00:19:03,830 --> 00:19:02,799
partner with the government and fly

505
00:19:06,150 --> 00:19:03,840
and

506
00:19:07,909 --> 00:19:06,160
potentially at very low cost to the

507
00:19:09,430 --> 00:19:07,919
government

508
00:19:11,510 --> 00:19:09,440
and while guaranteeing intellectual

509
00:19:12,789 --> 00:19:11,520
property rights for that partner through

510
00:19:14,870 --> 00:19:12,799
the creative

511
00:19:17,510 --> 00:19:14,880
um so the other idea obvious this one i

512
00:19:19,270 --> 00:19:17,520
think is the most obvious one um

513
00:19:21,590 --> 00:19:19,280

for the asteroid mining community and

514
00:19:24,390 --> 00:19:21,600
for the planetary defense community we

515
00:19:26,390 --> 00:19:24,400
we want a partner we need to partner on

516
00:19:27,909 --> 00:19:26,400
how we're collecting data or at least we

517
00:19:29,590 --> 00:19:27,919
could i'd like to see a partner on how

518
00:19:31,590 --> 00:19:29,600
we're collecting data and one option is

519
00:19:33,750 --> 00:19:31,600
a data buy there's another option which

520
00:19:36,710 --> 00:19:33,760
would be if if nasa does decide that we

521
00:19:39,190 --> 00:19:36,720
need to fly new space telescopes that

522
00:19:41,510 --> 00:19:39,200
instead of seeing nasa and private

523
00:19:42,789 --> 00:19:41,520
industry as competing to build a scout

524
00:19:44,789 --> 00:19:42,799
type mission we could actually work

525
00:19:46,789 --> 00:19:44,799
together pool resources do more for less

526
00:19:48,710 --> 00:19:46,799
those kinds of things

527
00:19:50,390 --> 00:19:48,720
so so so those are the kind of things

528
00:19:53,270 --> 00:19:50,400
that i think we could do using this

529
00:19:55,830 --> 00:19:53,280
approach

530
00:19:59,590 --> 00:19:55,840
uh so here's just one example of

531
00:20:03,350 --> 00:20:01,350
if we want to go find asteroids that are

532
00:20:04,710 --> 00:20:03,360
coming to earth in our and our low delta

533
00:20:06,310 --> 00:20:04,720
v return

534
00:20:08,149 --> 00:20:06,320
the place we need to look is not as

535
00:20:10,230 --> 00:20:08,159
they're flying by earth and not going to

536
00:20:11,830 --> 00:20:10,240
come back for another 100 years it'd be

537
00:20:15,029 --> 00:20:11,840
nice if we could go look where they are

538
00:20:17,510 --> 00:20:15,039

now which is slowly looping in uh these

539
00:20:19,190 --> 00:20:17,520
would be the the the few asteroids are

540
00:20:21,110 --> 00:20:19,200
the very many asteroids actually that

541
00:20:22,149 --> 00:20:21,120
are in very earth-like orbits

542
00:20:25,510 --> 00:20:22,159
with

543
00:20:27,830 --> 00:20:25,520
long synoptic periods

544
00:20:28,789 --> 00:20:27,840
and and therefore low delta-v to return

545
00:20:30,470 --> 00:20:28,799
to earth

546
00:20:33,029 --> 00:20:30,480
these are great candidates for arm

547
00:20:35,350 --> 00:20:33,039
they're awesome candidates for asteroid

548
00:20:37,350 --> 00:20:35,360
mining and that kind of activity

549
00:20:38,950 --> 00:20:37,360
so just just one example

550
00:20:41,909 --> 00:20:38,960
maybe uh maybe

551
00:20:42,630 --> 00:20:41,919
a partner provides a telescope

552
00:20:49,110 --> 00:20:42,640
and

553
00:20:50,470 --> 00:20:49,120
mission together

554
00:20:52,230 --> 00:20:50,480
just something to think about this is

555
00:20:53,750 --> 00:20:52,240
kind of the kind of partnership

556
00:20:56,390 --> 00:20:53,760
arrangement that you could do with this

557
00:20:59,190 --> 00:20:57,510
so

558
00:21:00,870 --> 00:20:59,200
in conclusion i think clearly

559
00:21:02,549 --> 00:21:00,880
public-private partnerships can yield

560
00:21:04,549 --> 00:21:02,559
significant benefits to both parties

561
00:21:06,230 --> 00:21:04,559
there's a great history of those things

562
00:21:08,470 --> 00:21:06,240
the geocom industry started that way

563
00:21:10,149 --> 00:21:08,480

with echo the cots as cox is a great

564
00:21:12,630 --> 00:21:10,159
example hopefully satellite servicing in

565
00:21:14,390 --> 00:21:12,640
the near future will be another example

566
00:21:16,310 --> 00:21:14,400
don't forget when you're looking at

567
00:21:18,630 --> 00:21:16,320
partnership opportunities it's not just

568
00:21:21,029 --> 00:21:18,640
spacex it's not just firebase contracts

569
00:21:23,430 --> 00:21:21,039
and grants and the traditional things

570
00:21:25,430 --> 00:21:23,440
but crait is an option too and so if

571
00:21:27,830 --> 00:21:25,440
anyone wants to

572
00:21:29,270 --> 00:21:27,840
talk to us about this approach

573
00:21:30,630 --> 00:21:29,280
come see me after i'll give you my

574
00:21:32,549 --> 00:21:30,640
contact information i'll put you in

575
00:21:33,510 --> 00:21:32,559
touch with the right people

576
00:21:39,830 --> 00:21:33,520
great so

577
00:21:46,390 --> 00:21:42,789
next up we have charlie shafer

578
00:21:56,390 --> 00:21:46,400
from space services holdings

579
00:21:59,029 --> 00:21:57,510
thank you

580
00:22:00,950 --> 00:21:59,039
morning everybody my name is charlie

581
00:22:02,070 --> 00:22:00,960
chaffer i'm the ceo of space services

582
00:22:04,789 --> 00:22:02,080
holdings

583
00:22:06,950 --> 00:22:04,799
i was delighted to see the

584
00:22:09,110 --> 00:22:06,960
topic of today's discussion because i

585
00:22:10,230 --> 00:22:09,120
believe we do have a mission that's

586
00:22:12,390 --> 00:22:10,240
ongoing

587
00:22:14,870 --> 00:22:12,400
that is a public-private partnership and

588
00:22:15,990 --> 00:22:14,880

is widely focused on participation so

589
00:22:19,270 --> 00:22:16,000
i'd like to talk to you a little bit

590
00:22:20,549 --> 00:22:19,280
about it i think it might be a model

591
00:22:24,870 --> 00:22:20,559
so

592
00:22:27,110 --> 00:22:24,880
this is really

593
00:22:29,750 --> 00:22:27,120
a dream come true for me and for

594
00:22:31,350 --> 00:22:29,760
everybody back to galileo that nasa

595
00:22:33,510 --> 00:22:31,360
decided to

596
00:22:36,070 --> 00:22:33,520
release as part of its technology

597
00:22:37,909 --> 00:22:36,080
demonstration mission program the sun

598
00:22:40,230 --> 00:22:37,919
jammer mission

599
00:22:42,710 --> 00:22:40,240
solar sails aren't this won't be the

600
00:22:43,990 --> 00:22:42,720
first sail mission ever flown

601
00:22:46,070 --> 00:22:44,000
the

602
00:22:48,390 --> 00:22:46,080
japanese ikaros

603
00:22:51,350 --> 00:22:48,400
spacecraft is still flying this will be

604
00:22:52,950 --> 00:22:51,360
the largest mission ever flown 1300

605
00:22:55,750 --> 00:22:52,960
meters squared

606
00:22:56,630 --> 00:22:55,760
it's designed to answer all questions

607
00:22:59,590 --> 00:22:56,640
about

608
00:23:01,190 --> 00:22:59,600
sales as flight hardware that's worthy

609
00:23:02,230 --> 00:23:01,200
of your consideration for future

610
00:23:05,270 --> 00:23:02,240
missions

611
00:23:07,669 --> 00:23:05,280
so sun jammer has

612
00:23:10,549 --> 00:23:07,679
the as i mentioned it's a nasa-funded

613
00:23:12,710 --> 00:23:10,559

solar sail mission it's focused on

614
00:23:14,630 --> 00:23:12,720
technology demonstration

615
00:23:15,909 --> 00:23:14,640
and within the

616
00:23:18,390 --> 00:23:15,919
procurement

617
00:23:20,789 --> 00:23:18,400
uh the rfp and the award there were

618
00:23:22,630 --> 00:23:20,799
infusion requirements we'll talk mostly

619
00:23:25,830 --> 00:23:22,640
about those

620
00:23:27,830 --> 00:23:25,840
2014 maybe early 2015

621
00:23:29,430 --> 00:23:27,840
launch were co-manifested on the

622
00:23:32,149 --> 00:23:29,440
discover launch

623
00:23:35,590 --> 00:23:32,159
and we will fly the sale

624
00:23:37,430 --> 00:23:35,600
to l1 where we'll calibrate some space

625
00:23:40,390 --> 00:23:37,440
weather sensors that have been provided

626
00:23:43,269 --> 00:23:40,400
by the uk space agency and then move on

627
00:23:46,470 --> 00:23:43,279
out to a sub l1 position about twice as

628
00:23:47,990 --> 00:23:46,480
far from earth to demonstrate the value

629
00:23:49,750 --> 00:23:48,000
of sales

630
00:23:52,230 --> 00:23:49,760
one value of which is doubling the

631
00:23:55,669 --> 00:23:52,240
warning time for solar storms

632
00:23:57,990 --> 00:23:55,679
we also have a global participation

633
00:23:59,269 --> 00:23:58,000
component which we head up

634
00:24:02,470 --> 00:23:59,279
so

635
00:24:05,110 --> 00:24:02,480
the team is of course nasa providing the

636
00:24:08,070 --> 00:24:05,120
funding and the technical oversight the

637
00:24:10,870 --> 00:24:08,080
contractors legard and tustin california

638
00:24:13,430 --> 00:24:10,880

they've built and flown 150 inflatable

639
00:24:15,669 --> 00:24:13,440
and deployable missions in space so

640
00:24:18,470 --> 00:24:15,679
they're not newcomers microair space

641
00:24:20,549 --> 00:24:18,480
solutions of melbourne my company and

642
00:24:22,230 --> 00:24:20,559
then of course noah as one of the

643
00:24:25,110 --> 00:24:22,240
infusion partners

644
00:24:28,870 --> 00:24:25,120
so the opportunity here is

645
00:24:30,230 --> 00:24:28,880
uh that we are one of the first

646
00:24:32,950 --> 00:24:30,240
ever

647
00:24:35,750 --> 00:24:32,960
commercial rights holders to a nasa

648
00:24:37,990 --> 00:24:35,760
mission how do we get it we asked for it

649
00:24:40,710 --> 00:24:38,000
in the rfp

650
00:24:43,830 --> 00:24:40,720
the infusion requirement envisioned

651
00:24:45,830 --> 00:24:43,840
participation by commercial partners

652
00:24:47,750 --> 00:24:45,840
we provided an offer that includes

653
00:24:50,870 --> 00:24:47,760
direct cash payments to the mission to

654
00:24:52,149 --> 00:24:50,880
fly some of our payload and an extensive

655
00:24:53,830 --> 00:24:52,159
epo

656
00:24:56,470 --> 00:24:53,840
outreach effort centered around the

657
00:24:59,269 --> 00:24:56,480
website and in exchange for that we now

658
00:25:01,510 --> 00:24:59,279
have the rights to monetize web traffic

659
00:25:03,029 --> 00:25:01,520
and to provide sponsorship opportunities

660
00:25:04,630 --> 00:25:03,039
throughout the mission

661
00:25:07,110 --> 00:25:04,640
a little bit about us

662
00:25:08,789 --> 00:25:07,120
we go back about

663
00:25:09,669 --> 00:25:08,799

30 years plus

664
00:25:43,269 --> 00:25:09,679
a

665
00:25:48,710 --> 00:25:43,279
uh

666
00:25:52,390 --> 00:25:48,720
accomplishments to date

667
00:25:54,950 --> 00:25:52,400
include the deployment of the sale

668
00:25:59,350 --> 00:25:57,510
size of the sail on the ground and for

669
00:26:01,430 --> 00:25:59,360
those of you that know sailcraft you'll

670
00:26:04,950 --> 00:26:01,440
know that it's harder to do it

671
00:26:07,990 --> 00:26:04,960
in 1g than it is in zero g

672
00:26:11,029 --> 00:26:08,000
we have worked with noaa over the course

673
00:26:12,630 --> 00:26:11,039
of five competitively awarded contracts

674
00:26:15,430 --> 00:26:12,640
to help them define

675
00:26:17,430 --> 00:26:15,440
a sale-based approach to a data buy for

676
00:26:19,350 --> 00:26:17,440
commercial space weather

677
00:26:22,390 --> 00:26:19,360
and back in the early days when we're

678
00:26:24,390 --> 00:26:22,400
first working on solar sails we entered

679
00:26:26,549 --> 00:26:24,400
into a space act agreement with nasa

680
00:26:29,510 --> 00:26:26,559
langley at their request

681
00:26:30,470 --> 00:26:29,520
to share some ideas about uh deployable

682
00:26:32,390 --> 00:26:30,480
booms

683
00:26:34,310 --> 00:26:32,400
so here's the core of what i'd like to

684
00:26:37,350 --> 00:26:34,320
speak about today it's our business

685
00:26:39,110 --> 00:26:37,360
model and it does include

686
00:26:41,029 --> 00:26:39,120
sort of three components

687
00:26:43,269 --> 00:26:41,039
the first is that you and and this is

688
00:26:45,510 --> 00:26:43,279

why i think it's applicable not just to

689
00:26:47,990 --> 00:26:45,520
sales but to any

690
00:26:50,230 --> 00:26:48,000
technology asteroid retrieval has all of

691
00:26:52,870 --> 00:26:50,240
these components so the first thing you

692
00:26:55,190 --> 00:26:52,880
have to have is a real and a compelling

693
00:26:58,310 --> 00:26:55,200
space mission we have a motto at our

694
00:27:01,029 --> 00:26:58,320
company no cartoons only flight

695
00:27:03,750 --> 00:27:01,039
the mesh the mission can be compelling

696
00:27:06,630 --> 00:27:03,760
on the basis of where it's going

697
00:27:09,029 --> 00:27:06,640
who's on board or what it's doing any of

698
00:27:10,710 --> 00:27:09,039
those components can make a compelling

699
00:27:11,830 --> 00:27:10,720
space mission but remember it has to be

700
00:27:14,070 --> 00:27:11,840
real

701
00:27:15,430 --> 00:27:14,080
the second component is

702
00:27:17,029 --> 00:27:15,440
make the world aware of what you're

703
00:27:18,870 --> 00:27:17,039
doing

704
00:27:22,389 --> 00:27:18,880
you do that through earned media of

705
00:27:24,310 --> 00:27:22,399
course our most recent celestis flight

706
00:27:26,950 --> 00:27:24,320
where we launched scotty and gordo

707
00:27:29,669 --> 00:27:26,960
cooper and 300 other folks attracted

708
00:27:32,549 --> 00:27:29,679
more than a billion media impressions

709
00:27:35,830 --> 00:27:32,559
and our website and our webcast was an

710
00:27:38,630 --> 00:27:35,840
equal number of unique impressions so

711
00:27:40,950 --> 00:27:38,640
getting earned media is easy for

712
00:27:43,110 --> 00:27:40,960
compelling space missions if you know

713
00:27:44,870 --> 00:27:43,120

how to do it it's more difficult if it's

714
00:27:48,389 --> 00:27:44,880
a boring space mission i'll give you

715
00:27:50,870 --> 00:27:48,399
that but it it is a key component of

716
00:27:53,830 --> 00:27:50,880
global awareness the second is through

717
00:27:56,310 --> 00:27:53,840
advertising we are a groupon evergreen

718
00:27:59,510 --> 00:27:56,320
partner we do pay per click on google we

719
00:28:01,029 --> 00:27:59,520
have a broad scope of methods by which

720
00:28:03,269 --> 00:28:01,039
we let the world know that we're

721
00:28:05,590 --> 00:28:03,279
involved in a compelling space mission

722
00:28:07,350 --> 00:28:05,600
the final component of the

723
00:28:10,230 --> 00:28:07,360
business model which again i think is

724
00:28:11,510 --> 00:28:10,240
relevant for missions going forward

725
00:28:14,310 --> 00:28:11,520
is pretty simple

726
00:28:16,310 --> 00:28:14,320
take money wherever it exists so we have

727
00:28:18,310 --> 00:28:16,320
traditional revenues we have us

728
00:28:21,750 --> 00:28:18,320
government customers we have commercial

729
00:28:24,310 --> 00:28:21,760
customers that buy data or buy hardware

730
00:28:26,870 --> 00:28:24,320
or buy demonstrations but we also have

731
00:28:28,870 --> 00:28:26,880
what i call non-traditional revenues we

732
00:28:32,149 --> 00:28:28,880
monetize internet you get unique

733
00:28:33,830 --> 00:28:32,159
visitors i was asked to give a testimony

734
00:28:36,470 --> 00:28:33,840
to the senate space committee a few

735
00:28:39,669 --> 00:28:36,480
years back i told senator brownback that

736
00:28:40,789 --> 00:28:39,679
if nasa had a shopping cart on its mars

737
00:28:42,710 --> 00:28:40,799
landing

738
00:28:45,190 --> 00:28:42,720

web pages they probably could have

739
00:28:46,630 --> 00:28:45,200
financed to subsequent missions i'm glad

740
00:28:48,789 --> 00:28:46,640
that they don't because that's my

741
00:28:51,669 --> 00:28:48,799
business but taking

742
00:28:53,190 --> 00:28:51,679
interested space interested web traffic

743
00:28:55,510 --> 00:28:53,200
and learning how to monetize it's

744
00:28:58,070 --> 00:28:55,520
something we've been doing for 15 years

745
00:29:00,789 --> 00:28:58,080
sponsorship we've done missions for 20th

746
00:29:03,669 --> 00:29:00,799
century fox nescafe barrels writings

747
00:29:06,950 --> 00:29:03,679
instruments in england and a number of

748
00:29:08,789 --> 00:29:06,960
other uh key sponsors and then finally

749
00:29:12,870 --> 00:29:08,799
memorial space flight certainly a

750
00:29:14,950 --> 00:29:12,880
non-traditional revenue stream so uh in

751
00:29:17,029 --> 00:29:14,960
the form of solar cell

752
00:29:18,870 --> 00:29:17,039
commercial infusion the first

753
00:29:21,350 --> 00:29:18,880
application i've already mentioned this

754
00:29:23,830 --> 00:29:21,360
is the outcome of a study we did for

755
00:29:25,029 --> 00:29:23,840
noaa that shows how a data purchase

756
00:29:27,830 --> 00:29:25,039
approach

757
00:29:30,710 --> 00:29:27,840
to sale delivered space weather

758
00:29:33,990 --> 00:29:30,720
information is a lower cost be more

759
00:29:35,590 --> 00:29:34,000
comprehensive and c provides at least

760
00:29:37,750 --> 00:29:35,600
double the warning time and if you're a

761
00:29:39,350 --> 00:29:37,760
nuclear power plant trying to shut down

762
00:29:41,510 --> 00:29:39,360
during a solar storm because you're

763
00:29:44,389 --> 00:29:41,520

worried about the grid overheating

764
00:29:45,590 --> 00:29:44,399
that extra 45 minutes matters if you're

765
00:29:48,070 --> 00:29:45,600
piloting an

766
00:29:50,230 --> 00:29:48,080
airplane over the poles and you need to

767
00:29:52,789 --> 00:29:50,240
come down to a lower

768
00:29:55,269 --> 00:29:52,799
altitude or even land having that extra

769
00:29:56,630 --> 00:29:55,279
time matters if you're in this space

770
00:29:58,470 --> 00:29:56,640
station and you need to get to the

771
00:30:00,230 --> 00:29:58,480
russian side of it because it's more

772
00:30:03,909 --> 00:30:00,240
heavily

773
00:30:06,789 --> 00:30:03,919
shielded that extra time matters

774
00:30:08,950 --> 00:30:06,799
so i'll skip communications i'll talk

775
00:30:11,990 --> 00:30:08,960
about entertainment missions

776
00:30:14,549 --> 00:30:12,000
uh certainly anybody that's ever seen

777
00:30:17,190 --> 00:30:14,559
in america's cup race understands the

778
00:30:18,950 --> 00:30:17,200
concept of logos on the sale we've

779
00:30:20,950 --> 00:30:18,960
already tested the paint we know how to

780
00:30:23,350 --> 00:30:20,960
do it we know how to cover

781
00:30:26,310 --> 00:30:23,360
x percent of sales and not reduce the

782
00:30:29,110 --> 00:30:26,320
propulsive reflectivity uh it's just a

783
00:30:31,110 --> 00:30:29,120
matter of time once sales get going that

784
00:30:34,070 --> 00:30:31,120
you'll see the race around the moon that

785
00:30:35,750 --> 00:30:34,080
actually is what sun jammer is named for

786
00:30:37,830 --> 00:30:35,760
back in june we announced that sir

787
00:30:39,430 --> 00:30:37,840
arthur clark's dna will be part of our

788
00:30:42,710 --> 00:30:39,440

cosmic archive

789
00:30:45,669 --> 00:30:42,720
on the sun jammer mission and uh clark

790
00:30:47,990 --> 00:30:45,679
wrote sunjammer as a story about a race

791
00:30:48,830 --> 00:30:48,000
around the moon

792
00:30:51,830 --> 00:30:48,840
so

793
00:30:53,510 --> 00:30:51,840
uh space weather i'll stick

794
00:30:55,190 --> 00:30:53,520
let's say one thing about space weather

795
00:30:57,990 --> 00:30:55,200
this is uh

796
00:31:00,789 --> 00:30:58,000
a chart provided by the new

797
00:31:03,269 --> 00:31:00,799
uh director of of noaa dr katherine

798
00:31:04,630 --> 00:31:03,279
sullivan assistant secretary of commerce

799
00:31:07,909 --> 00:31:04,640
last year

800
00:31:10,149 --> 00:31:07,919
everybody in commercial space

801
00:31:12,389 --> 00:31:10,159
is seeking the hockey stick

802
00:31:15,350 --> 00:31:12,399
many people are promising the hockey

803
00:31:18,070 --> 00:31:15,360
stick in terms of just get started and

804
00:31:20,470 --> 00:31:18,080
you'll see dramatic growth in the use

805
00:31:21,509 --> 00:31:20,480
here's the hockey stick the consumer

806
00:31:23,590 --> 00:31:21,519
growth

807
00:31:25,430 --> 00:31:23,600
in the space weather prediction center's

808
00:31:27,669 --> 00:31:25,440
subscription service

809
00:31:30,870 --> 00:31:27,679
as we become a more wired planet and

810
00:31:35,269 --> 00:31:30,880
dependent upon space weather information

811
00:31:39,990 --> 00:31:39,029
game changer i've described that

812
00:31:42,389 --> 00:31:40,000
and

813
00:31:45,269 --> 00:31:42,399

so what are we doing with sun jammer we

814
00:31:47,430 --> 00:31:45,279
call it explore educate and entertain

815
00:31:49,190 --> 00:31:47,440
the exploration component is the proof

816
00:31:51,350 --> 00:31:49,200
of the technology we're going to take it

817
00:31:52,870 --> 00:31:51,360
fly it into deep space

818
00:31:55,430 --> 00:31:52,880
educate we have

819
00:31:58,310 --> 00:31:55,440
kids school students

820
00:32:00,389 --> 00:31:58,320
from tustin california to zambia

821
00:32:02,470 --> 00:32:00,399
participating in the mission and

822
00:32:05,830 --> 00:32:02,480
remember we're

823
00:32:08,389 --> 00:32:05,840
14 to 18 months out from the flight

824
00:32:11,029 --> 00:32:08,399
you only heard about curiosity you all

825
00:32:13,430 --> 00:32:11,039
heard about curiosity well in advance

826
00:32:15,509 --> 00:32:13,440
the world learned about curiosity seven

827
00:32:18,149 --> 00:32:15,519
days in advance so we're in the process

828
00:32:19,750 --> 00:32:18,159
of building that crescendo i guarantee

829
00:32:23,669 --> 00:32:19,760
you when there are

830
00:32:26,070 --> 00:32:23,679
six hd cameras and one gopro fly away

831
00:32:29,590 --> 00:32:26,080
camera taking images of that fully

832
00:32:31,509 --> 00:32:29,600
deployed sale out in deepest space there

833
00:32:33,750 --> 00:32:31,519
isn't a sports bar on the planet that's

834
00:32:35,590 --> 00:32:33,760
not going to have that on cnn and people

835
00:32:37,669 --> 00:32:35,600
are going to see that

836
00:32:39,430 --> 00:32:37,679
finally and that slips over into the

837
00:32:41,750 --> 00:32:39,440
entertainment component

838
00:32:43,590 --> 00:32:41,760

we have the music of sun jammer we have

839
00:32:46,149 --> 00:32:43,600
launch events we have any number of

840
00:32:47,750 --> 00:32:46,159
things uh planned and we're beginning to

841
00:32:48,549 --> 00:32:47,760
implement them

842
00:32:50,870 --> 00:32:48,559
uh

843
00:32:53,430 --> 00:32:50,880
celeste is we're flying payload

844
00:32:54,470 --> 00:32:53,440
so i'll finish up here with what my

845
00:32:58,870 --> 00:32:54,480
thoughts

846
00:33:00,149 --> 00:32:58,880
about what is relevant for today's topic

847
00:33:02,389 --> 00:33:00,159
the first is that innovative

848
00:33:04,230 --> 00:33:02,399
partnerships can succeed there's some

849
00:33:07,350 --> 00:33:04,240
hiccups along the way

850
00:33:09,430 --> 00:33:07,360
i thought for certain when we

851
00:33:11,830 --> 00:33:09,440
when when we

852
00:33:13,509 --> 00:33:11,840
were announced the winner that i was

853
00:33:16,470 --> 00:33:13,519
going to have a huge

854
00:33:19,190 --> 00:33:16,480
i'll say it battle at nasa dragging a

855
00:33:20,789 --> 00:33:19,200
space act agreement out of them to allow

856
00:33:22,710 --> 00:33:20,799
me to do the things i'd want in the

857
00:33:27,269 --> 00:33:22,720
procurement

858
00:33:29,269 --> 00:33:27,279
not a bit uh cots and uh new ways of

859
00:33:32,149 --> 00:33:29,279
doing things took hold

860
00:33:34,870 --> 00:33:32,159
we have uh an agreement

861
00:33:36,789 --> 00:33:34,880
we have the rights those rights include

862
00:33:39,830 --> 00:33:36,799
don't mess with our mission which we

863
00:33:42,789 --> 00:33:39,840

understand uh all of our activities

864
00:33:45,350 --> 00:33:42,799
occur post the accomplishment of the

865
00:33:48,310 --> 00:33:45,360
nasa mission but there was a lot of give

866
00:33:51,269 --> 00:33:48,320
and take in terms of what is the proper

867
00:33:52,950 --> 00:33:51,279
format to do that but we can succeed the

868
00:33:54,789 --> 00:33:52,960
science and technical goals of the

869
00:33:58,710 --> 00:33:54,799
mission came first

870
00:34:01,669 --> 00:33:58,720
the infusion between noaa and us

871
00:34:02,789 --> 00:34:01,679
accomplished also and we've figured out

872
00:34:05,350 --> 00:34:02,799
a bunch of new

873
00:34:07,190 --> 00:34:05,360
missions and things that we can use

874
00:34:09,109 --> 00:34:07,200
solar sails for i mentioned space

875
00:34:11,589 --> 00:34:09,119
weather obviously anybody that's been to

876
00:34:14,069 --> 00:34:11,599
an asteroid conference knows that sales

877
00:34:16,470 --> 00:34:14,079
have a role there but again i will say

878
00:34:19,829 --> 00:34:16,480
that it is not the the model is not

879
00:34:22,149 --> 00:34:19,839
unique to solar sails

880
00:34:24,230 --> 00:34:22,159
cell missions already in planning public

881
00:34:26,710 --> 00:34:24,240
engagement technologies and methods

882
00:34:29,030 --> 00:34:26,720
evolving is as almost as fast as the

883
00:34:31,750 --> 00:34:29,040
mission technologies we're trying to

884
00:34:34,470 --> 00:34:31,760
keep up with developing apps with

885
00:34:36,389 --> 00:34:34,480
developing new forms of interaction for

886
00:34:39,349 --> 00:34:36,399
our public the more folks the more

887
00:34:41,589 --> 00:34:39,359
eyeballs we show on this mission the

888
00:34:43,990 --> 00:34:41,599

more dollars flow to us and the more

889
00:34:47,030 --> 00:34:44,000
dollars that flow to the mission

890
00:34:50,230 --> 00:34:47,040
so that's me i'm here in houston and

891
00:34:52,470 --> 00:34:50,240
happy to be a part of today's

892
00:34:56,310 --> 00:34:52,480
program thanks

893
00:35:01,589 --> 00:34:58,390
fantastic all right

894
00:35:03,030 --> 00:35:01,599
so we've got now 15 minutes of

895
00:35:05,190 --> 00:35:03,040
questions

896
00:35:09,030 --> 00:35:05,200
i want to throw it out first do we have

897
00:35:11,030 --> 00:35:09,040
anything that's come online joe

898
00:35:13,589 --> 00:35:11,040
okay

899
00:35:16,630 --> 00:35:13,599
we've got our speakers in the room

900
00:35:18,710 --> 00:35:16,640
any questions uh

901
00:35:21,750 --> 00:35:18,720
ideas peaked

902
00:35:25,670 --> 00:35:21,760
from our audience members

903
00:35:29,430 --> 00:35:27,190
okay

904
00:35:32,550 --> 00:35:29,440
we do have oh please so i have a

905
00:35:34,150 --> 00:35:32,560
question about solar sails and and uh

906
00:35:35,750 --> 00:35:34,160
gravity or uh

907
00:35:37,430 --> 00:35:35,760
planetary defense

908
00:35:39,349 --> 00:35:37,440
where you go

909
00:35:40,870 --> 00:35:39,359
oh

910
00:35:42,870 --> 00:35:40,880
so um

911
00:35:49,990 --> 00:35:42,880
presumably you can use a solar sail like

912
00:35:56,470 --> 00:35:51,589
yes

913
00:35:58,950 --> 00:35:56,480

it's a in-space propulsion system that

914
00:36:01,829 --> 00:35:58,960
has a variety of applications the

915
00:36:04,710 --> 00:36:01,839
sunlight is the photonic pressure is

916
00:36:06,790 --> 00:36:04,720
constant so we have to end up jiving and

917
00:36:08,870 --> 00:36:06,800
tacking just like you

918
00:36:10,470 --> 00:36:08,880
use a sailboat but

919
00:36:13,430 --> 00:36:10,480
that's what we'll be demonstrating is

920
00:36:15,829 --> 00:36:13,440
that maneuverability uh and it can be

921
00:36:17,589 --> 00:36:15,839
attached to you know that depends on the

922
00:36:19,750 --> 00:36:17,599
size of the sail the thickness of the

923
00:36:27,430 --> 00:36:19,760
material that you use but certainly

924
00:36:31,430 --> 00:36:29,109
actually i have a question on that on

925
00:36:33,670 --> 00:36:31,440
the solar sail too uh

926
00:36:36,550 --> 00:36:33,680
i'm not sure when the launch is of the

927
00:36:38,230 --> 00:36:36,560
sun jammer but have you already um

928
00:36:40,950 --> 00:36:38,240
started with your

929
00:36:42,870 --> 00:36:40,960
public outreach have you gotten a

930
00:36:45,190 --> 00:36:42,880
following already have you started to

931
00:36:50,470 --> 00:36:45,200
see people hitting the site and things

932
00:36:50,480 --> 00:36:54,550
love that question sunjammermission.com

933
00:36:59,430 --> 00:36:57,030
yes we have a large number of people

934
00:37:01,670 --> 00:36:59,440
that are already on the mailing list we

935
00:37:04,069 --> 00:37:01,680
also facebook and tweet on a regular

936
00:37:07,430 --> 00:37:04,079
basis about the mission we've done a

937
00:37:09,750 --> 00:37:07,440
number of media rollouts we did a press

938
00:37:11,510 --> 00:37:09,760

conference in june where we announced

939
00:37:14,230 --> 00:37:11,520
sir arthur we got another one coming up

940
00:37:16,390 --> 00:37:14,240
in december we'll announce the first

941
00:37:18,069 --> 00:37:16,400
major consumer products marketing

942
00:37:20,630 --> 00:37:18,079
partner that we have i can't do that

943
00:37:23,750 --> 00:37:20,640
today but but we have that as well and

944
00:37:25,270 --> 00:37:23,760
so we have a series of planned events

945
00:37:26,790 --> 00:37:25,280
and announcements

946
00:37:30,470 --> 00:37:26,800
some of which i think are pretty cool

947
00:37:32,790 --> 00:37:30,480
coming uh to the point uh of the launch

948
00:37:39,109 --> 00:37:32,800
to answer your question the launch is

949
00:37:41,270 --> 00:37:39,119
currently on the manifest for q4 of 2014

950
00:37:43,109 --> 00:37:41,280
my guess is having been doing this stuff

951
00:37:43,990 --> 00:37:43,119
for 30 years it'll move to the right a

952
00:37:44,870 --> 00:37:44,000
little bit

953
00:37:47,349 --> 00:37:44,880
but

954
00:37:50,470 --> 00:37:47,359
we are a secondary i have a t-shirt that

955
00:37:52,710 --> 00:37:50,480
says being a secondary sucks but

956
00:37:53,710 --> 00:37:52,720
in this case we're a happy secondary and

957
00:37:56,710 --> 00:37:53,720
so we'll be

958
00:38:04,390 --> 00:37:56,720
manifested with the discover spacecraft

959
00:38:08,550 --> 00:38:06,310
you had a photograph of a band and you

960
00:38:14,630 --> 00:38:08,560
mentioned the music of sun jammer what

961
00:38:21,750 --> 00:38:16,710
there's sort of two components to that

962
00:38:23,030 --> 00:38:21,760
one is uh on our website in q1 next year

963
00:38:24,950 --> 00:38:23,040

we're going to open it up for

964
00:38:27,190 --> 00:38:24,960
everybody's playlists

965
00:38:29,190 --> 00:38:27,200
mine includes come sail away here comes

966
00:38:30,150 --> 00:38:29,200
the sun all that kind of stuff old guy

967
00:38:35,910 --> 00:38:30,160
music

968
00:38:38,310 --> 00:38:35,920
also have are lining up a series of uh

969
00:38:40,710 --> 00:38:38,320
celebrities who are doing songs for the

970
00:38:42,630 --> 00:38:40,720
mission they'll be part of what we call

971
00:38:45,589 --> 00:38:42,640
the cosmic archive sort of like the

972
00:38:46,870 --> 00:38:45,599
voyager mission only in this instance

973
00:38:48,950 --> 00:38:46,880
some of the performers will be

974
00:38:50,710 --> 00:38:48,960
performing the music for the first time

975
00:38:52,870 --> 00:38:50,720
in some of their concerts

976
00:38:54,310 --> 00:38:52,880
i wish i could tell you more i'm dying

977
00:38:56,550 --> 00:38:54,320
to tell you more because it will

978
00:38:58,630 --> 00:38:56,560
increase the traffic on our website but

979
00:38:59,829 --> 00:38:58,640
we do plan both

980
00:39:02,150 --> 00:38:59,839
broad

981
00:39:04,230 --> 00:39:02,160
participation where anybody will have

982
00:39:07,030 --> 00:39:04,240
people submit songs that will put on the

983
00:39:09,589 --> 00:39:07,040
cosmic archive as well so

984
00:39:16,310 --> 00:39:09,599
broad-based public participation as well

985
00:39:20,790 --> 00:39:17,829
i guess this question is for jason or

986
00:39:23,750 --> 00:39:20,800
jen uh we heard some different kinds of

987
00:39:26,230 --> 00:39:23,760
partnership ideas different ways of

988
00:39:27,670 --> 00:39:26,240

engaging with nasa from the program

989
00:39:30,390 --> 00:39:27,680
perspective

990
00:39:32,710 --> 00:39:30,400
what are you guys more amenable to

991
00:39:35,349 --> 00:39:32,720
for just grand challenge type activities

992
00:39:36,630 --> 00:39:35,359
or ones that cross the other side into

993
00:39:38,150 --> 00:39:36,640
the mission how do you guys see

994
00:39:40,950 --> 00:39:38,160
structuring that

995
00:39:43,349 --> 00:39:40,960
so um

996
00:39:45,030 --> 00:39:43,359
i represent uh the grand challenge and

997
00:39:46,790 --> 00:39:45,040
so i'm listening

998
00:39:48,470 --> 00:39:46,800
with my ears

999
00:39:50,230 --> 00:39:48,480
for that number one

1000
00:39:52,870 --> 00:39:50,240
uh but number two

1001
00:39:53,829 --> 00:39:52,880
uh as the lead for this session i'm

1002
00:39:56,870 --> 00:39:53,839
listening

1003
00:39:57,910 --> 00:39:56,880
for all the ideas that can then be put

1004
00:40:00,950 --> 00:39:57,920
into

1005
00:40:02,310 --> 00:40:00,960
the findings for the mission as well so

1006
00:40:04,390 --> 00:40:02,320
while i do

1007
00:40:07,109 --> 00:40:04,400
wear the grand challenge hat and jen

1008
00:40:10,069 --> 00:40:07,119
helps me with that hat

1009
00:40:12,069 --> 00:40:10,079
this is about the asteroid initiative

1010
00:40:14,630 --> 00:40:12,079
right now and so it's pulling out all

1011
00:40:16,870 --> 00:40:14,640
the best ideas that can be laid on the

1012
00:40:24,550 --> 00:40:16,880
table and factored into

1013
00:40:28,710 --> 00:40:26,790

can these solar sails be configured in

1014
00:40:31,349 --> 00:40:28,720
an array so that you can use the solar

1015
00:40:32,790 --> 00:40:31,359
pressure and the arkovsky effect to your

1016
00:40:37,349 --> 00:40:32,800
advantage when trying to move an

1017
00:40:41,670 --> 00:40:39,109
i went to the foreign service school at

1018
00:40:46,550 --> 00:40:41,680
georgetown i'd have to ask the engineers

1019
00:40:50,309 --> 00:40:49,030
i'll i'll jump in we've got a question

1020
00:40:54,309 --> 00:40:50,319
from

1021
00:40:55,589 --> 00:40:54,319
mike helton at h-a-d-a-y-a-n-o

1022
00:40:58,390 --> 00:40:55,599
on twitter

1023
00:41:00,870 --> 00:40:58,400
uh his question is has there been or is

1024
00:41:03,430 --> 00:41:00,880
there a consideration to involve a group

1025
00:41:05,430 --> 00:41:03,440
of philanthropists to partner with nasa

1026
00:41:07,750 --> 00:41:05,440
to supply funds

1027
00:41:10,150 --> 00:41:07,760
and i'll throw that out there to to our

1028
00:41:13,109 --> 00:41:10,160
speakers uh since you've been out uh

1029
00:41:15,190 --> 00:41:13,119
engaging in partnership has uh

1030
00:41:17,270 --> 00:41:15,200
has discussion with philanthrop

1031
00:41:20,630 --> 00:41:17,280
philanthropists uh

1032
00:41:27,430 --> 00:41:20,640
crossed your mind or actually been

1033
00:41:32,390 --> 00:41:29,750
yes yeah from our perspective we

1034
00:41:35,349 --> 00:41:32,400
generally approach them as uh invest

1035
00:41:39,349 --> 00:41:35,359
investors not for philanthropists

1036
00:41:41,670 --> 00:41:39,359
but a huge part of what we do is through

1037
00:41:43,430 --> 00:41:41,680
501 c 3s

1038
00:41:46,230 --> 00:41:43,440

we're partnered with the conrad

1039
00:41:50,230 --> 00:41:46,240
foundation we're working with other c3s

1040
00:41:53,829 --> 00:41:50,240
around the world and so would be easy to

1041
00:41:55,910 --> 00:41:53,839
try to vector interested people

1042
00:41:58,150 --> 00:41:55,920
who are looking for that tax

1043
00:42:00,390 --> 00:41:58,160
deductibility and

1044
00:42:02,550 --> 00:42:00,400
into the education programs i should

1045
00:42:04,630 --> 00:42:02,560
also mention if i may that we've been

1046
00:42:06,550 --> 00:42:04,640
working very closely with our partners

1047
00:42:09,510 --> 00:42:06,560
at the marshall space flight center in

1048
00:42:11,510 --> 00:42:09,520
epo they've been unbelievably supportive

1049
00:42:13,750 --> 00:42:11,520
they've asked us to do some events that

1050
00:42:15,750 --> 00:42:13,760
they couldn't didn't have the budget for

1051
00:42:17,589 --> 00:42:15,760
we had the budget to do it so that in

1052
00:42:19,990 --> 00:42:17,599
that way we're also trying to benefit

1053
00:42:21,670 --> 00:42:20,000
the mission do it making

1054
00:42:29,750 --> 00:42:21,680
education and public outreach

1055
00:42:32,390 --> 00:42:30,870
i haven't

1056
00:42:34,790 --> 00:42:32,400
personally talked

1057
00:42:37,109 --> 00:42:34,800
um with with such people but i know that

1058
00:42:39,349 --> 00:42:37,119
there are there are conversations like

1059
00:42:41,430 --> 00:42:39,359
that going on um

1060
00:42:43,670 --> 00:42:41,440
nasa has great potential to do

1061
00:42:45,670 --> 00:42:43,680
philanthropic things

1062
00:42:48,069 --> 00:42:45,680
one example would be you know helping

1063
00:42:50,309 --> 00:42:48,079

solve world hunger for example by using

1064
00:42:52,230 --> 00:42:50,319
space assets to measure soil

1065
00:42:54,470 --> 00:42:52,240
nitrogen composition and things like

1066
00:42:56,870 --> 00:42:54,480
that and i have certainly heard of

1067
00:42:58,870 --> 00:42:56,880
philanthropic organizations

1068
00:43:01,430 --> 00:42:58,880
meeting with nasa discussing with nasa

1069
00:43:02,870 --> 00:43:01,440
ways that we could partner to

1070
00:43:10,950 --> 00:43:02,880
do things that those kind of

1071
00:43:13,990 --> 00:43:12,630
this is actually still a response but

1072
00:43:16,950 --> 00:43:14,000
i've talked to a number of people who

1073
00:43:19,349 --> 00:43:16,960
seem to have an interest in um promoting

1074
00:43:21,190 --> 00:43:19,359
the idea of education i mean in this

1075
00:43:23,910 --> 00:43:21,200
country in particular i think there's a

1076
00:43:26,309 --> 00:43:23,920
a role for philanthropy in providing

1077
00:43:38,550 --> 00:43:26,319
educational tools for schools to embrace

1078
00:43:43,270 --> 00:43:40,950
yeah so one from online um the question

1079
00:43:45,510 --> 00:43:43,280
is about engaging uh universities as

1080
00:43:47,109 --> 00:43:45,520
well as uh foreign countries or foreign

1081
00:43:48,950 --> 00:43:47,119
space uh

1082
00:43:50,950 --> 00:43:48,960
entities who are interested in in

1083
00:43:52,710 --> 00:43:50,960
participating in that kind of thing

1084
00:44:03,109 --> 00:43:52,720
um it's kind of generic i'll just open

1085
00:44:07,829 --> 00:44:05,670
i alluded to the fact that we're having

1086
00:44:10,390 --> 00:44:07,839
we have two space weather instruments

1087
00:44:13,109 --> 00:44:10,400
magnetometers that's no bigger than this

1088
00:44:16,150 --> 00:44:13,119

it's an amazing machine and a solar wind

1089
00:44:18,950 --> 00:44:16,160
analyzer both provided by university

1090
00:44:23,109 --> 00:44:18,960
college and i believe it's kings college

1091
00:44:26,390 --> 00:44:23,119
in london through the uk space agency so

1092
00:44:27,510 --> 00:44:26,400
sun jammer is also involving

1093
00:44:29,829 --> 00:44:27,520
foreign

1094
00:44:31,270 --> 00:44:29,839
non-u.s space agencies

1095
00:44:41,910 --> 00:44:31,280
on

1096
00:44:43,670 --> 00:44:41,920
shaffer specifically um

1097
00:44:45,750 --> 00:44:43,680
i don't quite understand the the full

1098
00:44:46,710 --> 00:44:45,760
revenue model for your your company but

1099
00:44:48,309 --> 00:44:46,720
can you talk a little bit about

1100
00:44:49,109 --> 00:44:48,319
proportionately how much of it comes

1101
00:44:51,510 --> 00:44:49,119
from

1102
00:44:53,990 --> 00:44:51,520
government sources versus private and on

1103
00:44:56,150 --> 00:44:54,000
the private side do you see that that

1104
00:44:57,670 --> 00:44:56,160
source of revenue extensible to the

1105
00:44:59,510 --> 00:44:57,680
orders of magnitude more expensive

1106
00:45:04,630 --> 00:44:59,520
missions where we're talking about human

1107
00:45:08,710 --> 00:45:06,870
um taking the second part first there

1108
00:45:11,270 --> 00:45:08,720
are companies out there that are are

1109
00:45:14,230 --> 00:45:11,280
talking about using the same model that

1110
00:45:16,630 --> 00:45:14,240
we're implementing for human missions

1111
00:45:18,950 --> 00:45:16,640
uh i i have to say that the jury's out

1112
00:45:21,589 --> 00:45:18,960
on that just because we're in the very

1113
00:45:23,990 --> 00:45:21,599

early parts of doing of doing these

1114
00:45:25,750 --> 00:45:24,000
types of missions there's no question

1115
00:45:27,990 --> 00:45:25,760
that if you look at the olympics or you

1116
00:45:29,030 --> 00:45:28,000
look at the world cup or you look at any

1117
00:45:32,470 --> 00:45:29,040
sort of

1118
00:45:34,710 --> 00:45:32,480
of high visibility activity the the

1119
00:45:37,030 --> 00:45:34,720
dollars available to monetize the

1120
00:45:39,430 --> 00:45:37,040
eyeballs that are on those events

1121
00:45:41,030 --> 00:45:39,440
are quite high and at the level that

1122
00:45:44,150 --> 00:45:41,040
that permit that

1123
00:45:46,390 --> 00:45:44,160
our money is mostly private uh the the

1124
00:45:48,950 --> 00:45:46,400
good news is that the mission is paid

1125
00:45:52,150 --> 00:45:48,960
for by in this for sun jammer the

1126
00:45:54,870 --> 00:45:52,160
mission is paid for by the government uh

1127
00:45:57,589 --> 00:45:54,880
we are flowing additional dollars and

1128
00:46:00,150 --> 00:45:57,599
activities into it but we're not getting

1129
00:46:02,710 --> 00:46:00,160
any government dollars out of sun jammer

1130
00:46:05,670 --> 00:46:02,720
it's all risk capital uh

1131
00:46:09,349 --> 00:46:05,680
involved at this point

1132
00:46:12,630 --> 00:46:09,359
i think that going forward uh the model

1133
00:46:15,430 --> 00:46:12,640
can really apply across any space

1134
00:46:17,589 --> 00:46:15,440
mission as long as you deliver

1135
00:46:19,270 --> 00:46:17,599
what people are looking for which is a

1136
00:46:22,710 --> 00:46:19,280
compelling

1137
00:46:24,550 --> 00:46:22,720
experience that's handled professionally

1138
00:46:26,230 --> 00:46:24,560

and provides

1139
00:46:29,109 --> 00:46:26,240
a reason for people to stay on your

1140
00:46:32,390 --> 00:46:29,119
website and click through to website

1141
00:46:34,230 --> 00:46:32,400
uh users some of our follow-on missions

1142
00:46:36,870 --> 00:46:34,240
the the space weather mission for

1143
00:46:38,790 --> 00:46:36,880
example with noaa envisions that being a

1144
00:46:41,190 --> 00:46:38,800
data buy very much like the imagery

1145
00:46:44,630 --> 00:46:41,200
business went from landsat only to

1146
00:46:47,349 --> 00:46:44,640
government data buys for imagery and so

1147
00:46:49,510 --> 00:46:47,359
we believe that we can make a case for

1148
00:46:52,150 --> 00:46:49,520
lowering the cost to the government of

1149
00:46:54,630 --> 00:46:52,160
providing that service by using the

1150
00:46:56,390 --> 00:46:54,640
platform to serve multiple

1151
00:46:59,030 --> 00:46:56,400
revenue streams as opposed to be

1152
00:47:00,470 --> 00:46:59,040
dedicated only to the government

1153
00:47:02,790 --> 00:47:00,480
mission so i

1154
00:47:05,270 --> 00:47:02,800
i believe the model kind of can extend

1155
00:47:07,190 --> 00:47:05,280
in all those ways having said that you

1156
00:47:09,829 --> 00:47:07,200
got to get out there and actually do it

1157
00:47:12,309 --> 00:47:09,839
and then then we can have the discussion

1158
00:47:14,309 --> 00:47:12,319
so we're looking forward to a really

1159
00:47:15,829 --> 00:47:14,319
busy year followed by some some

1160
00:47:25,670 --> 00:47:15,839
additional

1161
00:47:30,950 --> 00:47:28,870
hey this uh questions for uh beau um

1162
00:47:32,870 --> 00:47:30,960
so when in your talk you talked about

1163
00:47:34,630 --> 00:47:32,880

you know convincing commercial partners

1164
00:47:37,430 --> 00:47:34,640
to come on and you know invest in what

1165
00:47:39,030 --> 00:47:37,440
you're doing um so traditionally nasa's

1166
00:47:41,030 --> 00:47:39,040
the funder for

1167
00:47:43,270 --> 00:47:41,040
activities and

1168
00:47:45,910 --> 00:47:43,280
providing the spacecraft so

1169
00:47:47,829 --> 00:47:45,920
what have you found that you have to do

1170
00:47:49,030 --> 00:47:47,839
differently or think differently as nasa

1171
00:47:50,790 --> 00:47:49,040
to convince

1172
00:47:53,190 --> 00:47:50,800
you know let's say the larger holders of

1173
00:47:54,069 --> 00:47:53,200
the technology to invest their own money

1174
00:47:58,870 --> 00:47:54,079
to

1175
00:48:11,030 --> 00:47:58,880
and move forward with you know projects

1176
00:48:14,390 --> 00:48:12,630
yeah what does nasa have to do

1177
00:48:16,470 --> 00:48:14,400
differently to be a good partner i think

1178
00:48:17,270 --> 00:48:16,480
is part of the question

1179
00:48:19,829 --> 00:48:17,280
um

1180
00:48:22,309 --> 00:48:19,839
i think there's two main things that

1181
00:48:24,870 --> 00:48:22,319
come to mind the first is

1182
00:48:26,150 --> 00:48:24,880
nasa has to accept that

1183
00:48:27,670 --> 00:48:26,160
private industry knows what they're

1184
00:48:30,470 --> 00:48:27,680
doing that they know how to build

1185
00:48:32,309 --> 00:48:30,480
spacecraft and that we don't need to

1186
00:48:33,990 --> 00:48:32,319
have a lot of oversight

1187
00:48:35,670 --> 00:48:34,000
into what they're doing we can trust

1188
00:48:37,670 --> 00:48:35,680

that if they have skin in the game

1189
00:48:39,270 --> 00:48:37,680
they're going to do the job right

1190
00:48:42,390 --> 00:48:39,280
and that we don't need to make something

1191
00:48:44,790 --> 00:48:42,400
that would cost private industry

1192
00:48:46,470 --> 00:48:44,800
100 million cost the government 300

1193
00:48:47,829 --> 00:48:46,480
million just because we make them do

1194
00:48:49,750 --> 00:48:47,839
more paper

1195
00:48:51,829 --> 00:48:49,760
so i think that's one of the things

1196
00:48:54,309 --> 00:48:51,839
we need to we need to back off and let

1197
00:48:56,870 --> 00:48:54,319
let industry do what it's good at

1198
00:48:59,270 --> 00:48:56,880
um i think the the second thing is much

1199
00:49:01,109 --> 00:48:59,280
more challenging and and especially in

1200
00:49:02,630 --> 00:49:01,119
today's climate

1201
00:49:03,750 --> 00:49:02,640
it's hard for the government to be a

1202
00:49:04,790 --> 00:49:03,760
good

1203
00:49:07,030 --> 00:49:04,800
partner

1204
00:49:08,870 --> 00:49:07,040
when we don't have stable year-to-year

1205
00:49:11,109 --> 00:49:08,880
programmatic funding

1206
00:49:13,430 --> 00:49:11,119
and so

1207
00:49:15,030 --> 00:49:13,440
for something like space station

1208
00:49:16,549 --> 00:49:15,040
and cots

1209
00:49:18,790 --> 00:49:16,559
the government can be a good partner

1210
00:49:20,870 --> 00:49:18,800
because we're committed

1211
00:49:22,710 --> 00:49:20,880
so certainly we need to be committed and

1212
00:49:24,150 --> 00:49:22,720
we need to um

1213
00:49:25,990 --> 00:49:24,160

we need to not

1214
00:49:27,270 --> 00:49:26,000
be subject to the whims of change in

1215
00:49:28,829 --> 00:49:27,280
washington

1216
00:49:37,910 --> 00:49:28,839
and that's much more

1217
00:49:41,910 --> 00:49:39,349
how much effort do you have to put into

1218
00:49:44,950 --> 00:49:43,510
so the other question is how much effort

1219
00:49:46,470 --> 00:49:44,960
do you need to put into understanding

1220
00:49:48,470 --> 00:49:46,480
the business case i think that's a great

1221
00:49:51,430 --> 00:49:48,480
example a great question i think we

1222
00:49:53,349 --> 00:49:51,440
really really have to understand it well

1223
00:49:56,549 --> 00:49:53,359
because we're making decisions now that

1224
00:49:58,710 --> 00:49:56,559
are going to impact that business case

1225
00:49:59,990 --> 00:49:58,720
and in order to bring partners on i

1226
00:50:03,109 --> 00:50:00,000
think they need to know that we

1227
00:50:05,190 --> 00:50:03,119
understand their business case so in the

1228
00:50:06,710 --> 00:50:05,200
mining exam asteroid mining example

1229
00:50:09,190 --> 00:50:06,720
right we need to make sure that we

1230
00:50:11,670 --> 00:50:09,200
understand the phases of their um

1231
00:50:12,549 --> 00:50:11,680
program and that we're doing things now

1232
00:50:14,390 --> 00:50:12,559
that

1233
00:50:15,349 --> 00:50:14,400
move them forward in those phases and

1234
00:50:16,150 --> 00:50:15,359
not

1235
00:50:16,950 --> 00:50:16,160
um

1236
00:50:19,030 --> 00:50:16,960
uh

1237
00:50:20,150 --> 00:50:19,040
just giving them setbacks and and those

1238
00:50:22,790 --> 00:50:20,160

kind of things

1239
00:50:24,309 --> 00:50:22,800
so um a very vague answer i know but i

1240
00:50:25,670 --> 00:50:24,319
think i think it's very important that

1241
00:50:32,549 --> 00:50:25,680
we understand

1242
00:50:36,309 --> 00:50:34,549
yeah i have another one for charles the

1243
00:50:38,150 --> 00:50:36,319
question is

1244
00:50:40,549 --> 00:50:38,160
school participation

1245
00:50:42,230 --> 00:50:40,559
what levels is it

1246
00:50:49,270 --> 00:50:42,240
high school community college

1247
00:50:54,069 --> 00:50:51,670
all of the above

1248
00:50:56,069 --> 00:50:54,079
if you go to sunjammermission.com you'll

1249
00:50:58,950 --> 00:50:56,079
see

1250
00:51:01,589 --> 00:50:58,960
about a little video of about

1251
00:51:03,589 --> 00:51:01,599
i think 30 zambian kids who are in

1252
00:51:05,190 --> 00:51:03,599
elementary school all going we are going

1253
00:51:06,390 --> 00:51:05,200
to space

1254
00:51:08,870 --> 00:51:06,400
we had

1255
00:51:12,470 --> 00:51:08,880
high school and middle schoolers into

1256
00:51:14,710 --> 00:51:12,480
the legard facility to see the sale

1257
00:51:17,030 --> 00:51:14,720
under construction and they actually

1258
00:51:18,069 --> 00:51:17,040
witnessed the deployment test as part of

1259
00:51:19,750 --> 00:51:18,079
their

1260
00:51:23,430 --> 00:51:19,760
advanced science

1261
00:51:26,150 --> 00:51:23,440
activities uh i universities will be

1262
00:51:28,150 --> 00:51:26,160
announcing a couple of partnerships uh

1263
00:51:32,069 --> 00:51:28,160

both in

1264
00:51:33,829 --> 00:51:32,079
technology and in um non-technology

1265
00:51:37,030 --> 00:51:33,839
components of the mission down the road

1266
00:51:38,790 --> 00:51:37,040
so i think you know we we're we're about

1267
00:51:41,829 --> 00:51:38,800
trying to

1268
00:51:44,230 --> 00:51:41,839
evangelize the mission wherever we can

1269
00:51:45,829 --> 00:51:44,240
and certainly a key component of it is

1270
00:51:47,670 --> 00:51:45,839
the education

1271
00:51:49,750 --> 00:51:47,680
side of things that we're doing so we've

1272
00:51:50,549 --> 00:51:49,760
got a full-time director of education

1273
00:51:53,030 --> 00:51:50,559
that

1274
00:51:55,589 --> 00:51:53,040
was a high school teacher in houston and

1275
00:51:58,069 --> 00:51:55,599
went on to run an urban debate league in

1276
00:51:59,910 --> 00:51:58,079
minnesota and is now

1277
00:52:02,390 --> 00:51:59,920
full-time working

1278
00:52:04,870 --> 00:52:02,400
doing our blog we have a university

1279
00:52:07,670 --> 00:52:04,880
student at ohio state university that

1280
00:52:10,630 --> 00:52:07,680
runs a really cool facebook called space

1281
00:52:13,750 --> 00:52:10,640
weather trackers and he writes blogs for

1282
00:52:14,950 --> 00:52:13,760
us about space weather that are targeted

1283
00:52:19,190 --> 00:52:14,960
at

1284
00:52:23,829 --> 00:52:20,950
okay folks

1285
00:52:26,230 --> 00:52:23,839
that uh will conclude our questions for

1286
00:52:27,670 --> 00:52:26,240
now we'll we'll have a 10 minute break i

1287
00:52:29,589 --> 00:52:27,680
just want to remind everybody that we're

1288
00:52:30,630 --> 00:52:29,599

going to have discussion period at the

1289
00:52:32,870 --> 00:52:30,640
end

1290
00:52:33,829 --> 00:52:32,880
of all the speakers so if you have

1291
00:52:35,349 --> 00:52:33,839
thoughts

1292
00:52:36,390 --> 00:52:35,359
other things get triggered during the

1293
00:52:37,589 --> 00:52:36,400
break that there's going to be an

1294
00:52:40,870 --> 00:52:37,599
opportunity to continue this

1295
00:52:42,950 --> 00:52:40,880
conversation so thanks to our presenters

1296
00:52:44,710 --> 00:52:42,960
uh we'll have 10 minute break and then

1297
00:52:47,109 --> 00:52:44,720
start up again