1
00:00:08,330 --> 00:00:05,240
well good morning three years ago today

2
00:00:10,820 --> 00:00:08,340
the president was here in an empty high

3
00:00:15,049 --> 00:00:10,830
bay challenging us to go to an asteroid

4
00:00:17,689 --> 00:00:15,059
by 2025 today this is a world-class

5
00:00:20,300 --> 00:00:17,699
production facility with a flight

6
00:00:23,450 --> 00:00:20,310
article a flight vehicle Orion getting

7
00:00:26,240 --> 00:00:23,460
ready to fly next year we've made

8
00:00:28,820 --> 00:00:26,250
tremendous progress in our transition to

9
00:00:30,950 --> 00:00:28,830
the future and now with the announcement

10
00:00:33,560 --> 00:00:30,960
during the budget rollout last week of

11
00:00:36,500 --> 00:00:33,570
our plans to retrieve an asteroid and

12
00:00:38,389 --> 00:00:36,510
send a crew to it we're moving forward

13
00:00:41,150 --> 00:00:38,399

to meet the president's challenge and

14
00:00:43,190 --> 00:00:41,160
this is not the only area that we've

15
00:00:45,500 --> 00:00:43,200
made tremendous progress in over the

16
00:00:48,889 --> 00:00:45,510
last three years out at launch complex

17
00:00:51,020 --> 00:00:48,899
39 we're readying pad be high bay three

18
00:00:53,479 --> 00:00:51,030
in the Vehicle Assembly Building the LCC

19
00:00:57,760 --> 00:00:53,489
to meet our commitments to be ready to

20
00:01:00,170 --> 00:00:57,770
launch the Space Launch System in 2017

21
00:01:02,080 --> 00:01:00,180
we've come this far and we've made this

22
00:01:05,450 --> 00:01:02,090
much progress because of the tremendous

23
00:01:08,179 --> 00:01:05,460
nasa contractor team in the cooperation

24
00:01:12,500 --> 00:01:08,189
between Johnson Marshall and Kennedy

25
00:01:14,510 --> 00:01:12,510
Space Center's as we move forward but

26
00:01:16,969 --> 00:01:14,520
rather than listen to me to talk about

27
00:01:19,640 --> 00:01:16,979
it I want to bring the experts up here

28
00:01:22,340 --> 00:01:19,650
and let them tell you about the progress

29
00:01:24,980 --> 00:01:22,350
that we made in where we're going first

30
00:01:28,010 --> 00:01:24,990
up dan dan bacher from the exploration

31
00:01:35,690 --> 00:01:28,020
mission systems Directorate at

32
00:01:38,420 --> 00:01:35,700
headquarters dan thank you Bob and good

33
00:01:41,600 --> 00:01:38,430
afternoon everyone and again welcome to

34
00:01:43,819 --> 00:01:41,610
the hardware NASA is very excited with

35
00:01:45,830 --> 00:01:43,829
our budget roll out from last week that

36
00:01:48,469 --> 00:01:45,840
you have seen to retrieve an asteroid

37
00:01:51,410 --> 00:01:48,479
and send a crew to it to explore that

38
00:01:53,780 --> 00:01:51,420

asteroid and return samples we have lots

39
00:01:56,420 --> 00:01:53,790
of work ahead of us on that challenging

40
00:01:58,399 --> 00:01:56,430
and complex mission we have to learn how

41
00:02:01,459 --> 00:01:58,409
to do solar electric propulsion we have

42
00:02:03,679 --> 00:02:01,469
to figure out how to detect asteroids of

43
00:02:06,050 --> 00:02:03,689
the size that we want to retrieve and

44
00:02:08,690 --> 00:02:06,060
explore and we have to build the

45
00:02:11,059 --> 00:02:08,700
capabilities to get the crew to

46
00:02:14,030 --> 00:02:11,069
the asteroid and what you see behind us

47
00:02:16,570 --> 00:02:14,040
is an example of that wonderful progress

48
00:02:19,369 --> 00:02:16,580
that has been made by the Orion team

49
00:02:21,830 --> 00:02:19,379
there's also great progress by the Space

50
00:02:23,770 --> 00:02:21,840
Launch System team getting the launch

51
00:02:26,540 --> 00:02:23,780
vehicle ready getting the crew

52
00:02:28,160 --> 00:02:26,550
spacecraft prepared and all the crew

53
00:02:30,229 --> 00:02:28,170
cysts all the ground systems that we

54
00:02:33,259 --> 00:02:30,239
need to process and launch those

55
00:02:36,259 --> 00:02:33,269
vehicles so you see an example of that

56
00:02:37,970 --> 00:02:36,269
Hardware behind you we are thrilled with

57
00:02:40,039 --> 00:02:37,980
this mission we are looking forward to

58
00:02:43,580 --> 00:02:40,049
it it will be a challenge it will be

59
00:02:45,770 --> 00:02:43,590
complex and but NASA's up to the

60
00:02:48,350 --> 00:02:45,780
challenge and the team that you see

61
00:02:50,720 --> 00:02:48,360
represented here is ready and willing to

62
00:02:53,569 --> 00:02:50,730
take it on with that I'd like to

63
00:02:55,640 --> 00:02:53,579

introduce mark Geyer our Orion program

64
00:03:03,190 --> 00:02:55,650
manager and he can talk about his

65
00:03:05,660 --> 00:03:03,200
hardware hey thank you for coming today

66
00:03:07,160 --> 00:03:05,670
welcome to the Orion factory I'll talk a

67
00:03:09,850 --> 00:03:07,170
little bit about the vehicle behind me

68
00:03:13,220 --> 00:03:09,860
in a minute first of all I wanted to say

69
00:03:15,559 --> 00:03:13,230
that this architecture this Orion SLS

70
00:03:17,270 --> 00:03:15,569
ground ops architecture is extremely

71
00:03:18,680 --> 00:03:17,280
capable very flexible and so I think

72
00:03:21,289 --> 00:03:18,690
this is another great example of that

73
00:03:23,300 --> 00:03:21,299
this asteroid mission we work together

74
00:03:26,420 --> 00:03:23,310
with the the folks who are starting to

75
00:03:28,400 --> 00:03:26,430
plan this mission to understand exactly

76
00:03:30,500 --> 00:03:28,410
what the capabilities are needed and so

77
00:03:32,449 --> 00:03:30,510
Orion and SLS fit very well into this

78
00:03:35,720 --> 00:03:32,459
plan will work through the rest of the

79
00:03:38,059 --> 00:03:35,730
summer to identify the details as we go

80
00:03:40,729 --> 00:03:38,069
through the specifics but we already

81
00:03:43,789 --> 00:03:40,739
know that these systems can meet the

82
00:03:46,069 --> 00:03:43,799
challenge of this new mission as you

83
00:03:47,569 --> 00:03:46,079
know many of the core systems that you

84
00:03:49,610 --> 00:03:47,579
need for any mission regardless of where

85
00:03:52,240 --> 00:03:49,620
you go we're going to test on eft-1

86
00:03:55,520 --> 00:03:52,250
which flies in a mere 17 months in

87
00:03:58,120 --> 00:03:55,530
September 2014 will test the heat shield

88
00:04:00,979 --> 00:03:58,130

the guidance navigation the parachutes

89
00:04:02,599 --> 00:04:00,989
avionics we're going to go 3,000 miles

90
00:04:04,009 --> 00:04:02,609
into space we're going to go about

91
00:04:05,979 --> 00:04:04,019
eighty four percent of the lunar entry

92
00:04:08,240 --> 00:04:05,989
velocity to test the heat shield and

93
00:04:10,099 --> 00:04:08,250
again that's happening just in a few

94
00:04:12,740 --> 00:04:10,109
months so behind us is the flight

95
00:04:14,300 --> 00:04:12,750
article for eft-1 it's in a stand that

96
00:04:16,099 --> 00:04:14,310
we're going to use to test we're going

97
00:04:18,289 --> 00:04:16,109
to do a static load stesso will

98
00:04:20,449 --> 00:04:18,299
pressurize it and we have actuators that

99
00:04:22,099 --> 00:04:20,459
will push on the structure to simulate

100
00:04:24,529 --> 00:04:22,109
liftoff to stimulate

101
00:04:26,240 --> 00:04:24,539
deploy to simulate the other good big

102
00:04:28,010 --> 00:04:26,250
loading test to make sure the structure

103
00:04:29,839 --> 00:04:28,020
behaves as we expect and then we'll

104
00:04:31,939 --> 00:04:29,849
finish the outfitting put the boxes in

105
00:04:34,879 --> 00:04:31,949
cables weld the tubes and everything

106
00:04:36,379 --> 00:04:34,889
else and then send it out to the pad so

107
00:04:39,709 --> 00:04:36,389
the team here is doing a great job and

108
00:04:42,890 --> 00:04:39,719
the factory of course is right here at

109
00:04:46,189 --> 00:04:42,900
KSC and you're in it at the moment so we

110
00:04:48,439 --> 00:04:46,199
are now building a testing in 14 months

111
00:04:50,270 --> 00:04:48,449
we'll be flying and we're also now

112
00:04:51,980 --> 00:04:50,280
planning new and exciting mission so

113
00:04:54,170 --> 00:04:51,990

it's a great it's a great day to be part

114
00:04:55,510 --> 00:04:54,180
of ESD and part of Orion so now I'm

115
00:04:57,860 --> 00:04:55,520
going to introduce Keith Hefner who's

116
00:05:06,379 --> 00:04:57,870
the Space Launch System program planning

117
00:05:08,119 --> 00:05:06,389
can control manager good afternoon the

118
00:05:10,429 --> 00:05:08,129
Space Launch System capability is

119
00:05:12,230 --> 00:05:10,439
essential to America's future and human

120
00:05:14,749 --> 00:05:12,240
spaceflight and exploration of deep

121
00:05:17,360 --> 00:05:14,759
space only with a heavy-lift launch

122
00:05:20,089 --> 00:05:17,370
vehicle can humans explore our solar

123
00:05:23,300 --> 00:05:20,099
system investigate asteroids and one day

124
00:05:26,300 --> 00:05:23,310
set foot on Mars respect to the

125
00:05:28,730 --> 00:05:26,310
exploration flight test-1 it will be

126
00:05:32,240 --> 00:05:28,740
able to help us on the SLS program

127
00:05:34,730 --> 00:05:32,250
reduce our risks with respect to

128
00:05:36,920 --> 00:05:34,740
providing early information on our

129
00:05:40,369 --> 00:05:36,930
vehicle stability guidance navigation

130
00:05:42,379 --> 00:05:40,379
and control environmental loads and many

131
00:05:45,529 --> 00:05:42,389
other factors that will help us in our

132
00:05:47,329 --> 00:05:45,539
design as we move forward you're on

133
00:05:49,820 --> 00:05:47,339
stage adapter is currently being

134
00:05:51,800 --> 00:05:49,830
designed and built at Marshall it will

135
00:05:54,260 --> 00:05:51,810
be used for multiple flights not only

136
00:05:56,899 --> 00:05:54,270
for exploration flight test-1 but also

137
00:05:59,240 --> 00:05:56,909
for exploration mission 1 and 2 is a

138
00:06:01,100 --> 00:05:59,250

part of our pursuit of providing

139
00:06:04,309 --> 00:06:01,110
affordable solutions for human

140
00:06:07,219 --> 00:06:04,319
spaceflight with respect to progress

141
00:06:09,019 --> 00:06:07,229
that we're making on sls the sls team

142
00:06:11,240 --> 00:06:09,029
has met all of its milestones and its

143
00:06:12,649 --> 00:06:11,250
objectives we're moving forward toward

144
00:06:15,469 --> 00:06:12,659
our vehicle preliminary design review

145
00:06:18,709 --> 00:06:15,479
this summer with respect to the other

146
00:06:20,480 --> 00:06:18,719
elements on sls we have large tools

147
00:06:22,429 --> 00:06:20,490
needed that have been bought and put in

148
00:06:25,370 --> 00:06:22,439
place at the reshoot assembly facility

149
00:06:27,870 --> 00:06:25,380
down in New Orleans

150
00:06:30,620 --> 00:06:27,880
including what is one of the largest

151
00:06:34,880 --> 00:06:30,630
welding tools that has ever been built

152
00:06:37,710 --> 00:06:34,890
the j-2x engine team has tested a

153
00:06:40,710 --> 00:06:37,720
selected laser melted or 3d designed

154
00:06:42,990 --> 00:06:40,720
part that will ultimately prepare us for

155
00:06:47,910 --> 00:06:43,000
putting a first such part on our first

156
00:06:51,180 --> 00:06:47,920
flight in 2017 also the j-2x is in the

157
00:06:53,400 --> 00:06:51,190
test stand at Stennis now once that

158
00:06:56,280 --> 00:06:53,410
testing is completed then we will be

159
00:06:59,040 --> 00:06:56,290
moving forward with the rs.25 testing of

160
00:07:01,620 --> 00:06:59,050
that engine in that same test and our

161
00:07:04,650 --> 00:07:01,630
five segments booster team is currently

162
00:07:07,650 --> 00:07:04,660
looking toward a qualification test of a

163
00:07:09,690 --> 00:07:07,660

qualification motor later this year with

164
00:07:11,820 --> 00:07:09,700
all of this said and in summary the

165
00:07:15,000 --> 00:07:11,830
Space Launch System Program is on course

166
00:07:17,580 --> 00:07:15,010
to deliver the national capability for

167
00:07:20,820 --> 00:07:17,590
beyond Earth orbit exploration beginning

168
00:07:24,170 --> 00:07:20,830
in 2017 and later to take our astronauts

169
00:07:27,150 --> 00:07:24,180
into outer space and ultimately to Mars

170
00:07:34,490 --> 00:07:27,160
now I'd like to introduce Scott Colorado

171
00:07:36,660 --> 00:07:34,500
from the ground systems area thank you

172
00:07:37,770 --> 00:07:36,670
as Keith said I'm with the ground

173
00:07:41,520 --> 00:07:37,780
systems development and operations

174
00:07:43,200 --> 00:07:41,530
program I have the job of essentially

175
00:07:45,330 --> 00:07:43,210
figuring out what Kennedy Space Center

176
00:07:46,860 --> 00:07:45,340
is going to do in the future and in the

177
00:07:49,230 --> 00:07:46,870
past to make sure that we're ready to

178
00:07:50,340 --> 00:07:49,240
support the rocket and spacecraft that

179
00:07:53,640 --> 00:07:50,350
they've described the Space Launch

180
00:07:56,280 --> 00:07:53,650
System and the Orion as we as we are

181
00:07:58,530 --> 00:07:56,290
here today three years ago we really hit

182
00:08:00,660 --> 00:07:58,540
the ground running trying to make sure

183
00:08:04,200 --> 00:08:00,670
that we would be here and ready for the

184
00:08:07,050 --> 00:08:04,210
program facing us both eft-1 exploration

185
00:08:08,610 --> 00:08:07,060
flight test-1 as well as exploration

186
00:08:10,920 --> 00:08:08,620
missions beyond that and I think you'll

187
00:08:12,060 --> 00:08:10,930
find we've made a lot of progress again

188
00:08:14,970 --> 00:08:12,070

I'm with the ground systems development

189
00:08:16,620 --> 00:08:14,980
operations program it's here at Kennedy

190
00:08:18,960 --> 00:08:16,630
Space Center our job is to make sure

191
00:08:21,540 --> 00:08:18,970
that the assets that you're mostly

192
00:08:23,600 --> 00:08:21,550
familiar with I would think like the

193
00:08:26,040 --> 00:08:23,610
Vehicle Assembly Building launch pads

194
00:08:28,260 --> 00:08:26,050
Shuttle Landing Facility assets like

195
00:08:29,970 --> 00:08:28,270
that our job is to convert those from

196
00:08:32,010 --> 00:08:29,980
what they used to do primarily space

197
00:08:33,990 --> 00:08:32,020
shuttle program to get ready for these

198
00:08:35,760 --> 00:08:34,000
for the new exploration mission so we're

199
00:08:38,230 --> 00:08:35,770
well on our way of doing that it was

200
00:08:40,510 --> 00:08:38,240
kind of a concept in most cases for

201
00:08:42,909 --> 00:08:40,520
years ago going forward now it's

202
00:08:44,670 --> 00:08:42,919
becoming reality one of the things we've

203
00:08:48,430 --> 00:08:44,680
done is taking a very flexible approach

204
00:08:51,070 --> 00:08:48,440
we know that missions change launch

205
00:08:52,360 --> 00:08:51,080
vehicles evolve spacecraft evolve and we

206
00:08:54,370 --> 00:08:52,370
want to make sure that we're ready as

207
00:08:56,290 --> 00:08:54,380
those as those items change we can

208
00:08:58,090 --> 00:08:56,300
change with them so what you'll see here

209
00:09:00,730 --> 00:08:58,100
at Kennedy Space Center is a very

210
00:09:02,760 --> 00:09:00,740
flexible evolvable approach so as the

211
00:09:05,139 --> 00:09:02,770
missions are defined and as the

212
00:09:07,290 --> 00:09:05,149
commercial or government users

213
00:09:09,220 --> 00:09:07,300

materialized we're ready to accept them

214
00:09:11,620 --> 00:09:09,230
just to walk you through a few things

215
00:09:15,340 --> 00:09:11,630
that we've touched on some of the major

216
00:09:17,440 --> 00:09:15,350
assets for example launch pad 39b if you

217
00:09:19,269 --> 00:09:17,450
haven't been out there recently we've

218
00:09:20,800 --> 00:09:19,279
done a major overhaul there we've pretty

219
00:09:23,139 --> 00:09:20,810
much cleaned the pad up we call it a

220
00:09:26,620 --> 00:09:23,149
clean pad concept where it is able to

221
00:09:28,660 --> 00:09:26,630
accept various users potentially in

222
00:09:31,000 --> 00:09:28,670
addition to sls which is our primary

223
00:09:32,680 --> 00:09:31,010
mission the lightning protection towers

224
00:09:34,870 --> 00:09:32,690
have been created to create a universal

225
00:09:36,519 --> 00:09:34,880
lightning protection system as opposed

226
00:09:39,160 --> 00:09:36,529
to one that was dedicated for shuttle

227
00:09:40,750 --> 00:09:39,170
like you would see a pad 39a today so

228
00:09:42,400 --> 00:09:40,760
we've made some major progress there

229
00:09:44,440 --> 00:09:42,410
we've also revamped the cryogenic

230
00:09:47,230 --> 00:09:44,450
systems the fuels commodities things

231
00:09:49,210 --> 00:09:47,240
like that the the ramp that goes up to

232
00:09:51,790 --> 00:09:49,220
the pad has gone through an overhaul

233
00:09:53,500 --> 00:09:51,800
itself so all sorts of systems have been

234
00:09:55,690 --> 00:09:53,510
changed to get ready for the for the

235
00:09:57,340 --> 00:09:55,700
next generation of spacecraft we've also

236
00:10:00,130 --> 00:09:57,350
we've done a lot of work on the VA be

237
00:10:02,019 --> 00:10:00,140
primarily the the high bays that you may

238
00:10:04,300 --> 00:10:02,029

be familiar with with the space shuttle

239
00:10:06,910 --> 00:10:04,310
program we're now converting those from

240
00:10:08,470 --> 00:10:06,920
a shuttle configuration the platforms

241
00:10:10,480 --> 00:10:08,480
and ground support equipment the things

242
00:10:12,579 --> 00:10:10,490
that you would see there under shuttle

243
00:10:14,740 --> 00:10:12,589
have now been removed and they're

244
00:10:17,829 --> 00:10:14,750
currently in the design of putting in

245
00:10:19,720 --> 00:10:17,839
new flexible platforms and ground

246
00:10:22,600 --> 00:10:19,730
support equipment that would be able to

247
00:10:26,500 --> 00:10:22,610
evolve not only to support SLS but other

248
00:10:28,900 --> 00:10:26,510
programs as well we've also in the midst

249
00:10:31,210 --> 00:10:28,910
of building a mobile launcher similar to

250
00:10:32,829 --> 00:10:31,220
space shuttle program where the mobile

251
00:10:34,810 --> 00:10:32,839
launcher is a big steel structure that's

252
00:10:37,360 --> 00:10:34,820
used it to actually interface with the

253
00:10:40,150 --> 00:10:37,370
rocket in the VAB it's picked up and

254
00:10:41,710 --> 00:10:40,160
taken to the pad that system has been

255
00:10:43,319 --> 00:10:41,720
designed and for the most part built

256
00:10:47,019 --> 00:10:43,329
we're in the midst of designing the

257
00:10:48,910 --> 00:10:47,029
changes to convert that to a SLS capable

258
00:10:50,470 --> 00:10:48,920
mobile launcher and we also have the

259
00:10:50,889 --> 00:10:50,480
crawler the crawler transporter I think

260
00:10:52,210 --> 00:10:50,899
a lot of

261
00:10:54,460 --> 00:10:52,220
we're familiar with where the crawler is

262
00:10:56,379 --> 00:10:54,470
being upgraded from a 12 million pound

263
00:10:58,239 --> 00:10:56,389

capacity to about 18 million pound

264
00:10:59,859 --> 00:10:58,249
capacity which will be able to pick up

265
00:11:02,439 --> 00:10:59,869
the mobile launcher and take that to the

266
00:11:05,769 --> 00:11:02,449
pad with the Space Launch System vehicle

267
00:11:08,350 --> 00:11:05,779
on board a few others we also are doing

268
00:11:09,819 --> 00:11:08,360
the Orion hazardous processing in a

269
00:11:12,160 --> 00:11:09,829
facility here in the industrial area

270
00:11:14,470 --> 00:11:12,170
called the NPPF the multipurpose

271
00:11:17,679 --> 00:11:14,480
processing facility that construction

272
00:11:19,509 --> 00:11:17,689
will happen this year and the launch

273
00:11:22,629 --> 00:11:19,519
control center the launch control center

274
00:11:24,549 --> 00:11:22,639
we've overhauled firing room 1 than old

275
00:11:27,069 --> 00:11:24,559
space shuttle firing room and now it's

276
00:11:28,660 --> 00:11:27,079
being converted for SLS so we're making

277
00:11:29,739 --> 00:11:28,670
sure that's ready along with the command

278
00:11:32,499 --> 00:11:29,749
and control system that's being

279
00:11:35,230 --> 00:11:32,509
outfitted to have that ready for SLS as

280
00:11:37,900 --> 00:11:35,240
well in the rain and finally the last

281
00:11:39,999 --> 00:11:37,910
system is here at Kennedy and ground

282
00:11:42,850 --> 00:11:40,009
ground systems development operations we

283
00:11:45,639 --> 00:11:42,860
have the role to recover the crew module

284
00:11:47,769 --> 00:11:45,649
both for eft-1 and beyond that and we're

285
00:11:49,809 --> 00:11:47,779
working on that as well to be ready to

286
00:11:53,169 --> 00:11:49,819
recover when they when they splashed

287
00:11:55,600 --> 00:11:53,179
down so I think that's all I have and

288
00:11:57,669 --> 00:11:55,610

the only thing I would mention is again

289
00:11:59,769 --> 00:11:57,679
it was three years ago that we were put

290
00:12:01,600 --> 00:11:59,779
on this mission and since then we've

291
00:12:04,150 --> 00:12:01,610
come up with the architecture to support

292
00:12:06,129 --> 00:12:04,160
it we've come up with these assets

293
00:12:07,329 --> 00:12:06,139
redefined our architecture to support

294
00:12:09,730 --> 00:12:07,339
the program that we're working on now

295
00:12:12,369 --> 00:12:09,740
and we're well on our way to making that

296
00:12:17,799 --> 00:12:12,379
happen and I think we'll take your

297
00:12:19,689 --> 00:12:17,809
questions now at this time hi Peter King

298
00:12:23,559 --> 00:12:19,699
with CBS Radio News and I've actually

299
00:12:28,150 --> 00:12:23,569
got a couple questions for both mr.

300
00:12:30,669 --> 00:12:28,160
Guyer and mr. Hefner and questions for

301
00:12:33,579 --> 00:12:30,679
each of you would be you know have the

302
00:12:36,400 --> 00:12:33,589
biggest challenges so far in getting

303
00:12:40,059 --> 00:12:36,410
this done Ben financial or technical and

304
00:12:44,679 --> 00:12:40,069
if you can get specific specific but in

305
00:12:46,240 --> 00:12:44,689
layman's terms thank you I have to

306
00:12:49,300 --> 00:12:46,250
choose huh

307
00:12:51,960 --> 00:12:49,310
so I think let me say this there are

308
00:12:54,220 --> 00:12:51,970
clearly technical challenges in

309
00:12:56,620 --> 00:12:54,230
integrating these systems to get this

310
00:12:57,940 --> 00:12:56,630
capability in in the vehicle and the

311
00:13:00,880 --> 00:12:57,950
requirements that we have on the

312
00:13:05,770 --> 00:13:00,890
schedule we've been given both the

313
00:13:07,480 --> 00:13:05,780

reliability mass and schedule have been

314
00:13:10,000 --> 00:13:07,490
a real challenge part of that is I think

315
00:13:11,800 --> 00:13:10,010
again reinvigorating the supplier base

316
00:13:14,290 --> 00:13:11,810
across the country we use tens of

317
00:13:17,680 --> 00:13:14,300
suppliers in one case on the heat shield

318
00:13:20,410 --> 00:13:17,690
we used I think 14 different titanium

319
00:13:22,360 --> 00:13:20,420
suppliers across the country so it's a

320
00:13:24,580 --> 00:13:22,370
struggle to get that done and get it

321
00:13:27,220 --> 00:13:24,590
done on time it also though as a benefit

322
00:13:28,660 --> 00:13:27,230
is that where there's suppliers across

323
00:13:30,310 --> 00:13:28,670
the country learning how to build these

324
00:13:32,410 --> 00:13:30,320
parts for spacecraft which i think is

325
00:13:33,880 --> 00:13:32,420
important for the country and its

326
00:13:36,010 --> 00:13:33,890
competitive edge so I think that's been

327
00:13:37,720 --> 00:13:36,020
a real challenge the budget the budget

328
00:13:40,270 --> 00:13:37,730
is a challenge really because it's a

329
00:13:42,430 --> 00:13:40,280
flat budget to be straight forward we we

330
00:13:43,900 --> 00:13:42,440
don't get the normal DD if you know the

331
00:13:46,000 --> 00:13:43,910
development curve usually goes up and

332
00:13:47,440 --> 00:13:46,010
then you ramp off we understand what the

333
00:13:50,200 --> 00:13:47,450
budget is today and the challenges that

334
00:13:51,910 --> 00:13:50,210
we have as a country so we have a flat

335
00:13:53,800 --> 00:13:51,920
budget that means that we have to

336
00:13:56,190 --> 00:13:53,810
develop some systems and then ramp off

337
00:13:58,540 --> 00:13:56,200
and develop the other one so it causes

338
00:14:00,970 --> 00:13:58,550

some strategies we have to work through

339
00:14:02,620 --> 00:14:00,980
and gapping some of those teams if you

340
00:14:04,180 --> 00:14:02,630
know what I mean we they move on to

341
00:14:06,370 --> 00:14:04,190
other parts of the company or on to

342
00:14:08,320 --> 00:14:06,380
other things and then when we may need

343
00:14:09,670 --> 00:14:08,330
them back when we come back and we're

344
00:14:11,680 --> 00:14:09,680
done with these other systems and

345
00:14:12,850 --> 00:14:11,690
sometimes it's hard to ramp up enough to

346
00:14:14,320 --> 00:14:12,860
do that so I think the budget has

347
00:14:16,300 --> 00:14:14,330
definitely been a challenge as well but

348
00:14:18,730 --> 00:14:16,310
we recognize that's part of the job it's

349
00:14:21,250 --> 00:14:18,740
not just going to an asteroid also doing

350
00:14:23,020 --> 00:14:21,260
it affordably in meeting the constraints

351
00:14:24,430 --> 00:14:23,030
that we've been given so I hope that

352
00:14:28,660 --> 00:14:24,440
answered your question for Ryan go ahead

353
00:14:31,329 --> 00:14:28,670
i would say on the sls side we try to

354
00:14:33,220 --> 00:14:31,339
use many of the same hardware elements

355
00:14:35,380 --> 00:14:33,230
to work carried over from the shuttle

356
00:14:39,400 --> 00:14:35,390
program that being the Boosters and the

357
00:14:42,070 --> 00:14:39,410
rs.25 engines we do have one new element

358
00:14:44,260 --> 00:14:42,080
that being of course stages so i would

359
00:14:46,030 --> 00:14:44,270
say challenge wise i would say it's the

360
00:14:48,970 --> 00:14:46,040
integration of those various elements

361
00:14:51,400 --> 00:14:48,980
within sls as well as the integration of

362
00:14:54,010 --> 00:14:51,410
sls with the other program elements

363
00:14:55,980 --> 00:14:54,020

outside of those with orion and PCV and

364
00:14:58,690 --> 00:14:55,990
of course with the ground systems area

365
00:14:59,500 --> 00:14:58,700
then the other big areas is more mention

366
00:15:01,990 --> 00:14:59,510
is our budget

367
00:15:04,030 --> 00:15:02,000
we are looking at and having to deal

368
00:15:06,880 --> 00:15:04,040
with a flat budget for the budget

369
00:15:08,500 --> 00:15:06,890
horizon period so being able to pull off

370
00:15:10,870 --> 00:15:08,510
all the technical elements that have to

371
00:15:13,660 --> 00:15:10,880
be done within the schedule constraints

372
00:15:16,930 --> 00:15:13,670
that we have within that fixed budget is

373
00:15:20,580 --> 00:15:16,940
definitely a challenge for us follow up

374
00:15:23,230 --> 00:15:20,590
this is either for mr. cabana or mr.

375
00:15:25,750 --> 00:15:23,240
Colorado when do we expect when do you

376
00:15:28,360 --> 00:15:25,760
expect all the KSC infrastructure to be

377
00:15:31,450 --> 00:15:28,370
in place so you'll be able to launch all

378
00:15:37,170 --> 00:15:31,460
of this from KSC as opposed to Cape

379
00:15:39,820 --> 00:15:37,180
Canaveral Air Station thank you our

380
00:15:42,190 --> 00:15:39,830
exploration mission 1 launch date is in

381
00:15:44,140 --> 00:15:42,200
December of 2017 so that's our target

382
00:15:50,860 --> 00:15:44,150
and so we'll be ready earlier that year

383
00:15:54,310 --> 00:15:50,870
to support for m1 okay todd halvorson of

384
00:15:56,890 --> 00:15:54,320
Florida today first for bob cabana and

385
00:15:59,250 --> 00:15:56,900
then a follow Bob I was wondering if you

386
00:16:02,620 --> 00:15:59,260
could tell us what your thoughts are

387
00:16:05,830 --> 00:16:02,630
about the selection of an asteroid as

388
00:16:09,790 --> 00:16:05,840

the initial target for the Orion

389
00:16:12,370 --> 00:16:09,800
spacecraft as opposed to say returning

390
00:16:15,640 --> 00:16:12,380
to the moon like some in Congress would

391
00:16:18,790 --> 00:16:15,650
choose to do Todd we're excited about

392
00:16:20,230 --> 00:16:18,800
the about the mission I think it's

393
00:16:21,700 --> 00:16:20,240
really neat that the first time we fly

394
00:16:23,980 --> 00:16:21,710
it with crew they actually got some

395
00:16:26,140 --> 00:16:23,990
place to to go with it and something to

396
00:16:28,530 --> 00:16:26,150
accomplish with it this is not going to

397
00:16:31,600 --> 00:16:28,540
be easy it's extremely challenging and

398
00:16:33,640 --> 00:16:31,610
all the technology that is going to be

399
00:16:36,070 --> 00:16:33,650
required to accomplish this mission it's

400
00:16:38,800 --> 00:16:36,080
all stuff that we need for further

401
00:16:40,800 --> 00:16:38,810
exploration beyond our home planet the

402
00:16:44,200 --> 00:16:40,810
solar electric propulsion the autonomous

403
00:16:46,480 --> 00:16:44,210
rendezvous proximity ops docking robotic

404
00:16:50,650 --> 00:16:46,490
operations getting the crew there so I

405
00:16:53,800 --> 00:16:50,660
think as we move on we're excited about

406
00:16:55,330 --> 00:16:53,810
it absolutely and you know we want to we

407
00:16:57,250 --> 00:16:55,340
want to explore we want to get beyond

408
00:16:58,990 --> 00:16:57,260
planet Earth and we're extremely proud

409
00:17:00,040 --> 00:16:59,000
of what we've accomplished so far and we

410
00:17:04,140 --> 00:17:00,050
look forward to the challenge of the

411
00:17:07,510 --> 00:17:04,150
future thanks and for guest Mark Guyer

412
00:17:09,670 --> 00:17:07,520
I'm wondering if you can give us an idea

413
00:17:11,590 --> 00:17:09,680

of what your major milestone

414
00:17:15,010 --> 00:17:11,600
bones are going to be with Orion between

415
00:17:17,050 --> 00:17:15,020
now and the flight in September 2014

416
00:17:18,700 --> 00:17:17,060
when you're going to put power on the

417
00:17:21,790 --> 00:17:18,710
vehicle for the first time and could you

418
00:17:26,020 --> 00:17:21,800
also update us on the planning for the

419
00:17:28,060 --> 00:17:26,030
follow-on pad abort mission Thanks great

420
00:17:29,710 --> 00:17:28,070
yes a couple of big things so we're

421
00:17:31,870 --> 00:17:29,720
doing this test now which is the static

422
00:17:34,210 --> 00:17:31,880
test and then what we're done we'll take

423
00:17:36,040 --> 00:17:34,220
it out of this unit and actually finish

424
00:17:38,890 --> 00:17:36,050
the installation so we put a lot of the

425
00:17:41,860 --> 00:17:38,900
propulsion tubing equus tubing we do

426
00:17:44,020 --> 00:17:41,870
with about 300 welds on tubes right here

427
00:17:45,640 --> 00:17:44,030
in this factory after this then we

428
00:17:47,260 --> 00:17:45,650
install the back shell in the tiles the

429
00:17:50,410 --> 00:17:47,270
tiles will actually be bonded here in

430
00:17:51,970 --> 00:17:50,420
this in this hall as well and all the

431
00:17:53,410 --> 00:17:51,980
cables that are going to go into this

432
00:17:56,170 --> 00:17:53,420
unit are being built here right here in

433
00:17:57,760 --> 00:17:56,180
this factory as well so power on now is

434
00:18:00,040 --> 00:17:57,770
probably going to be late summer Todd

435
00:18:02,140 --> 00:18:00,050
probably in that August timeframe the

436
00:18:03,520 --> 00:18:02,150
big thing is getting the tubes welded we

437
00:18:06,010 --> 00:18:03,530
have to weld the tubes you don't want

438
00:18:07,360 --> 00:18:06,020

your computers if you think about it you

439
00:18:09,250 --> 00:18:07,370
wouldn't want your computer sitting next

440
00:18:10,660 --> 00:18:09,260
to a welder so we got to weld the tubes

441
00:18:12,490 --> 00:18:10,670
first then the computers will come and

442
00:18:14,410 --> 00:18:12,500
we'll stick them in and turn them on so

443
00:18:17,380 --> 00:18:14,420
that's that's the time frame will

444
00:18:19,660 --> 00:18:17,390
deliver this vehicle turn it over to the

445
00:18:21,940 --> 00:18:19,670
the launch vehicle folks probably in the

446
00:18:24,070 --> 00:18:21,950
january/february time frame of next year

447
00:18:26,440 --> 00:18:24,080
that's what we're looking at remember

448
00:18:28,030 --> 00:18:26,450
the service module which is further down

449
00:18:30,310 --> 00:18:28,040
the unit which is basically made of

450
00:18:32,710 --> 00:18:30,320
composites and aluminum that also is

451
00:18:34,450 --> 00:18:32,720
being finished and that's part of the

452
00:18:37,840 --> 00:18:34,460
pieces that have to be done we have a

453
00:18:39,370 --> 00:18:37,850
big fairing separation test that will

454
00:18:40,750 --> 00:18:39,380
happen in the summer is well taught if

455
00:18:42,730 --> 00:18:40,760
you remember the service module fairings

456
00:18:45,550 --> 00:18:42,740
that encapsulate the service module

457
00:18:47,770 --> 00:18:45,560
there's three very large fairings if you

458
00:18:49,570 --> 00:18:47,780
don't think we have the can't see the

459
00:18:51,490 --> 00:18:49,580
picture here but anyway they will be

460
00:18:53,650 --> 00:18:51,500
that's one of the key test is this is to

461
00:18:55,330 --> 00:18:53,660
test the separation of those faring so

462
00:18:57,520 --> 00:18:55,340
we'll do a test out in sunnyvale will

463
00:18:58,750 --> 00:18:57,530

actually blow the Pyro's and make sure

464
00:19:00,640 --> 00:18:58,760
that they separate correctly that's

465
00:19:02,200 --> 00:19:00,650
coming up in the summer and then we

466
00:19:04,630 --> 00:19:02,210
actually do what we call a hot fire test

467
00:19:07,630 --> 00:19:04,640
of the propulsion system that will be

468
00:19:10,690 --> 00:19:07,640
mounted on the crew module where we

469
00:19:13,240 --> 00:19:10,700
actually have key thrusters tanks and

470
00:19:15,040 --> 00:19:13,250
tubing to simulate how the thrusters are

471
00:19:16,240 --> 00:19:15,050
operate relative to one another to make

472
00:19:18,760 --> 00:19:16,250
sure that they are integrated well that

473
00:19:20,830 --> 00:19:18,770
will actually be out in Sacramento also

474
00:19:21,560 --> 00:19:20,840
I think may june timeframe so those are

475
00:19:26,900 --> 00:19:21,570
the key things

476
00:19:29,390 --> 00:19:26,910
anything else sorry Hollywood fly so the

477
00:19:31,430 --> 00:19:29,400
following flight is 2017 just like Scott

478
00:19:34,250 --> 00:19:31,440
said so our plan is to e-m1 is the next

479
00:19:37,180 --> 00:19:34,260
flight so we'll be we're actually going

480
00:19:39,620 --> 00:19:37,190
through the design cycle now for em1

481
00:19:41,810 --> 00:19:39,630
which is the flight that'll fly in 17

482
00:19:44,360 --> 00:19:41,820
and that design cycle we roll in changes

483
00:19:46,130 --> 00:19:44,370
like some of the math savings ideas to

484
00:19:48,020 --> 00:19:46,140
get the mast down from the flight test

485
00:19:51,520 --> 00:19:48,030
article that's actually happening now in

486
00:19:55,010 --> 00:19:51,530
the spring actually quick pollen and

487
00:19:58,070 --> 00:19:55,020
have you removed from the schedule in

488
00:20:01,310 --> 00:19:58,080

the flight on the Peacekeeper know so

489
00:20:06,170 --> 00:20:01,320
that's an 18 so IAM one is in 17 and

490
00:20:08,660 --> 00:20:06,180
then a a2 is in 18 so that is an abort

491
00:20:11,210 --> 00:20:08,670
test so we'll take will take this crew

492
00:20:13,730 --> 00:20:11,220
module that we flew on eft-1 will refurb

493
00:20:16,220 --> 00:20:13,740
it will put a new launch abort system on

494
00:20:17,510 --> 00:20:16,230
it new fairings new fifty five hundred

495
00:20:19,540 --> 00:20:17,520
thousand pound abort motor on it

496
00:20:21,800 --> 00:20:19,550
attitude control motor jettison motor

497
00:20:24,740 --> 00:20:21,810
will put it on top of a peacekeeper

498
00:20:27,200 --> 00:20:24,750
stage and launch it out of LC 46 I

499
00:20:29,560 --> 00:20:27,210
believe right here at KSC so it'll be

500
00:20:32,300 --> 00:20:29,570
what it'll it's a much different test

501
00:20:34,670 --> 00:20:32,310
you're basically trying to get to max

502
00:20:37,640 --> 00:20:34,680
dynamic pressure and transonic speed

503
00:20:39,740 --> 00:20:37,650
when you when you're going to very high

504
00:20:41,390 --> 00:20:39,750
speeds and high dynamic pressure and you

505
00:20:43,190 --> 00:20:41,400
want to make sure that the launch abort

506
00:20:45,140 --> 00:20:43,200
system can actually fly the vehicle that

507
00:20:46,430 --> 00:20:45,150
it doesn't tumble so that's the

508
00:20:47,840 --> 00:20:46,440
condition we're trying to put it in and

509
00:20:49,730 --> 00:20:47,850
it's a great test for here because then

510
00:20:52,820 --> 00:20:49,740
we can land in the water and recover the

511
00:20:55,490 --> 00:20:52,830
element afterwards so that's an 18 okay

512
00:20:57,380 --> 00:20:55,500
uh mark you can go ahead and stake as my

513
00:20:59,150 --> 00:20:57,390

own actions actually Jason Ryan for

514
00:21:02,360 --> 00:20:59,160
America's space com I'm going to follow

515
00:21:04,130 --> 00:21:02,370
up on what marks what Todd said was with

516
00:21:06,410 --> 00:21:04,140
the milestones we're looking at we're

517
00:21:07,820 --> 00:21:06,420
seeing Orion being developed here but

518
00:21:09,650 --> 00:21:07,830
the public still has this perception

519
00:21:11,840 --> 00:21:09,660
that for some reason we're out of the

520
00:21:13,490 --> 00:21:11,850
spaceflight business when do you think

521
00:21:16,070 --> 00:21:13,500
this particular version of Orion which

522
00:21:17,270 --> 00:21:16,080
is going to fly ft 1 what milestone will

523
00:21:18,380 --> 00:21:17,280
be the one that lets the public know

524
00:21:21,410 --> 00:21:18,390
that guess what we're back in the game

525
00:21:23,930 --> 00:21:21,420
thank you well the most obvious would be

526
00:21:26,000 --> 00:21:23,940
the flight itself right and so will be

527
00:21:27,740 --> 00:21:26,010
on a will be on a large rocket will be

528
00:21:30,170 --> 00:21:27,750
flying around out here out of the cape

529
00:21:32,159 --> 00:21:30,180
on the Delta for heavy and then we'll be

530
00:21:34,229 --> 00:21:32,169
landing off the coast of California

531
00:21:35,279 --> 00:21:34,239
and recover just like a nominal recovery

532
00:21:37,919 --> 00:21:35,289
would be like a nominal so I think

533
00:21:39,659 --> 00:21:37,929
that's the key thing what obviously

534
00:21:41,700 --> 00:21:39,669
eft-1 does a huge amount of work for us

535
00:21:43,169 --> 00:21:41,710
in testing these key systems making sure

536
00:21:45,840 --> 00:21:43,179
the parachutes work guidance works

537
00:21:47,549 --> 00:21:45,850
separation works heat shield works all

538
00:21:49,799 --> 00:21:47,559

those things are important technical

539
00:21:52,169 --> 00:21:49,809
things but I think you're pulling on a

540
00:21:54,149 --> 00:21:52,179
very important point it also shows its

541
00:21:57,239 --> 00:21:54,159
its demonstrable evidence that we're

542
00:21:59,729 --> 00:21:57,249
actually flying exploration and getting

543
00:22:02,489 --> 00:21:59,739
ready to fly people so Steve Barrett

544
00:22:03,899 --> 00:22:02,499
WFTV and this is a good springboard I

545
00:22:05,909 --> 00:22:03,909
have no preference who answers this

546
00:22:07,769 --> 00:22:05,919
obviously Space Coast always worried

547
00:22:09,989 --> 00:22:07,779
about jobs in the wake of the shuttle

548
00:22:12,419 --> 00:22:09,999
programming program winding down you

549
00:22:14,129 --> 00:22:12,429
have a rough timeline of when jobs will

550
00:22:16,619 --> 00:22:14,139
start to peak and people again we'll see

551
00:22:18,720 --> 00:22:16,629
not only are we back in the space flight

552
00:22:23,430 --> 00:22:18,730
business but we're back in the jobs on

553
00:22:25,139 --> 00:22:23,440
the Space Coast business numbers you can

554
00:22:27,060 --> 00:22:25,149
throw out there that you know will see

555
00:22:29,759 --> 00:22:27,070
this number then and this number here I

556
00:22:31,710 --> 00:22:29,769
mean this production facility supports

557
00:22:34,529 --> 00:22:31,720
300 jobs that came here in a partnership

558
00:22:36,899 --> 00:22:34,539
with the state of Florida that paid for

559
00:22:39,109 --> 00:22:36,909
the refurbishment of this facility and I

560
00:22:41,340 --> 00:22:39,119
mean this is a phenomenal facility

561
00:22:43,739 --> 00:22:41,350
Apollo astronauts went to the moon from

562
00:22:44,999 --> 00:22:43,749
here and one day astronauts are going to

563
00:22:48,450 --> 00:22:45,009

go to Mars from here I mean that's

564
00:22:49,859 --> 00:22:48,460
pretty darn amazing the jobs will ramp

565
00:22:52,799 --> 00:22:49,869
up but it's never going to be what it

566
00:22:54,659 --> 00:22:52,809
was you know as I've said before we're

567
00:22:57,599 --> 00:22:54,669
flying different vehicles we have a

568
00:22:59,729 --> 00:22:57,609
different mission and you know as we

569
00:23:02,369 --> 00:22:59,739
progress when we get closer to launch

570
00:23:04,859 --> 00:23:02,379
and we're processing the actual vehicle

571
00:23:08,759 --> 00:23:04,869
here we'll see a few more jobs but it's

572
00:23:11,340 --> 00:23:08,769
not just a job supporting SLS MPCV you

573
00:23:12,960 --> 00:23:11,350
know Orion our exploration program it's

574
00:23:14,700 --> 00:23:12,970
the jobs that we bring here supporting

575
00:23:16,919 --> 00:23:14,710
commercial crews supporting commercial

576
00:23:19,830 --> 00:23:16,929
spaceflight that's what's also critical

577
00:23:21,299 --> 00:23:19,840
to the area as I've said in the past I

578
00:23:22,889 --> 00:23:21,309
think eventually we'll get to where we

579
00:23:25,859 --> 00:23:22,899
have around 10,000 people working here

580
00:23:27,810 --> 00:23:25,869
at the cape and that hopefully within

581
00:23:30,330 --> 00:23:27,820
you know the next two to three years

582
00:23:31,979 --> 00:23:30,340
we'll see that but there's no guarantees

583
00:23:33,299 --> 00:23:31,989
we'll see how it all plays out but we're

584
00:23:38,039 --> 00:23:33,309
doing all the right things to make that

585
00:23:40,320 --> 00:23:38,049
happen I think one of the key things

586
00:23:43,169 --> 00:23:40,330
about pushing on it is so it's a similar

587
00:23:44,369 --> 00:23:43,179
vehicle to operate in process but one of

588
00:23:45,690 --> 00:23:44,379

the key things we did was bring the

589
00:23:47,909 --> 00:23:45,700
factory here this is the first time that

590
00:23:49,560 --> 00:23:47,919
the Assembly of the flight article is

591
00:23:51,450 --> 00:23:49,570
actually here in Florida usually it's

592
00:23:52,859 --> 00:23:51,460
been in other states so that's a huge

593
00:23:56,070 --> 00:23:52,869
change for a run and you see it here

594
00:23:57,419 --> 00:23:56,080
today all the the welders the people

595
00:24:01,190 --> 00:23:57,429
doing the installations the people

596
00:24:04,830 --> 00:24:03,239
I was going to say at the end I'll say

597
00:24:06,570 --> 00:24:04,840
it now because the questions it brought

598
00:24:08,129 --> 00:24:06,580
up I mean we are excited about the

599
00:24:10,200 --> 00:24:08,139
mission that we have but we're really

600
00:24:11,820 --> 00:24:10,210
excited to show you the progress that

601
00:24:13,649 --> 00:24:11,830
we've made we've made tremendous

602
00:24:15,659 --> 00:24:13,659
progress and we want you to see it and

603
00:24:17,399 --> 00:24:15,669
you know that's a real flight vehicle

604
00:24:19,080 --> 00:24:17,409
behind us that's gonna fly next year

605
00:24:20,669 --> 00:24:19,090
that's pretty darn amazing considering

606
00:24:27,239 --> 00:24:20,679
this was an empty high bay three years

607
00:24:29,759 --> 00:24:27,249
ago there are any green wmf e-news I

608
00:24:32,970 --> 00:24:29,769
have two questions actually the first is

609
00:24:38,759 --> 00:24:32,980
how has sequestration affected the Orion

610
00:24:40,529 --> 00:24:38,769
program and also can you explain as I

611
00:24:42,060 --> 00:24:40,539
understand it the Orion capsule will

612
00:24:45,720 --> 00:24:42,070
launch next year on the Atlas 5 rocket

613
00:24:47,879 --> 00:24:45,730

and it will launch in 2017 I think on

614
00:24:51,210 --> 00:24:47,889
the sls can you explain the difference

615
00:24:53,609 --> 00:24:51,220
between the Atlas and the SLS and what

616
00:24:56,430 --> 00:24:53,619
added capabilities the SLS will have in

617
00:24:59,430 --> 00:24:56,440
addition to or that will make it better

618
00:25:01,499 --> 00:24:59,440
than Alice let's see i'll start with the

619
00:25:03,659 --> 00:25:01,509
technical any eat which is easier to

620
00:25:05,639 --> 00:25:03,669
answer so it's actually a delta for

621
00:25:07,200 --> 00:25:05,649
heavy it's similar to an atlas 5 and

622
00:25:09,839 --> 00:25:07,210
capability delta for heavy is a little

623
00:25:11,700 --> 00:25:09,849
more capable and it actually is easier

624
00:25:13,859 --> 00:25:11,710
for us to integrate you know we're on

625
00:25:15,239 --> 00:25:13,869
the orion we have not just the capsule

626
00:25:17,549 --> 00:25:15,249
itself in service module but also a

627
00:25:19,710 --> 00:25:17,559
launch abort and on delta 4 we can

628
00:25:21,419 --> 00:25:19,720
actually attach that to the upper stage

629
00:25:22,799 --> 00:25:21,429
structure of the Delta Force it was easy

630
00:25:26,460 --> 00:25:22,809
to integrate so that's why we chose the

631
00:25:28,799 --> 00:25:26,470
Delta for Delta for can really just just

632
00:25:30,479 --> 00:25:28,809
gets us enough to do a good test it gets

633
00:25:31,950 --> 00:25:30,489
us like I said about 3,600 nautical

634
00:25:34,379 --> 00:25:31,960
miles that's its real capability to

635
00:25:36,450 --> 00:25:34,389
throw the Orion this particular around

636
00:25:37,950 --> 00:25:36,460
configuration so it gets us like I said

637
00:25:39,509 --> 00:25:37,960
to about eighty four percent of the

638
00:25:43,409 --> 00:25:39,519

lunar velocity so that's a great test

639
00:25:45,869 --> 00:25:43,419
for the heat shield while SLS is getting

640
00:25:48,060 --> 00:25:45,879
finished but you need SLS to do these

641
00:25:49,759 --> 00:25:48,070
big missions you need SLS to go do this

642
00:25:52,859 --> 00:25:49,769
asteroid mission because you need more

643
00:25:54,779 --> 00:25:52,869
velocity you need more energy to push it

644
00:25:57,240 --> 00:25:54,789
further into the solar system so that to

645
00:25:59,340 --> 00:25:57,250
me that's the big difference

646
00:26:00,630 --> 00:25:59,350
and I'll and then as far as

647
00:26:03,150 --> 00:26:00,640
sequestration you know we're still

648
00:26:05,610 --> 00:26:03,160
working through that right now we're

649
00:26:07,680 --> 00:26:05,620
were it doesn't affect it doesn't

650
00:26:09,570 --> 00:26:07,690
significantly affect our our bottom-line

651
00:26:12,360 --> 00:26:09,580
budget so that was good for us it wasn't

652
00:26:14,130 --> 00:26:12,370
a big change and so we're working with

653
00:26:15,990 --> 00:26:14,140
headquarters to see exactly what the

654
00:26:24,169 --> 00:26:16,000
dollars will be but it hasn't changed

655
00:26:29,869 --> 00:26:27,799
any other questions well again I want to

656
00:26:31,519 --> 00:26:29,879
thank you all for coming today as I said

657
00:26:33,139 --> 00:26:31,529
we are extremely excited about our

658
00:26:35,299 --> 00:26:33,149
mission but we're extremely excited

659
00:26:38,090 --> 00:26:35,309
about the progress that we've made and

660
00:26:39,769 --> 00:26:38,100
we'll try and find more opportunities as

661
00:26:42,409 --> 00:26:39,779
we move ahead to really show the

662
00:26:43,519 --> 00:26:42,419
progress we're making because we're

663
00:26:45,859 --> 00:26:43,529

going to get there we're going to make

664
00:26:50,149 --> 00:26:45,869
this happen on time within budget that's

665
00:26:51,739 --> 00:26:50,159
our goal and i think it's it's really an

666
00:26:53,840 --> 00:26:51,749
awesome time to be here at the Kennedy

667
00:26:56,180 --> 00:26:53,850
Space Center to see the progress that

668
00:27:30,450 --> 00:26:56,190
we're making toward the future so thanks

669
00:27:35,790 --> 00:27:32,850
this is a probably the most exciting

670
00:27:38,310 --> 00:27:35,800
point in a program from the standpoint

671
00:27:40,110 --> 00:27:38,320
of activating the factory the stage of

672
00:27:42,230 --> 00:27:40,120
the program that we're dealing with is

673
00:27:45,450 --> 00:27:42,240
it's called confidence hardware and

674
00:27:48,420 --> 00:27:45,460
that's when we take flight form hardware

675
00:27:52,290 --> 00:27:48,430
run it through all the tooling use that

676
00:27:55,290 --> 00:27:52,300
for subsequent testing and fit ups all

677
00:28:00,570 --> 00:27:55,300
of the tooling that is is going in is up

678
00:28:03,720 --> 00:28:00,580
sighs to scale for the SLS program some

679
00:28:08,070 --> 00:28:03,730
of the vertical tooling is in a building

680
00:28:10,710 --> 00:28:08,080
that is probably 15 stories tall the

681
00:28:13,230 --> 00:28:10,720
largest section of the rocket is the

682
00:28:16,080 --> 00:28:13,240
fuel tank the hydrogen tank you have to

683
00:28:18,120 --> 00:28:16,090
stack that with the other sections of

684
00:28:20,280 --> 00:28:18,130
the rocket inner tank the engine section

685
00:28:23,130 --> 00:28:20,290
the forward skirt put all that together

686
00:28:26,100 --> 00:28:23,140
you've got a very large rocket we're

687
00:28:31,560 --> 00:28:26,110
looking at completing the first flight

688
00:28:34,780 --> 00:28:31,570

vehicle at math in May of 2016 and we're

689
00:28:39,710 --> 00:28:37,640
slm is selective laser melting it's a

690
00:28:44,380 --> 00:28:39,720
method of turning powdered metal finely

691
00:28:47,000 --> 00:28:44,390
grained powdered metal into solid parts

692
00:28:49,760 --> 00:28:47,010
the design is done straight from 3d CAD

693
00:28:51,560 --> 00:28:49,770
models which is standard in the industry

694
00:28:54,230 --> 00:28:51,570
you can use any kind of commercial

695
00:28:56,330 --> 00:28:54,240
software and the machine takes that and

696
00:28:58,220 --> 00:28:56,340
cuts that into a bunch of slices and

697
00:28:59,540 --> 00:28:58,230
build them sliced by slicing what we

698
00:29:01,070 --> 00:28:59,550
have to do in order to trust the

699
00:29:05,750 --> 00:29:01,080
material is we have to do a lot of

700
00:29:08,930 --> 00:29:05,760
testing on the ground back in 2011 we

701
00:29:12,070 --> 00:29:08,940
built a duct using this process for the

702
00:29:14,680 --> 00:29:12,080
j-2x and we hot fired it

703
00:29:16,930 --> 00:29:14,690
and what we saw was basically no

704
00:29:18,789 --> 00:29:16,940
deterioration of the material we built

705
00:29:21,009 --> 00:29:18,799
the one part for thirty-five cents on

706
00:29:23,529 --> 00:29:21,019
the dollar more complex parts we think

707
00:29:26,049 --> 00:29:23,539
the cost savings are approaches of order

708
00:29:28,120 --> 00:29:26,059
of magnitude if this technology proves

709
00:29:30,669 --> 00:29:28,130
out like we think it will the schedule

710
00:29:35,080 --> 00:29:30,679
savings and the cost savings is is

711
00:29:38,110 --> 00:29:35,090
almost beyond imagination the work that

712
00:29:41,320 --> 00:29:38,120
we're doing here is to support the Orion

713
00:29:43,299 --> 00:29:41,330

test flight which is eft-1 the hardware

714
00:29:48,070 --> 00:29:43,309
that we're manufacturing here in this

715
00:29:53,430 --> 00:29:48,080
shot is the adapter for the Delta for

716
00:29:59,830 --> 00:29:56,830
to complete the welded structure you

717
00:30:04,360 --> 00:29:59,840
have three vertical or longitude in the

718
00:30:07,090 --> 00:30:04,370
welds that join the barrel panels into a

719
00:30:09,850 --> 00:30:07,100
cone it moves from the vertical well

720
00:30:11,830 --> 00:30:09,860
tool to the robotic well too for the

721
00:30:13,450 --> 00:30:11,840
circumferential wells the

722
00:30:16,930 --> 00:30:13,460
circumferential wells are the welds that

723
00:30:19,899 --> 00:30:16,940
join the welded cone structure to the

724
00:30:22,120 --> 00:30:19,909
forward and aft ring flanges and that

725
00:30:24,289 --> 00:30:22,130
pretty much provides your primary

726
00:30:27,259 --> 00:30:24,299
structure

727
00:30:31,049 --> 00:30:27,269
we would a NASA are passionate about

728
00:30:34,489 --> 00:30:31,059
stem SLS with that Tennessee Tech for

729
00:30:38,909 --> 00:30:34,499
engineering week we sat on a panel and

730
00:30:40,769 --> 00:30:38,919
we did video talks with several

731
00:30:44,039 --> 00:30:40,779
different elementary middle and high

732
00:30:45,840 --> 00:30:44,049
school students their engineering week

733
00:30:49,710 --> 00:30:45,850
they have shared with us who usually

734
00:30:51,719 --> 00:30:49,720
draws about 70 people and on a Friday

735
00:30:54,090 --> 00:30:51,729
night one of our programs to drew more

736
00:30:56,249 --> 00:30:54,100
than 400 the more that we can get people

737
00:30:57,719 --> 00:30:56,259
involved in those creative ways and more

738
00:31:00,029 --> 00:30:57,729

successful we're going to be the

739
00:31:03,599 --> 00:31:00,039
outreach for inspiring the future is

740
00:31:06,989 --> 00:31:03,609
such an important goal of NASA's so we

741
00:31:09,359 --> 00:31:06,999
have to foster that inspiration and that

742
00:31:19,820 --> 00:31:09,369
dedication to learning that's necessary

743
00:31:24,719 --> 00:31:22,259
there's a lot of work on on the VA be

744
00:31:27,989 --> 00:31:24,729
getting ready for SLS and Orion coming

745
00:31:30,869 --> 00:31:27,999
in 17 in the VA be yeah we've built a

746
00:31:32,629 --> 00:31:30,879
full-scale mock-up the main thing we're

747
00:31:34,560 --> 00:31:32,639
looking for is the handling and axis

748
00:31:37,109 --> 00:31:34,570
what we're looking at we're looking at

749
00:31:38,999 --> 00:31:37,119
get some of the ogive panels from the

750
00:31:41,339 --> 00:31:39,009
dta which are the ground test article

751
00:31:42,930 --> 00:31:41,349
they work great to do the practicing

752
00:31:45,629 --> 00:31:42,940
just like we used to see them and then

753
00:31:47,940 --> 00:31:45,639
last we are working pretty pretty heavy

754
00:31:51,210 --> 00:31:47,950
on the eft-1 park and we're talking

755
00:31:53,279 --> 00:31:51,220
we're only 18 months away the whole

756
00:31:54,960 --> 00:31:53,289
program it's all its massive successful

757
00:31:56,820 --> 00:31:54,970
it's not just ground systems or Ryan or

758
00:31:58,799 --> 00:31:56,830
SLS so even though go they're going off

759
00:32:02,039 --> 00:31:58,809
a delta for having this flight

760
00:32:05,140 --> 00:32:02,049
successful does help sls AMG sdl it's

761
00:32:08,390 --> 00:32:05,150
going to give us a lot of experience

762
00:32:11,270 --> 00:32:08,400
we did a one-year design on the entire

763
00:32:14,180 --> 00:32:11,280

crawl away from the VA be to pate and

764
00:32:17,210 --> 00:32:14,190
from the VA be to Pat be over the years

765
00:32:20,270 --> 00:32:17,220
the top level rock has been referred

766
00:32:22,310 --> 00:32:20,280
multiple times the actual foundation the

767
00:32:24,320 --> 00:32:22,320
lime rock which is what we're doing now

768
00:32:27,470 --> 00:32:24,330
has been refurbished since it was

769
00:32:29,570 --> 00:32:27,480
installed we are reinstalling lime rock

770
00:32:31,280 --> 00:32:29,580
and bring it back to print and then

771
00:32:32,780 --> 00:32:31,290
we'll install some fresh river rock on

772
00:32:34,909 --> 00:32:32,790
top and then hopefully be good for

773
00:32:37,130 --> 00:32:34,919
another 50 years currently the contract

774
00:32:39,159 --> 00:32:37,140
is about twenty percent complete we're

775
00:32:43,190 --> 00:32:39,169
looking for a total completion date in

776
00:32:46,039 --> 00:32:43,200
mid-2014 the crawler transporter as it

777
00:32:49,250 --> 00:32:46,049
finishes its upgrades it will exercise

778
00:32:54,110 --> 00:32:49,260
or stretch and go up and down the crawl

779
00:32:56,390 --> 00:32:54,120
away we have almost 47 different

780
00:32:58,520 --> 00:32:56,400
projects that touch almost every system

781
00:33:01,130 --> 00:32:58,530
on the crawler the drivers cabs of

782
00:33:03,020 --> 00:33:01,140
breaks the generators we're increasing

783
00:33:04,430 --> 00:33:03,030
the generator capacities who are able to

784
00:33:05,990 --> 00:33:04,440
provide more power to the mobile

785
00:33:07,730 --> 00:33:06,000
launcher to the vehicle to the

786
00:33:09,409 --> 00:33:07,740
spacecraft within the next two weeks

787
00:33:11,180 --> 00:33:09,419
we're going to be able to take the belt

788
00:33:13,789 --> 00:33:11,190

off the crawler remove the old

789
00:33:16,250 --> 00:33:13,799
assemblies and start assembling the new

790
00:33:18,950 --> 00:33:16,260
components in place followed by the gel

791
00:33:20,480 --> 00:33:18,960
cylinders the hydraulic cylinders what

792
00:33:23,090 --> 00:33:20,490
the gel cylinders do when you're

793
00:33:25,520 --> 00:33:23,100
carrying a load they automatically keep

794
00:33:27,230 --> 00:33:25,530
the crawler completely stabilized so the

795
00:33:29,799 --> 00:33:27,240
vehicle does not see any movement

796
00:33:32,810 --> 00:33:29,809
especially when you go on up the ramp

797
00:33:39,160 --> 00:33:32,820
after we complete the modifications will

798
00:33:44,240 --> 00:33:42,440
18 months from launch is not very far

799
00:33:46,460 --> 00:33:44,250
away really in the grand scheme of

800
00:33:48,710 --> 00:33:46,470
things you think about trying to get all

801
00:33:50,360 --> 00:33:48,720
the systems on board the guys are going

802
00:33:52,520 --> 00:33:50,370
great guns at putting all the secondary

803
00:33:53,780 --> 00:33:52,530
structure in which absolutely has to be

804
00:33:55,820 --> 00:33:53,790
done right before they start putting the

805
00:33:57,920 --> 00:33:55,830
systems in but you think about still all

806
00:34:00,020 --> 00:33:57,930
the wiring that needs to be done and all

807
00:34:03,110 --> 00:34:00,030
the plumbing that needs to be done and

808
00:34:06,140 --> 00:34:03,120
welded back in November we had an issue

809
00:34:07,700 --> 00:34:06,150
we took the pressure vessel to prove we

810
00:34:10,070 --> 00:34:07,710
had crack generated in the primary

811
00:34:11,659 --> 00:34:10,080
structure so sort of all hands on deck

812
00:34:13,490 --> 00:34:11,669
if you will to go figure out what

813
00:34:16,070 --> 00:34:13,500

happened and why and how to fix it and

814
00:34:17,960 --> 00:34:16,080
so we went in and just basically created

815
00:34:19,580 --> 00:34:17,970
the guys created some some fittings to

816
00:34:21,020 --> 00:34:19,590
offload the cracked part of the

817
00:34:23,270 --> 00:34:21,030
structure and then the technicians at

818
00:34:24,980 --> 00:34:23,280
the ONC went in and cut the cut the

819
00:34:26,570 --> 00:34:24,990
cracks out and there the process of

820
00:34:29,060 --> 00:34:26,580
putting that all putting that all

821
00:34:31,159 --> 00:34:29,070
together now so it'll be retested in in

822
00:34:32,720 --> 00:34:31,169
April for the next few weeks will take a

823
00:34:34,909 --> 00:34:32,730
little bit of a back seat to get in the

824
00:34:37,010 --> 00:34:34,919
crew module through its big structural

825
00:34:39,320 --> 00:34:37,020
test when the structures guys will put a

826
00:34:41,780 --> 00:34:39,330
focus put focused attention on to the

827
00:34:42,890 --> 00:34:41,790
service module getting it finished and

828
00:34:47,570 --> 00:34:42,900
built up and then it goes through a

829
00:34:49,430 --> 00:34:47,580
structural test as well see past stands

830
00:34:52,669 --> 00:34:49,440
for the capsule parachute assembly

831
00:34:54,320 --> 00:34:52,679
system we are building doing the

832
00:34:57,530 --> 00:34:54,330
development of the parachute system for

833
00:34:59,810 --> 00:34:57,540
trying the military have developed a

834
00:35:02,780 --> 00:34:59,820
technique called low velocity air drops

835
00:35:05,090 --> 00:35:02,790
and they set up the conditions for which

836
00:35:08,150 --> 00:35:05,100
then to start the sequence of the Orion

837
00:35:11,810 --> 00:35:08,160
parachute system and so we work very

838
00:35:15,050 --> 00:35:11,820

hard to reduce the risk as much as we

839
00:35:17,570 --> 00:35:15,060
can to understand as much as we can in

840
00:35:19,520 --> 00:35:17,580
order for when we do fly this crew it's

841
00:35:22,790 --> 00:35:19,530
going to be a safe vehicle so over the

842
00:35:26,090 --> 00:35:22,800
next six months very happy that we will

843
00:35:28,670 --> 00:35:26,100
be delivering our parachutes to the Cape

844
00:35:33,650 --> 00:35:28,680
to the ONC building to be installed in

845
00:35:35,150 --> 00:35:33,660
the eft-1 vehicle the NBL we're kind of

846
00:35:38,120 --> 00:35:35,160
working on everything post splashdown

847
00:35:40,339 --> 00:35:38,130
we're working with folks at a KSC in

848
00:35:42,769 --> 00:35:40,349
that of Patrick Air Force Base and

849
00:35:44,779 --> 00:35:42,779
with navy divers out of san diego

850
00:35:47,809 --> 00:35:44,789
putting together a training material on

851
00:35:51,380 --> 00:35:47,819
how to actually go recover eft-1 out in

852
00:35:54,650 --> 00:35:51,390
the ocean we're using navy and fibia

853
00:35:56,630 --> 00:35:54,660
sasawa they do is they can ballast down

854
00:35:58,969 --> 00:35:56,640
and lower the back end of the ship into

855
00:36:02,359 --> 00:35:58,979
the water and we can hook the capsule up

856
00:36:04,819 --> 00:36:02,369
and just tow it into that well deck and

857
00:36:07,460 --> 00:36:04,829
set it down in a cradle there's about 17

858
00:36:09,559 --> 00:36:07,470
folks when we get a dive crew available

859
00:36:12,829 --> 00:36:09,569
so what we'll do with them is we'll put

860
00:36:14,329 --> 00:36:12,839
two sets of three in small zodiacs and

861
00:36:17,509 --> 00:36:14,339
they'll do all the hands-on work on the

862
00:36:19,729 --> 00:36:17,519
vehicle the cradle that we plan on using

863
00:36:21,620 --> 00:36:19,739

for recovery it'll be finished within

864
00:36:24,259 --> 00:36:21,630
the next 30 days we're delivering it out

865
00:36:25,670 --> 00:36:24,269
to Langley and then in August put that

866
00:36:31,000 --> 00:36:25,680
equipment in a well deck ship and

867
00:36:37,030 --> 00:36:34,210
I think there was always a hope that I

868
00:36:40,420 --> 00:36:37,040
would be working on a vehicle that would

869
00:36:42,850 --> 00:36:40,430
carry humans outside farther outside of

870
00:36:46,060 --> 00:36:42,860
low-earth orbit getting back into the

871
00:36:47,970 --> 00:36:46,070
roots of what NASA was built on which is

872
00:36:51,510 --> 00:36:47,980
exploration what could be more exciting

873
00:36:54,910 --> 00:36:51,520
than building the next great outreach

874
00:36:56,890 --> 00:36:54,920
for the u.s. government and for for

875
00:36:59,650 --> 00:36:56,900
mankind actually you have to let people

876
00:37:02,530 --> 00:36:59,660
know that we're still here oh yes

877
00:37:04,300 --> 00:37:02,540
shuttle did retire but we are still

878
00:37:08,080 --> 00:37:04,310
making progress and we are still moving

879
00:37:11,050 --> 00:37:08,090
forward NASA's nowhere near slowing down

880
00:37:12,460 --> 00:37:11,060
we're preparing for the future it's a

881
00:37:15,610 --> 00:37:12,470
great time for us to have such a

882
00:37:17,320 --> 00:37:15,620
tangible tangible artifact of the work

883
00:37:19,000 --> 00:37:17,330
and the hours we put in so yeah we're

884
00:37:38,730 --> 00:37:19,010
really looking forward to really looking

885
00:37:43,890 --> 00:37:41,600
the President's budget proposal for NASA

886
00:37:47,120 --> 00:37:43,900
working to keep america the world's

887
00:37:50,280 --> 00:37:47,130
leader in innovation space exploration

888
00:37:52,890 --> 00:37:50,290

scientific discovery and inspiration for

889
00:37:55,080 --> 00:37:52,900
the benefit of humanity for generations

890
00:37:58,890 --> 00:37:55,090
to come we don't just look to the future

891
00:38:02,040 --> 00:37:58,900
we're making it happen one helping more

892
00:38:05,240 --> 00:38:02,050
US companies bring cargo and liftoff

893
00:38:07,800 --> 00:38:05,250
liftoff of the SpaceX Falcon 9 rocket

894
00:38:10,020 --> 00:38:07,810
launching dragon to the International

895
00:38:14,400 --> 00:38:10,030
Space Station and returning cargo

896
00:38:17,190 --> 00:38:14,410
resupply missions to US soil and by 2017

897
00:38:19,560 --> 00:38:17,200
launch astronauts from American soil to

898
00:38:21,810 --> 00:38:19,570
the international space station while

899
00:38:23,040 --> 00:38:21,820
creating new jobs here at home I'm

900
00:38:24,450 --> 00:38:23,050
excited about the opportunities that

901
00:38:26,400 --> 00:38:24,460
we're able to provide with NASA's

902
00:38:27,990 --> 00:38:26,410
Centennial Challenges program we

903
00:38:30,420 --> 00:38:28,000
advanced technologies not only for NASA

904
00:38:33,270 --> 00:38:30,430
but for the nation as a whole propel the

905
00:38:36,210 --> 00:38:33,280
Space Launch System and Orion toward the

906
00:38:40,140 --> 00:38:36,220
president's bold path to lead humans to

907
00:38:43,950 --> 00:38:40,150
an asteroid in 2025 and eventually on to

908
00:38:45,690 --> 00:38:43,960
Mars in the 2030s we're building and

909
00:38:46,859 --> 00:38:45,700
testing our first capsule right now and

910
00:38:48,660 --> 00:38:46,869
we'll get to see it launch into space

911
00:38:50,670 --> 00:38:48,670
next year for our first flight test

912
00:38:51,870 --> 00:38:50,680
we're upgrading and modifying the

913
00:38:53,400 --> 00:38:51,880

crawlers for the next generation

914
00:38:58,290 --> 00:38:53,410
spacecraft and we'll be launching soon

915
00:39:01,950 --> 00:38:58,300
now transitioning to sls it's really

916
00:39:05,280 --> 00:39:01,960
been rejuvenating to work on America's

917
00:39:07,320 --> 00:39:05,290
Next losses and aboard station helping

918
00:39:09,870 --> 00:39:07,330
us learn how to live and work in space

919
00:39:12,450 --> 00:39:09,880
as it is impossible pretty darn well

920
00:39:15,270 --> 00:39:12,460
while we prove new technologies and

921
00:39:18,690 --> 00:39:15,280
conduct science research to improve life

922
00:39:21,330 --> 00:39:18,700
here on earth our investigations into

923
00:39:23,880 --> 00:39:21,340
early onset osteoporosis and astronauts

924
00:39:27,180 --> 00:39:23,890
may enhance the detection of

925
00:39:30,160 --> 00:39:27,190
osteoporosis and patients here on earth

926
00:39:32,950 --> 00:39:30,170
the President's budget proposal funds

927
00:39:34,900 --> 00:39:32,960
innovations in space technology that

928
00:39:37,630 --> 00:39:34,910
will enable tomorrow's discoveries

929
00:39:40,360 --> 00:39:37,640
across NASA's wide spectrum of missions

930
00:39:43,330 --> 00:39:40,370
while fueling our economy for years to

931
00:39:45,940 --> 00:39:43,340
come pushing data to the user is really

932
00:39:47,910 --> 00:39:45,950
key users can always use more data

933
00:39:50,650 --> 00:39:47,920
especially the scientific community

934
00:39:53,230 --> 00:39:50,660
game-changing technologies may help

935
00:39:56,470 --> 00:39:53,240
advance our date to visit an asteroid as

936
00:39:58,660 --> 00:39:56,480
early as twenty twenty-one through an

937
00:40:01,780 --> 00:39:58,670
unprecedented feat of technology

938
00:40:05,320 --> 00:40:01,790

innovation and scientific discovery NASA

939
00:40:08,680 --> 00:40:05,330
will work to identify capture and move

940
00:40:11,740 --> 00:40:08,690
an asteroid raising the bar for human

941
00:40:16,720 --> 00:40:11,750
exploration and help inform us on how to

942
00:40:18,760 --> 00:40:16,730
better protect our home planet NASA's

943
00:40:21,070 --> 00:40:18,770
balanced portfolio of groundbreaking

944
00:40:23,710 --> 00:40:21,080
science missions will continue to

945
00:40:26,410 --> 00:40:23,720
monitor and collect critical data about

946
00:40:28,270 --> 00:40:26,420
Earth's climate and systems we do a lot

947
00:40:30,280 --> 00:40:28,280
of work on the polar region where we've

948
00:40:32,320 --> 00:40:30,290
taken scientists and instruments that

949
00:40:34,570 --> 00:40:32,330
can measure the thickness of ice not

950
00:40:36,310 --> 00:40:34,580
only can they measure how how high it is

951
00:40:37,960 --> 00:40:36,320
above the sea level but they can

952
00:40:39,760 --> 00:40:37,970
actually measure through the ice down

953
00:40:41,440 --> 00:40:39,770
till they reach water and then through

954
00:40:44,110 --> 00:40:41,450
that till they reach bedrock to

955
00:40:48,370 --> 00:40:44,120
understand our beginnings spacecraft are

956
00:40:49,900 --> 00:40:48,380
speeding to Jupiter Pluto and series I'm

957
00:40:51,520 --> 00:40:49,910
excited about my work and crowd

958
00:40:53,680 --> 00:40:51,530
propellant whose will help make it

959
00:40:56,740 --> 00:40:53,690
possible for us to someday explore the

960
00:40:59,830 --> 00:40:56,750
far reaches of our solar system peering

961
00:41:02,590 --> 00:40:59,840
into other galaxies and spotting planets

962
00:41:04,120 --> 00:41:02,600
around other stars thousands of planet

963
00:41:07,030 --> 00:41:04,130

candidates have been discovered to date

964
00:41:09,160 --> 00:41:07,040
hundreds of which are earth-sized the

965
00:41:11,140 --> 00:41:09,170
data are already hinting that planets

966
00:41:13,120 --> 00:41:11,150
are abundant in the galaxy and soon

967
00:41:15,000 --> 00:41:13,130
we'll know what percentage of stars

968
00:41:17,260 --> 00:41:15,010
Harbor planets more like our own earth

969
00:41:19,440 --> 00:41:17,270
they soon will be joined by the

970
00:41:22,540 --> 00:41:19,450
revolutionary james webb space telescope

971
00:41:25,210 --> 00:41:22,550
to delve farther back in time to the

972
00:41:26,860 --> 00:41:25,220
very origins of the universe we're here

973
00:41:27,280 --> 00:41:26,870
in NASA Goddard Space Flight centers

974
00:41:29,320 --> 00:41:27,290
clean

975
00:41:30,970 --> 00:41:29,330
we're we're testing a robotic arm that

976
00:41:33,940 --> 00:41:30,980
will help assemble the James Webb Space

977
00:41:36,580 --> 00:41:33,950
Telescope and as curiosity continues

978
00:41:38,620 --> 00:41:36,590
roving Mars on history's most daring

979
00:41:40,750 --> 00:41:38,630
mission to the red planet NASA is

980
00:41:42,610 --> 00:41:40,760
planning another robotic mission to

981
00:41:45,940 --> 00:41:42,620
Earth's nearest neighbor along with

982
00:41:47,380 --> 00:41:45,950
current mission maven and insight with a

983
00:41:49,450 --> 00:41:47,390
budget in place we're able to continue

984
00:41:51,340 --> 00:41:49,460
testing the development of exciting

985
00:41:53,590 --> 00:41:51,350
missions to Mars including the Maven

986
00:41:55,180 --> 00:41:53,600
mission maven will be able to explore

987
00:41:56,710 --> 00:41:55,190
whether or not the atmosphere of Mars

988
00:41:58,150 --> 00:41:56,720

has evolved over time and if the

989
00:42:00,760 --> 00:41:58,160
majority of it is actually been lost

990
00:42:03,100 --> 00:42:00,770
interplanetary space forever NASA's

991
00:42:05,890 --> 00:42:03,110
cutting-edge Aeronautics research will

992
00:42:09,130 --> 00:42:05,900
continue making air travel safer cleaner

993
00:42:12,130 --> 00:42:09,140
and quieter or Americans and everyone

994
00:42:14,050 --> 00:42:12,140
the world over NASA's always trying to

995
00:42:15,100 --> 00:42:14,060
push research push boundaries and one of

996
00:42:17,920 --> 00:42:15,110
the things we're trying to do is to

997
00:42:19,600 --> 00:42:17,930
bring commercial supersonic travel to

998
00:42:22,720 --> 00:42:19,610
the world we're working closely with

999
00:42:24,790 --> 00:42:22,730
other government agencies to mitigate

1000
00:42:27,610 --> 00:42:24,800
the environmental concerns of aviation

1001
00:42:30,580 --> 00:42:27,620
and this project will certainly have an

1002
00:42:32,230 --> 00:42:30,590
impact looking at five or ten years our

1003
00:42:34,150 --> 00:42:32,240
dynamic weather routes tool is an

1004
00:42:35,950 --> 00:42:34,160
example of how NASA will improve the

1005
00:42:37,930 --> 00:42:35,960
future of air transportation the

1006
00:42:39,730 --> 00:42:37,940
software will help Airlines and air

1007
00:42:41,500 --> 00:42:39,740
traffic controllers find efficient and

1008
00:42:43,900 --> 00:42:41,510
safe paths for aircraft to fly around

1009
00:42:45,550 --> 00:42:43,910
bad weather potentially saving about a

1010
00:42:48,040 --> 00:42:45,560
hundred million dollars each year and

1011
00:42:50,140 --> 00:42:48,050
operations and fuel costs and finally

1012
00:42:53,410 --> 00:42:50,150
NASA will continue to educate and

1013
00:42:56,500 --> 00:42:53,420

inspire our children to dream big work

1014
00:42:58,930 --> 00:42:56,510
and study hard and reach for the stars

1015
00:43:01,260 --> 00:42:58,940
as America's next generation of

1016
00:43:04,540 --> 00:43:01,270
scientists technologists engineers

1017
00:43:06,490 --> 00:43:04,550
mathematicians and astronauts all you

1018
00:43:08,230 --> 00:43:06,500
really need to do is you know get that

1019
00:43:10,150 --> 00:43:08,240
spark going in that little kids mind you

1020
00:43:12,220 --> 00:43:10,160
know about what he can do and and they

1021
00:43:14,410 --> 00:43:12,230
just you set them off and they go out to

1022
00:43:16,780 --> 00:43:14,420
learn I love working with young

1023
00:43:19,360 --> 00:43:16,790
scientists having their first experience

1024
00:43:20,630 --> 00:43:19,370
as researchers because I remember my

1025
00:43:22,160 --> 00:43:20,640
first experience in

1026
00:43:24,349 --> 00:43:22,170
srdjan my first time solving a problem

1027
00:43:26,779 --> 00:43:24,359
so I love giving young signed as an

1028
00:43:28,519 --> 00:43:26,789
opportunity to solve their first problem

1029
00:43:30,259 --> 00:43:28,529
and that in itself is building a

1030
00:43:33,259 --> 00:43:30,269
foundation to take us farther into the

1031
00:43:35,509 --> 00:43:33,269
future and grow our young engineers the

1032
00:43:38,059 --> 00:43:35,519
president's fiscal year 2014 budget

1033
00:43:40,329 --> 00:43:38,069
proposal ensures United States

1034
00:43:43,069 --> 00:43:40,339
leadership in space exploration and

1035
00:43:45,380 --> 00:43:43,079
scientific discovery for years to come

1036
00:43:48,170 --> 00:43:45,390
while making critical advances in

1037
00:43:50,900 --> 00:43:48,180
aerospace and Aeronautics to benefit the

1038
00:43:52,490 --> 00:43:50,910

American people all in more innovative

1039
00:43:54,620 --> 00:43:52,500
and cost-effective ways that will