
MISSION
JUNO

1
00:00:07,349 --> 00:00:05,829
good afternoon everyone

2
00:00:09,830 --> 00:00:07,359
welcome to our

3
00:00:11,910 --> 00:00:09,840
happy post-launch press conference for

4
00:00:13,110 --> 00:00:11,920
juno and the atlas v rocket launched

5
00:00:15,669 --> 00:00:13,120
earlier

6
00:00:17,590 --> 00:00:15,679
in the afternoon here to talk about the

7
00:00:18,870 --> 00:00:17,600
mission and the status of the juno

8
00:00:21,590 --> 00:00:18,880
spacecraft

9
00:00:23,830 --> 00:00:21,600
is jim adams the deputy director for the

10
00:00:27,109 --> 00:00:23,840
planetary science division at nasa

11
00:00:29,509 --> 00:00:27,119
headquarters in washington

12
00:00:32,229 --> 00:00:29,519
scott bolton the juno principal

13
00:00:34,630 --> 00:00:32,239

investigator from the southwest research

14
00:00:38,069 --> 00:00:34,640
institute

15
00:00:40,869 --> 00:00:38,079
and jan chodas the juno project manager

16
00:00:43,350 --> 00:00:40,879
from the jet propulsion laboratory and

17
00:00:45,910 --> 00:00:43,360
we'll begin first with jim adams jim

18
00:00:48,389 --> 00:00:45,920
well thanks george it was a great day

19
00:00:50,549 --> 00:00:48,399
for a launch and we're extremely happy

20
00:00:53,270 --> 00:00:50,559
that the weather cooperated with us and

21
00:00:55,510 --> 00:00:53,280
tropical storm emily dissipated

22
00:00:56,229 --> 00:00:55,520
in the caribbean

23
00:01:00,229 --> 00:00:56,239
we're

24
00:01:03,029 --> 00:01:00,239
proud of the juno team

25
00:01:05,030 --> 00:01:03,039
um entering the launch phase of this our

26
00:01:07,350 --> 00:01:05,040
year of the solar system

27
00:01:09,590 --> 00:01:07,360
and we're looking forward to just some

28
00:01:10,789 --> 00:01:09,600
fantastic science in roughly five years

29
00:01:13,270 --> 00:01:10,799
time

30
00:01:15,910 --> 00:01:13,280
i think the team should be commended

31
00:01:17,190 --> 00:01:15,920
for delivering this mission on cost and

32
00:01:19,190 --> 00:01:17,200
on schedule

33
00:01:21,429 --> 00:01:19,200
in an environment that is extremely

34
00:01:23,590 --> 00:01:21,439
difficult and the expectations of the

35
00:01:26,390 --> 00:01:23,600
team were very high and so

36
00:01:28,390 --> 00:01:26,400
i uh i convey my thanks

37
00:01:29,429 --> 00:01:28,400
to everybody who was involved in the

38
00:01:30,390 --> 00:01:29,439

juno

39
00:01:32,630 --> 00:01:30,400
effort

40
00:01:34,069 --> 00:01:32,640
and we look forward to the science that

41
00:01:35,469 --> 00:01:34,079
we're going to get back

42
00:01:38,069 --> 00:01:35,479
here in

43
00:01:40,870 --> 00:01:38,079
2016 right scott

44
00:01:43,749 --> 00:01:40,880
take it over you know

45
00:01:46,469 --> 00:01:43,759
yeah 2016. in fact the next stop is

46
00:01:48,710 --> 00:01:46,479
jupiter we arrived there july 4th

47
00:01:50,789 --> 00:01:48,720
on 2016.

48
00:01:53,190 --> 00:01:50,799
go into orbit there polar orbit and

49
00:01:55,109 --> 00:01:53,200
start to unlock those secrets of jupiter

50
00:01:57,030 --> 00:01:55,119
that we've been trying to get at for a

51
00:01:58,709 --> 00:01:57,040
long time i

52
00:02:00,069 --> 00:01:58,719
can't be happier i mean i could not be

53
00:02:01,990 --> 00:02:00,079
happier than this is sort of like a

54
00:02:03,510 --> 00:02:02,000
dream come true

55
00:02:05,429 --> 00:02:03,520
um you know

56
00:02:07,030 --> 00:02:05,439
more than 10 years ago we had these

57
00:02:09,109 --> 00:02:07,040
ideas

58
00:02:11,110 --> 00:02:09,119
and then you know yesterday looking at

59
00:02:12,869 --> 00:02:11,120
that rocket i realized started really

60
00:02:15,030 --> 00:02:12,879
starting to put together that this is

61
00:02:16,790 --> 00:02:15,040
happening there's the spacecraft inside

62
00:02:19,350 --> 00:02:16,800
the rocket

63
00:02:21,750 --> 00:02:19,360

and we're about to leave and

64
00:02:24,309 --> 00:02:21,760
and today we left

65
00:02:25,750 --> 00:02:24,319
and we're on our way and

66
00:02:27,589 --> 00:02:25,760
you know at this point the the

67
00:02:29,830 --> 00:02:27,599
spacecraft's out it's open the solar

68
00:02:32,390 --> 00:02:29,840
rays are open we're flowing our

69
00:02:34,550 --> 00:02:32,400
electricity through the veins of juno

70
00:02:36,949 --> 00:02:34,560
and we're on our way and

71
00:02:39,509 --> 00:02:36,959
getting ready now to gather all the

72
00:02:42,710 --> 00:02:39,519
great science and get everything working

73
00:02:43,990 --> 00:02:42,720
and it's just really a thrill it's

74
00:02:45,430 --> 00:02:44,000
exciting

75
00:02:47,350 --> 00:02:45,440
it's a relief

76
00:02:48,949 --> 00:02:47,360
because there's some tension associated

77
00:02:50,630 --> 00:02:48,959
with this of course

78
00:02:51,910 --> 00:02:50,640
but i'm happy that everything worked on

79
00:02:53,589 --> 00:02:51,920
schedule and

80
00:02:54,949 --> 00:02:53,599
you know we're on budget on schedule we

81
00:02:58,550 --> 00:02:54,959
launched on the first day the whole

82
00:03:01,030 --> 00:02:58,560
story is consistent so i'm happy

83
00:03:02,309 --> 00:03:01,040
and jan i'll give you some details of uh

84
00:03:06,070 --> 00:03:02,319
exactly what's going on with the

85
00:03:11,509 --> 00:03:08,630
thanks scott well this is certainly a

86
00:03:12,550 --> 00:03:11,519
wonderful day for the juno team

87
00:03:15,750 --> 00:03:12,560
we

88
00:03:17,190 --> 00:03:15,760

had planned for this day for many years

89
00:03:19,589 --> 00:03:17,200
everything

90
00:03:21,270 --> 00:03:19,599
clicked off like clockwork today we

91
00:03:22,630 --> 00:03:21,280
didn't

92
00:03:24,149 --> 00:03:22,640
launch at the opening of the window but

93
00:03:27,990 --> 00:03:24,159
we had planned to have our 69-minute

94
00:03:29,350 --> 00:03:28,000
window here today to allow for things to

95
00:03:31,509 --> 00:03:29,360
check out at the last minute make sure

96
00:03:33,990 --> 00:03:31,519
everything was on track ready to go

97
00:03:35,910 --> 00:03:34,000
we lifted off at 12 25

98
00:03:39,270 --> 00:03:35,920
pm eastern daylight time

99
00:03:42,869 --> 00:03:39,280
we separated 53 minutes later

100
00:03:46,149 --> 00:03:42,879
so about 1 18 p.m eastern daylight time

101
00:03:48,229 --> 00:03:46,159
the launch vehicle left us off at the

102
00:03:49,990 --> 00:03:48,239
nominal attitude right where we wanted

103
00:03:55,110 --> 00:03:50,000
to be the launch vehicle folks did a

104
00:04:00,630 --> 00:03:58,470
and the deep space network was amazing

105
00:04:02,070 --> 00:04:00,640
perth had acquired us uh that's that's

106
00:04:06,470 --> 00:04:02,080
the issa station that we had for

107
00:04:08,630 --> 00:04:06,480
downlink recording um at 1 18 30 24

108
00:04:11,990 --> 00:04:08,640
seconds after we separated from the

109
00:04:13,509 --> 00:04:12,000
centaur upper stage the canberra dss 34

110
00:04:17,030 --> 00:04:13,519
station

111
00:04:18,870 --> 00:04:17,040
locked up with us at 118 45

112
00:04:21,030 --> 00:04:18,880
39 seconds

113
00:04:22,870 --> 00:04:21,040

to lock up after separation which is

114
00:04:24,469 --> 00:04:22,880
just a phenomenal statistic from the

115
00:04:26,230 --> 00:04:24,479
deep space network

116
00:04:27,749 --> 00:04:26,240
couldn't be happier with that

117
00:04:30,150 --> 00:04:27,759
we started our solar array deployment

118
00:04:32,550 --> 00:04:30,160
about five minutes later as planned uh

119
00:04:36,710 --> 00:04:32,560
the arrays deployed properly

120
00:04:38,230 --> 00:04:36,720
we spun down to 0.4 rpm as predicted

121
00:04:42,469 --> 00:04:38,240
right on the dot and then the spacecraft

122
00:04:44,950 --> 00:04:42,479
spun us back up to one rpm as planned

123
00:04:47,110 --> 00:04:44,960
we were left off about 19 degrees off

124
00:04:50,070 --> 00:04:47,120
sun within the 20 degree cone that we

125
00:04:51,510 --> 00:04:50,080
needed so we did not need to turn to to

126
00:04:54,870 --> 00:04:51,520
put the arrays on the sun we were

127
00:04:56,390 --> 00:04:54,880
already pointed in the right direction

128
00:04:59,830 --> 00:04:56,400
so everything

129
00:05:03,189 --> 00:04:59,840
was our favorite word nominal

130
00:05:05,270 --> 00:05:03,199
we um we also on my way over here um i

131
00:05:08,870 --> 00:05:05,280
got a call saying that we had sent in

132
00:05:10,310 --> 00:05:08,880
our first uh command we we sent a no-op

133
00:05:12,469 --> 00:05:10,320
a command that doesn't do anything just

134
00:05:14,710 --> 00:05:12,479
proves that we do have command ability

135
00:05:17,189 --> 00:05:14,720
so i'm happy to say that we are

136
00:05:18,469 --> 00:05:17,199
stable we are spinning

137
00:05:19,909 --> 00:05:18,479
we are

138
00:05:21,749 --> 00:05:19,919

power positive

139
00:05:23,430 --> 00:05:21,759
the arrays are picking up power and

140
00:05:25,350 --> 00:05:23,440
recharging the battery and we're

141
00:05:27,270 --> 00:05:25,360
commandable and so those are the four

142
00:05:28,870 --> 00:05:27,280
things that we wanted today couldn't be

143
00:05:30,710 --> 00:05:28,880
happier

144
00:05:31,830 --> 00:05:30,720
the um the other thing i was going to

145
00:05:34,230 --> 00:05:31,840
note was

146
00:05:36,790 --> 00:05:34,240
our batteries only discharged to 90

147
00:05:39,430 --> 00:05:36,800
percent during the ascent so they gave

148
00:05:40,710 --> 00:05:39,440
us a phenomenal performance during that

149
00:05:42,710 --> 00:05:40,720
time and in fact they didn't have to

150
00:05:45,670 --> 00:05:42,720
work that long because they were good

151
00:05:48,469 --> 00:05:45,680
for six or six plus hours

152
00:05:50,629 --> 00:05:48,479
after separation and we we got off on

153
00:05:53,909 --> 00:05:50,639
the solar rays within minutes

154
00:05:55,749 --> 00:05:53,919
so thank you thank you thank you to the

155
00:05:56,710 --> 00:05:55,759
extended juno team

156
00:05:59,270 --> 00:05:56,720
our

157
00:05:59,990 --> 00:05:59,280
ksc and launch vehicle friends

158
00:06:02,309 --> 00:06:00,000
the

159
00:06:05,270 --> 00:06:02,319
science community that's that we

160
00:06:07,510 --> 00:06:05,280
were eager to do this for it was just a

161
00:06:09,670 --> 00:06:07,520
team effort from start to finish i'm

162
00:06:11,350 --> 00:06:09,680
really looking forward to a great ops

163
00:06:13,430 --> 00:06:11,360

ride

164
00:06:15,909 --> 00:06:13,440
thank you jan and we'll take questions

165
00:06:17,670 --> 00:06:15,919
now please give the your name an

166
00:06:19,110 --> 00:06:17,680
affiliation when the microphone comes to

167
00:06:20,870 --> 00:06:19,120
you and we'll start here in the front

168
00:06:22,870 --> 00:06:20,880
with marcia

169
00:06:25,350 --> 00:06:22,880
marcia done associated press probably

170
00:06:27,510 --> 00:06:25,360
for mr adams and maybe dr bolton too but

171
00:06:28,710 --> 00:06:27,520
um today of all days people are worried

172
00:06:30,629 --> 00:06:28,720
about money

173
00:06:33,350 --> 00:06:30,639
and i'm just wondering um a billion

174
00:06:35,189 --> 00:06:33,360
dollars i know is on on cost but can you

175
00:06:36,950 --> 00:06:35,199
just sort of say why

176
00:06:38,629 --> 00:06:36,960
you guys think that

177
00:06:41,670 --> 00:06:38,639
this is going to be well money well

178
00:06:46,390 --> 00:06:43,350
i'll go first and then scott can correct

179
00:06:51,510 --> 00:06:49,029
actually um you know

180
00:06:53,990 --> 00:06:51,520
under exploring the solar system is all

181
00:06:57,350 --> 00:06:54,000
about finding our place in the universe

182
00:07:00,629 --> 00:06:57,360
and there is something about exploration

183
00:07:03,670 --> 00:07:00,639
that strokes the spirit of every person

184
00:07:06,950 --> 00:07:03,680
and so i believe that unlocking the

185
00:07:08,950 --> 00:07:06,960
mysteries of how we got here

186
00:07:10,710 --> 00:07:08,960
is a fundamental question that if

187
00:07:13,749 --> 00:07:10,720
everybody would pause and think about

188
00:07:16,070 --> 00:07:13,759

for a moment they would find

189
00:07:18,469 --> 00:07:16,080
is something that's deep within them and

190
00:07:20,710 --> 00:07:18,479
i believe that it's worth the money

191
00:07:22,950 --> 00:07:20,720
to go find out the answers to these

192
00:07:24,550 --> 00:07:22,960
questions

193
00:07:26,710 --> 00:07:24,560
you want to add anything i think you

194
00:07:28,950 --> 00:07:26,720
said it pretty well i mean

195
00:07:30,309 --> 00:07:28,960
i think you know searching for our

196
00:07:32,390 --> 00:07:30,319
origin and understanding the

197
00:07:35,110 --> 00:07:32,400
fundamentals of nature is uh is

198
00:07:38,230 --> 00:07:35,120
something that uh all societies

199
00:07:40,150 --> 00:07:38,240
should be trying to do and of course

200
00:07:41,830 --> 00:07:40,160
the more successful your society is the

201
00:07:43,510 --> 00:07:41,840
more you can afford to

202
00:07:45,350 --> 00:07:43,520
to go after these really fundamental

203
00:07:47,589 --> 00:07:45,360
questions that are so important and

204
00:07:49,990 --> 00:07:47,599
that's really how you progress

205
00:07:51,589 --> 00:07:50,000
technologically that's how you progress

206
00:07:53,589 --> 00:07:51,599
philosophically

207
00:07:55,909 --> 00:07:53,599
you have to learn about ourselves and

208
00:07:57,990 --> 00:07:55,919
and and these investments are really in

209
00:07:59,990 --> 00:07:58,000
ourselves and i and i believe they're

210
00:08:02,550 --> 00:08:00,000
worth it the other thing about you know

211
00:08:04,309 --> 00:08:02,560
a billion dollars is a lot of money

212
00:08:06,869 --> 00:08:04,319
um but if you think about what we're

213
00:08:08,790 --> 00:08:06,879

doing with juno we're we're um

214
00:08:10,309 --> 00:08:08,800
we've got incredibly sophisticated

215
00:08:11,990 --> 00:08:10,319
instruments some of the most advanced

216
00:08:13,749 --> 00:08:12,000
that have ever ever been on any

217
00:08:15,670 --> 00:08:13,759
spacecraft at all

218
00:08:17,110 --> 00:08:15,680
and we're going into orbit around

219
00:08:20,150 --> 00:08:17,120
jupiter

220
00:08:21,909 --> 00:08:20,160
with these um so traditionally

221
00:08:24,070 --> 00:08:21,919
these things are even more expensive and

222
00:08:25,749 --> 00:08:24,080
and we've we've really designed

223
00:08:26,390 --> 00:08:25,759
something through the synergy of the of

224
00:08:27,589 --> 00:08:26,400
the

225
00:08:29,510 --> 00:08:27,599
engineers

226
00:08:31,110 --> 00:08:29,520
and the managers and the scientists

227
00:08:32,550 --> 00:08:31,120
together to do to it even more

228
00:08:34,709 --> 00:08:32,560
efficiently than it's ever been done

229
00:08:36,949 --> 00:08:34,719
before so i think we're we're showing

230
00:08:38,870 --> 00:08:36,959
that you can even get more done for the

231
00:08:41,670 --> 00:08:38,880
money

232
00:08:43,430 --> 00:08:41,680
okay stefano

233
00:08:45,509 --> 00:08:43,440
yes thank you stefano called them for

234
00:08:46,870 --> 00:08:45,519
italian radio and tv

235
00:08:48,710 --> 00:08:46,880
um

236
00:08:50,550 --> 00:08:48,720
excuse me what is the current speed of

237
00:08:52,550 --> 00:08:50,560
the spacecraft

238
00:08:55,910 --> 00:08:52,560

if you know

239
00:08:58,230 --> 00:08:57,430
we'll probably have to get that oh yeah

240
00:08:59,509 --> 00:08:58,240
we'll have to get back to you i'm not

241
00:09:01,190 --> 00:08:59,519
sure if it's in the press kit or not but

242
00:09:02,310 --> 00:09:01,200
you're asking at separation what was our

243
00:09:03,590 --> 00:09:02,320
what was our velocity the only thing i

244
00:09:06,310 --> 00:09:03,600
can tell you is it's greater than the

245
00:09:08,230 --> 00:09:06,320
escape velocity of the earth

246
00:09:10,230 --> 00:09:08,240
but i i don't know that exact number but

247
00:09:12,550 --> 00:09:10,240
i'll bet you uh one of our guys can get

248
00:09:15,430 --> 00:09:12,560
that to you

249
00:09:17,670 --> 00:09:15,440
okay question right here

250
00:09:19,350 --> 00:09:17,680
uh leo enright with uh irish television

251
00:09:21,350 --> 00:09:19,360
i i was wondering what an average day at

252
00:09:23,910 --> 00:09:21,360
the office is going to look like for the

253
00:09:26,230 --> 00:09:23,920
flight control team for the next five

254
00:09:28,870 --> 00:09:26,240
years i mean is there a room where

255
00:09:30,790 --> 00:09:28,880
people will gather every day to control

256
00:09:32,790 --> 00:09:30,800
the spacecraft or do they just come to

257
00:09:34,949 --> 00:09:32,800
it once a week or

258
00:09:37,910 --> 00:09:34,959
can they do it you know from their sofa

259
00:09:40,310 --> 00:09:37,920
at home with an internet connection or

260
00:09:41,990 --> 00:09:40,320
you know could you talk just briefly how

261
00:09:43,829 --> 00:09:42,000
does it look when you're in a coast for

262
00:09:47,350 --> 00:09:43,839
this length

263
00:09:49,750 --> 00:09:47,360

well um it's not five years of boredom

264
00:09:52,710 --> 00:09:49,760
that's for sure uh at first what we'll

265
00:09:54,710 --> 00:09:52,720
do is monitor the spacecraft around the

266
00:09:56,389 --> 00:09:54,720
clock because we want it's a it's a

267
00:09:58,310 --> 00:09:56,399
brand new baby we want to make sure that

268
00:10:00,389 --> 00:09:58,320
we learn to

269
00:10:01,990 --> 00:10:00,399
understand and appreciate its quirks and

270
00:10:04,470 --> 00:10:02,000
idiosyncrasies

271
00:10:06,630 --> 00:10:04,480
so we want to monitor it carefully when

272
00:10:08,870 --> 00:10:06,640
we feel comfortable and so we have dsn

273
00:10:11,430 --> 00:10:08,880
passes around the clock when we feel

274
00:10:12,630 --> 00:10:11,440
comfortable that we can um we'll

275
00:10:13,910 --> 00:10:12,640
probably give up on the night shift

276
00:10:16,550 --> 00:10:13,920
first

277
00:10:18,550 --> 00:10:16,560
and uh we'll back off a little bit

278
00:10:21,670 --> 00:10:18,560
we do have a

279
00:10:23,190 --> 00:10:21,680
maneuver planned at 20 days which may or

280
00:10:24,949 --> 00:10:23,200
may not be needed depending on how the

281
00:10:26,870 --> 00:10:24,959
launch vehicle performed and we should

282
00:10:28,310 --> 00:10:26,880
know that uh within a week we'll know

283
00:10:29,990 --> 00:10:28,320
whether we need to do that maneuver or

284
00:10:32,870 --> 00:10:30,000
not but

285
00:10:35,269 --> 00:10:32,880
we were left off in such a great place

286
00:10:39,030 --> 00:10:35,279
from the launch vehicle um

287
00:10:43,110 --> 00:10:41,509
then we'll move into um

288
00:10:44,630 --> 00:10:43,120

characterizing the instruments so we'll

289
00:10:46,710 --> 00:10:44,640
get to know the engineering subsystems

290
00:10:48,389 --> 00:10:46,720
first and then we'll do the low voltage

291
00:10:50,069 --> 00:10:48,399
checkouts of the instruments and the

292
00:10:51,670 --> 00:10:50,079
high voltage checkouts of the ins of the

293
00:10:53,430 --> 00:10:51,680
three instruments that operate at high

294
00:10:55,350 --> 00:10:53,440
voltage that'll take through about

295
00:10:57,670 --> 00:10:55,360
december

296
00:10:59,110 --> 00:10:57,680
then we have our two deep space

297
00:11:01,910 --> 00:10:59,120
maneuvers

298
00:11:05,190 --> 00:11:01,920
about a year after launch september 2012

299
00:11:07,110 --> 00:11:05,200
time frame we start our dsm preparation

300
00:11:08,870 --> 00:11:07,120
campaign as we call it in about the

301
00:11:10,310 --> 00:11:08,880
february time frame we want to make sure

302
00:11:12,389 --> 00:11:10,320
that we

303
00:11:14,710 --> 00:11:12,399
dot the eyes and cross the t's take that

304
00:11:16,790 --> 00:11:14,720
design down to the nth level have the

305
00:11:18,150 --> 00:11:16,800
right peer level reviews independent

306
00:11:20,150 --> 00:11:18,160
reviews to make sure that we're not

307
00:11:21,590 --> 00:11:20,160
missing something and so

308
00:11:23,269 --> 00:11:21,600
the team will

309
00:11:25,829 --> 00:11:23,279
decrease in size because we'll have a

310
00:11:27,910 --> 00:11:25,839
larger staff at the start we carry some

311
00:11:29,590 --> 00:11:27,920
of the development folks into operations

312
00:11:31,910 --> 00:11:29,600
to make sure that we benefit from their

313
00:11:33,509 --> 00:11:31,920

knowledge and and we

314
00:11:35,269 --> 00:11:33,519
we don't miss anything as we make the

315
00:11:36,710 --> 00:11:35,279
transition into a more of a steady state

316
00:11:39,030 --> 00:11:36,720
operations

317
00:11:40,710 --> 00:11:39,040
so we'll work on that dsm preparation

318
00:11:42,310 --> 00:11:40,720
and then

319
00:11:43,350 --> 00:11:42,320
the months fly by pretty quickly when

320
00:11:44,630 --> 00:11:43,360
you're doing something like that and

321
00:11:47,509 --> 00:11:44,640
then a year later we have the earth

322
00:11:48,949 --> 00:11:47,519
flyby october 2013. so i and we'll do

323
00:11:50,870 --> 00:11:48,959
the same sort of preparation campaign

324
00:11:54,389 --> 00:11:50,880
several months ahead of time using the

325
00:11:56,870 --> 00:11:54,399
earth flyby um appropriately as a as a

326
00:11:59,430 --> 00:11:56,880
practice run for what we're going to do

327
00:12:01,030 --> 00:11:59,440
on one of our passes at jupiter

328
00:12:03,190 --> 00:12:01,040
then when we go out into the quiet

329
00:12:04,710 --> 00:12:03,200
cruise i believe we will have some

330
00:12:06,389 --> 00:12:04,720
downtime

331
00:12:08,230 --> 00:12:06,399
shortly after launch we'll get down to

332
00:12:09,990 --> 00:12:08,240
the two tracks a day and then we'll get

333
00:12:11,350 --> 00:12:10,000
down to the two trucks a week and one

334
00:12:13,110 --> 00:12:11,360
track a week then it'll it'll go up and

335
00:12:15,509 --> 00:12:13,120
down depending on the activities that we

336
00:12:17,430 --> 00:12:15,519
have on board and and how often when

337
00:12:19,509 --> 00:12:17,440
we're doing the uh instrument checkouts

338
00:12:21,030 --> 00:12:19,519

for example we'll have more passes in

339
00:12:22,629 --> 00:12:21,040
the quiet cruise we'll be down to about

340
00:12:24,790 --> 00:12:22,639
once a week but people

341
00:12:26,870 --> 00:12:24,800
people do meet daily we'll have daily

342
00:12:28,790 --> 00:12:26,880
status meetings for several months very

343
00:12:30,310 --> 00:12:28,800
it's a very tactical operation at this

344
00:12:31,030 --> 00:12:30,320
point um

345
00:12:33,430 --> 00:12:31,040
we

346
00:12:35,430 --> 00:12:33,440
like the team to come in to do that to

347
00:12:36,629 --> 00:12:35,440
have those tech those technical meetings

348
00:12:38,389 --> 00:12:36,639
and make sure we have the tag up but we

349
00:12:40,949 --> 00:12:38,399
have a distributed team

350
00:12:44,230 --> 00:12:40,959
the spacecraft team is flying it out of

351
00:12:46,389 --> 00:12:44,240
denver and so we have all the modern

352
00:12:48,069 --> 00:12:46,399
conveniences of internet video

353
00:12:49,509 --> 00:12:48,079
conferencing teleconferencing that we

354
00:12:51,829 --> 00:12:49,519
use we've used during our development

355
00:12:53,269 --> 00:12:51,839
and we'll continue to to do that and

356
00:12:55,509 --> 00:12:53,279
then of course we have the whole science

357
00:12:57,509 --> 00:12:55,519
community we want the scientists to come

358
00:12:59,190 --> 00:12:57,519
and reside with us at jpl during the

359
00:13:00,870 --> 00:12:59,200
checkouts but then they'll be back at

360
00:13:02,949 --> 00:13:00,880
their institutions we've already proven

361
00:13:04,389 --> 00:13:02,959
out that we can flow the data end to end

362
00:13:06,389 --> 00:13:04,399
all the way out to their institutions

363
00:13:08,069 --> 00:13:06,399

they can they can use their familiar

364
00:13:09,829 --> 00:13:08,079
equipment and

365
00:13:12,310 --> 00:13:09,839
be at their home institutions when they

366
00:13:14,389 --> 00:13:12,320
uh get their data so so it'll really the

367
00:13:17,750 --> 00:13:14,399
tempo will vary from the start of the

368
00:13:19,030 --> 00:13:17,760
mission as we progress

369
00:13:23,110 --> 00:13:19,040
bill

370
00:13:24,470 --> 00:13:23,120
answered my question too but but just

371
00:13:25,750 --> 00:13:24,480
maybe a little follow on sometimes these

372
00:13:27,350 --> 00:13:25,760
flights deep space missions there's

373
00:13:29,269 --> 00:13:27,360
still software development required and

374
00:13:30,629 --> 00:13:29,279
you're still working on the science plan

375
00:13:31,509 --> 00:13:30,639
during transit is this a mission where

376
00:13:33,110 --> 00:13:31,519
you pretty well know what you're going

377
00:13:34,550 --> 00:13:33,120
to do when you get there or are you

378
00:13:35,910 --> 00:13:34,560
still refining how you're going to go

379
00:13:37,910 --> 00:13:35,920
about it

380
00:13:40,629 --> 00:13:37,920
as far as the flight software that's

381
00:13:43,030 --> 00:13:40,639
residing in the onboard processor from

382
00:13:45,430 --> 00:13:43,040
the engineering perspective

383
00:13:48,470 --> 00:13:45,440
we have no post-launch development

384
00:13:51,189 --> 00:13:48,480
planned we have already designed and

385
00:13:54,389 --> 00:13:51,199
tested our joi sequence that's not to

386
00:13:56,069 --> 00:13:54,399
say that we won't do

387
00:13:57,670 --> 00:13:56,079
we'll dust off those notebooks when we

388
00:13:59,030 --> 00:13:57,680

get close we'll run that again we'll

389
00:14:00,230 --> 00:13:59,040
make sure that anything that we've

390
00:14:02,470 --> 00:14:00,240
learned from the behavior of the

391
00:14:04,550 --> 00:14:02,480
spacecraft will modify the sequence as

392
00:14:07,509 --> 00:14:04,560
appropriate but i would consider that

393
00:14:09,110 --> 00:14:07,519
more part of normal business

394
00:14:10,949 --> 00:14:09,120
i'll let scott talk about the science

395
00:14:12,629 --> 00:14:10,959
planning because some of it's done to a

396
00:14:14,629 --> 00:14:12,639
certain level and others will continue

397
00:14:17,110 --> 00:14:14,639
to refine

398
00:14:19,750 --> 00:14:17,120
to a large scale we have the science

399
00:14:21,030 --> 00:14:19,760
plan figured out um and we kind of know

400
00:14:22,790 --> 00:14:21,040
what we're going to do and in fact

401
00:14:25,110 --> 00:14:22,800
that's one of the reasons that this this

402
00:14:27,750 --> 00:14:25,120
mission is so efficient is that we've

403
00:14:29,750 --> 00:14:27,760
designed it in the way to uh to just

404
00:14:32,550 --> 00:14:29,760
gather the data with with little

405
00:14:34,790 --> 00:14:32,560
detailed planning unlike some of the uh

406
00:14:37,110 --> 00:14:34,800
other types of missions that go

407
00:14:38,710 --> 00:14:37,120
but we still haven't built the sequences

408
00:14:40,710 --> 00:14:38,720
for what would actually be run at

409
00:14:42,310 --> 00:14:40,720
jupiter so we we will have to do that

410
00:14:43,269 --> 00:14:42,320
and there will be some choices that can

411
00:14:45,990 --> 00:14:43,279
be made

412
00:14:47,670 --> 00:14:46,000
and and some of those choices will wait

413
00:14:49,750 --> 00:14:47,680

to see how the instruments are

414
00:14:51,590 --> 00:14:49,760
functioning and and the idiosyncrasies

415
00:14:53,350 --> 00:14:51,600
that jan mentioned earlier

416
00:14:55,110 --> 00:14:53,360
when we go through all the calibrations

417
00:14:57,430 --> 00:14:55,120
and we go through how the and learn how

418
00:14:58,949 --> 00:14:57,440
the instruments work and exactly

419
00:15:01,990 --> 00:14:58,959
how well the measurements are that we

420
00:15:04,230 --> 00:15:02,000
can predict um then we will refine our

421
00:15:06,470 --> 00:15:04,240
plan a little bit but to a large scale

422
00:15:07,990 --> 00:15:06,480
we have our plan already figured out

423
00:15:09,189 --> 00:15:08,000
when we go into orbit we know pretty

424
00:15:11,350 --> 00:15:09,199
much where we're going to get what

425
00:15:12,550 --> 00:15:11,360
measurement

426
00:15:13,750 --> 00:15:12,560
one quick follow and i think you guys

427
00:15:15,110 --> 00:15:13,760
addressed this at one of the pre-launch

428
00:15:16,550 --> 00:15:15,120
and i can't remember what the answer was

429
00:15:18,470 --> 00:15:16,560
when you guys do the flyby are you going

430
00:15:19,829 --> 00:15:18,480
to be taking any imagery or science i

431
00:15:23,030 --> 00:15:19,839
mean what's the when's the first time

432
00:15:25,670 --> 00:15:23,040
we're going to see any pictures of

433
00:15:27,350 --> 00:15:25,680
earth i mean yeah we're going to for the

434
00:15:28,710 --> 00:15:27,360
first time out of your instruments

435
00:15:29,590 --> 00:15:28,720
that's what i'm looking for

436
00:15:31,749 --> 00:15:29,600
um

437
00:15:33,269 --> 00:15:31,759
well i can't tell you that that uh when

438
00:15:35,749 --> 00:15:33,279

the first day that we'll get an image

439
00:15:37,749 --> 00:15:35,759
down of anything because we may we may

440
00:15:39,910 --> 00:15:37,759
accelerate that plan from what we have

441
00:15:40,790 --> 00:15:39,920
right now depending on how things work

442
00:15:43,269 --> 00:15:40,800
but

443
00:15:45,430 --> 00:15:43,279
right now we plan to operate

444
00:15:46,949 --> 00:15:45,440
most of the instruments at the earth one

445
00:15:49,030 --> 00:15:46,959
to learn how they operate and make sure

446
00:15:51,269 --> 00:15:49,040
that we understand how a sequence that

447
00:15:53,990 --> 00:15:51,279
we would actually operate near jupiter

448
00:15:55,189 --> 00:15:54,000
will work sort of an example in previous

449
00:15:56,150 --> 00:15:55,199
missions that have gone to the outer

450
00:15:58,470 --> 00:15:56,160
planets

451
00:16:00,389 --> 00:15:58,480
that have had earth flybys you know it's

452
00:16:02,069 --> 00:16:00,399
really dictated by the energy and the

453
00:16:04,150 --> 00:16:02,079
fact that you need to go around in order

454
00:16:06,230 --> 00:16:04,160
to get out to the outer planet you made

455
00:16:08,389 --> 00:16:06,240
incredible use of the fact that you went

456
00:16:09,430 --> 00:16:08,399
by the earth not only to calibrate your

457
00:16:11,430 --> 00:16:09,440
instruments

458
00:16:13,189 --> 00:16:11,440
but to also get new science but maybe

459
00:16:14,550 --> 00:16:13,199
most importantly you learn about the

460
00:16:16,230 --> 00:16:14,560
spacecraft

461
00:16:17,509 --> 00:16:16,240
long before you get to the outer planet

462
00:16:19,590 --> 00:16:17,519
when you're going there so that you can

463
00:16:21,189 --> 00:16:19,600

adapt your plan if needed

464
00:16:23,590 --> 00:16:21,199
so we will make use of all of those

465
00:16:25,749 --> 00:16:23,600
things we will be limited by the fact

466
00:16:27,829 --> 00:16:25,759
that some instruments we will have to

467
00:16:29,749 --> 00:16:27,839
analyze and make sure that thermally

468
00:16:31,430 --> 00:16:29,759
this close to the sun since they're

469
00:16:33,430 --> 00:16:31,440
designed to operate at the jupiter that

470
00:16:35,189 --> 00:16:33,440
we aren't taking any risks

471
00:16:37,189 --> 00:16:35,199
that will be our first priority and then

472
00:16:39,509 --> 00:16:37,199
the calibrations that are unique at

473
00:16:41,430 --> 00:16:39,519
earth will also be the second priority

474
00:16:44,470 --> 00:16:41,440
and then the third will be whatever new

475
00:16:47,110 --> 00:16:44,480
science we can possibly get

476
00:16:49,030 --> 00:16:47,120
okay a question right here in the back

477
00:16:50,790 --> 00:16:49,040
mark ratterman from talking space

478
00:16:53,590 --> 00:16:50,800
question for scott bolton

479
00:16:55,670 --> 00:16:53,600
do you think that our educators that are

480
00:16:57,910 --> 00:16:55,680
teaching our middle school high school

481
00:16:59,030 --> 00:16:57,920
children do you think that they'll

482
00:17:00,790 --> 00:16:59,040
be uh

483
00:17:03,189 --> 00:17:00,800
be having some exciting things to talk

484
00:17:04,390 --> 00:17:03,199
about after juno enters orbit or will

485
00:17:06,230 --> 00:17:04,400
they have some

486
00:17:08,230 --> 00:17:06,240
things to talk to their kids about

487
00:17:09,350 --> 00:17:08,240
beforehand

488
00:17:11,110 --> 00:17:09,360

um

489
00:17:13,510 --> 00:17:11,120
well i i hope they have exciting things

490
00:17:15,270 --> 00:17:13,520
to talk about beforehand um even right

491
00:17:17,590 --> 00:17:15,280
now because there are exciting things i

492
00:17:18,949 --> 00:17:17,600
i assume you mean just respect to juno

493
00:17:21,990 --> 00:17:18,959
though

494
00:17:23,350 --> 00:17:22,000
not all science but

495
00:17:24,949 --> 00:17:23,360
there will be some things that they can

496
00:17:26,390 --> 00:17:24,959
talk about a lot of them are

497
00:17:27,990 --> 00:17:26,400
technological

498
00:17:30,230 --> 00:17:28,000
stuff advances that we've made with

499
00:17:31,909 --> 00:17:30,240
solar arrays the radiation vault things

500
00:17:33,909 --> 00:17:31,919
that are unique to juno the challenges

501
00:17:35,750 --> 00:17:33,919
that have gone on i think help teach

502
00:17:37,750 --> 00:17:35,760
kids that might be interested in

503
00:17:39,830 --> 00:17:37,760
engineering and the science that's

504
00:17:42,150 --> 00:17:39,840
coming is lessons that we've already

505
00:17:44,070 --> 00:17:42,160
started to incorporate in curriculum uh

506
00:17:45,110 --> 00:17:44,080
for that those grade levels and in fact

507
00:17:46,630 --> 00:17:45,120
we're trying to push it down to

508
00:17:48,950 --> 00:17:46,640
elementary school

509
00:17:50,150 --> 00:17:48,960
now of course once we get to jupiter and

510
00:17:52,230 --> 00:17:50,160
we learn

511
00:17:54,710 --> 00:17:52,240
the new things that juno uh is going to

512
00:17:56,390 --> 00:17:54,720
learn for us

513
00:17:58,630 --> 00:17:56,400

that will open up you know

514
00:18:00,710 --> 00:17:58,640
a wealth of new information that will

515
00:18:02,789 --> 00:18:00,720
provide it and so you know that may

516
00:18:06,470 --> 00:18:02,799
dwarf what we've been able to do prior

517
00:18:09,029 --> 00:18:06,480
to that at least with respect to juno

518
00:18:15,590 --> 00:18:09,039
okay let's come up here to the front to

519
00:18:19,669 --> 00:18:17,430
uh hi ken kramer for space flight

520
00:18:21,110 --> 00:18:19,679
magazine for uh scott bolton please um

521
00:18:22,630 --> 00:18:21,120
london if you could tell us a little bit

522
00:18:25,350 --> 00:18:22,640
about uh

523
00:18:27,590 --> 00:18:25,360
how this idea originated in in your mind

524
00:18:29,350 --> 00:18:27,600
the kernel of the idea when you came up

525
00:18:30,870 --> 00:18:29,360
with it how it might have evolved is it

526
00:18:32,630 --> 00:18:30,880
is it every

527
00:18:33,909 --> 00:18:32,640
bit that you wanted

528
00:18:35,669 --> 00:18:33,919
this this you know the idea for the

529
00:18:37,029 --> 00:18:35,679
mission did it evolve over time with the

530
00:18:40,549 --> 00:18:37,039
instruments or

531
00:18:42,789 --> 00:18:40,559
what um it did uh some some uh

532
00:18:45,430 --> 00:18:42,799
instrument ideas might have been uh like

533
00:18:49,110 --> 00:18:45,440
a revelation um other ones have evolved

534
00:18:52,230 --> 00:18:49,120
over time um it started long before i

535
00:18:54,230 --> 00:18:52,240
i was a kid uh when when the first

536
00:18:57,110 --> 00:18:54,240
scientists were trying to go into polar

537
00:18:59,990 --> 00:18:57,120
orbit around jupiter in fact

538
00:19:02,230 --> 00:19:00,000

even in the 70s people were arguing as

539
00:19:03,990 --> 00:19:02,240
we started to plan galileo

540
00:19:06,150 --> 00:19:04,000
that maybe they should maybe

541
00:19:07,990 --> 00:19:06,160
that kind of a mission should be a polar

542
00:19:09,750 --> 00:19:08,000
orbiter

543
00:19:10,789 --> 00:19:09,760
most of those studies were aimed at

544
00:19:12,390 --> 00:19:10,799
trying to understand the polar

545
00:19:14,230 --> 00:19:12,400
magnetosphere

546
00:19:15,669 --> 00:19:14,240
although some of them understood that if

547
00:19:17,190 --> 00:19:15,679
you could go into polar orbit you might

548
00:19:19,430 --> 00:19:17,200
be able to get better measurements of

549
00:19:20,549 --> 00:19:19,440
the magnetic and gravity field

550
00:19:22,150 --> 00:19:20,559
and then

551
00:19:24,630 --> 00:19:22,160
in the

552
00:19:26,310 --> 00:19:24,640
late 80s and 90s

553
00:19:29,830 --> 00:19:26,320
there were missions that were conceived

554
00:19:32,710 --> 00:19:29,840
of uh to go into uh

555
00:19:34,789 --> 00:19:32,720
close orbits polar near polar not truly

556
00:19:37,029 --> 00:19:34,799
polar but highly inclined orbits similar

557
00:19:40,150 --> 00:19:37,039
to junos to look at the magnetic field

558
00:19:42,230 --> 00:19:40,160
in the gravity field

559
00:19:44,310 --> 00:19:42,240
and those one of those was called inside

560
00:19:45,750 --> 00:19:44,320
jupiter and it progressed and tried to

561
00:19:48,070 --> 00:19:45,760
try to win it was also proposed

562
00:19:49,830 --> 00:19:48,080
competitively and and didn't make it all

563
00:19:51,909 --> 00:19:49,840

the way to the final round

564
00:19:54,310 --> 00:19:51,919
and then about the time um

565
00:19:57,350 --> 00:19:54,320
cassini was flying by

566
00:20:00,870 --> 00:19:57,360
jupiter um i was on the cassini team on

567
00:20:02,710 --> 00:20:00,880
a few instruments as a co-investigator

568
00:20:06,470 --> 00:20:02,720
and was arguing that we should do

569
00:20:09,190 --> 00:20:06,480
science at jupiter as we flew by

570
00:20:11,750 --> 00:20:09,200
and i was able to persuade

571
00:20:14,390 --> 00:20:11,760
enough people that that that opened the

572
00:20:16,310 --> 00:20:14,400
door but i was also tasked with figuring

573
00:20:18,470 --> 00:20:16,320
out which science we should do

574
00:20:20,070 --> 00:20:18,480
so a colleague of mine and myself ran

575
00:20:21,990 --> 00:20:20,080
workshops to try to figure out the

576
00:20:23,350 --> 00:20:22,000
science that we could do by uh going by

577
00:20:24,470 --> 00:20:23,360
cassini

578
00:20:26,870 --> 00:20:24,480
and

579
00:20:28,870 --> 00:20:26,880
one of those experiments that i came up

580
00:20:31,430 --> 00:20:28,880
with was to borrow

581
00:20:33,350 --> 00:20:31,440
the radar antenna it was the also uses

582
00:20:34,950 --> 00:20:33,360
the high gain antenna on cassini and map

583
00:20:37,510 --> 00:20:34,960
jupiter's radiation belts because it

584
00:20:38,950 --> 00:20:37,520
could work in a listen only mode it was

585
00:20:40,950 --> 00:20:38,960
an instrument that was primarily

586
00:20:43,750 --> 00:20:40,960
designed to see through the clouds of

587
00:20:44,630 --> 00:20:43,760
titan and map out titan's surface which

588
00:20:46,230 --> 00:20:44,640

was

589
00:20:47,350 --> 00:20:46,240
incredibly high priority also for

590
00:20:48,950 --> 00:20:47,360
cassini

591
00:20:51,190 --> 00:20:48,960
and i knew i was very familiar with that

592
00:20:53,270 --> 00:20:51,200
because i was also working to figure out

593
00:20:55,669 --> 00:20:53,280
what we should do at titan so i knew how

594
00:20:57,750 --> 00:20:55,679
that instrument worked pretty well

595
00:21:00,070 --> 00:20:57,760
and um

596
00:21:01,830 --> 00:21:00,080
so we borrowed this thing and and and i

597
00:21:03,669 --> 00:21:01,840
and i suggested that we make a map of

598
00:21:06,710 --> 00:21:03,679
these high-energy radiation belts which

599
00:21:09,590 --> 00:21:06,720
was part of the science that i had done

600
00:21:11,510 --> 00:21:09,600
before and that got approved and one of

601
00:21:13,350 --> 00:21:11,520
my other co-investigators came up and

602
00:21:16,230 --> 00:21:13,360
said you know can you use that to figure

603
00:21:18,390 --> 00:21:16,240
out the water abundance inside jupiter

604
00:21:20,549 --> 00:21:18,400
and i said no i don't think so and we

605
00:21:22,789 --> 00:21:20,559
worked out some details and then the

606
00:21:24,230 --> 00:21:22,799
next day i was uh you know getting ready

607
00:21:27,029 --> 00:21:24,240
to work and

608
00:21:29,190 --> 00:21:27,039
literally in the shower

609
00:21:31,350 --> 00:21:29,200
and i realized gosh if i yeah i was

610
00:21:32,630 --> 00:21:31,360
looking for water and there i was

611
00:21:34,549 --> 00:21:32,640
um

612
00:21:36,870 --> 00:21:34,559
and i realized gosh if we got a bunch of

613
00:21:39,270 --> 00:21:36,880

these antennas in the right place over

614
00:21:41,110 --> 00:21:39,280
the poles i could get away from the

615
00:21:42,630 --> 00:21:41,120
noise of the radiation belts and see

616
00:21:43,430 --> 00:21:42,640
into the planet

617
00:21:47,350 --> 00:21:43,440
and

618
00:21:48,950 --> 00:21:47,360
colleague had asked for

619
00:21:50,470 --> 00:21:48,960
and so i came back in the next day kind

620
00:21:53,830 --> 00:21:50,480
of excited saying i think i figured out

621
00:21:55,510 --> 00:21:53,840
a way to do this um but not with cassini

622
00:21:57,110 --> 00:21:55,520
and we don't have anything that can do

623
00:21:58,950 --> 00:21:57,120
it but i think if you made something

624
00:21:59,909 --> 00:21:58,960
like this it might work

625
00:22:01,750 --> 00:21:59,919
and

626
00:22:03,669 --> 00:22:01,760
that colleague of mine was named toby

627
00:22:05,669 --> 00:22:03,679
owen and he went and got a colleague of

628
00:22:07,190 --> 00:22:05,679
his name daniel gautier

629
00:22:09,590 --> 00:22:07,200
and they came in and tried to argue with

630
00:22:11,190 --> 00:22:09,600
me why that was so important to do

631
00:22:13,110 --> 00:22:11,200
and how fundamental that measurement

632
00:22:15,190 --> 00:22:13,120
would be and they were saying it was the

633
00:22:17,190 --> 00:22:15,200
could be the basis of a mission

634
00:22:18,950 --> 00:22:17,200
and i had my doubts although i knew

635
00:22:21,510 --> 00:22:18,960
because every scientist thinks their

636
00:22:24,310 --> 00:22:21,520
science is really important

637
00:22:26,870 --> 00:22:24,320
turns out there's is

638
00:22:28,630 --> 00:22:26,880

and i realized uh later that they were

639
00:22:31,669 --> 00:22:28,640
largely responsible for the cassini

640
00:22:33,510 --> 00:22:31,679
mission uh getting conceived so i

641
00:22:35,110 --> 00:22:33,520
realized that they really knew a lot

642
00:22:37,110 --> 00:22:35,120
about why we should do things and so i

643
00:22:39,270 --> 00:22:37,120
started looking more carefully and then

644
00:22:41,830 --> 00:22:39,280
and that's basically how that

645
00:22:44,310 --> 00:22:41,840
experiment then had to be go through a

646
00:22:46,390 --> 00:22:44,320
long painstaking process of convincing

647
00:22:48,230 --> 00:22:46,400
my colleagues that knew

648
00:22:49,990 --> 00:22:48,240
about the hardware and the measurements

649
00:22:51,430 --> 00:22:50,000
that it could actually be done a lot of

650
00:22:53,350 --> 00:22:51,440
people didn't think that we could figure

651
00:22:54,789 --> 00:22:53,360
out how to do this but i we kept pushing

652
00:22:57,270 --> 00:22:54,799
and kept working

653
00:22:58,230 --> 00:22:57,280
and once we got that figured out

654
00:23:01,909 --> 00:22:58,240
um

655
00:23:03,510 --> 00:23:01,919
we then joined uh with the other teams

656
00:23:05,590 --> 00:23:03,520
that were already interested in doing

657
00:23:06,789 --> 00:23:05,600
jupiter's gravity and magnetic fields

658
00:23:08,230 --> 00:23:06,799
and then another team that was

659
00:23:09,750 --> 00:23:08,240
interested in doing the polar magnesium

660
00:23:11,990 --> 00:23:09,760
i put them all together under one

661
00:23:14,630 --> 00:23:12,000
umbrella and nasa came out with an

662
00:23:16,149 --> 00:23:14,640
opportunity that could allow that kind

663
00:23:18,549 --> 00:23:16,159

of a mission

664
00:23:21,029 --> 00:23:18,559
you know at that level of expense and

665
00:23:23,029 --> 00:23:21,039
and complexity and so we all came in

666
00:23:24,870 --> 00:23:23,039
under one umbrella and proposed juno and

667
00:23:28,310 --> 00:23:24,880
that was back i mean the ideas were

668
00:23:30,950 --> 00:23:28,320
conceived maybe back in around 2000 1999

669
00:23:34,149 --> 00:23:30,960
when the water abundance idea came in

670
00:23:37,510 --> 00:23:34,159
and it got added for uh

671
00:23:39,270 --> 00:23:37,520
the ao was about 2003

672
00:23:40,630 --> 00:23:39,280
and so that's when the teams all came

673
00:23:42,710 --> 00:23:40,640
together and so that's how long we've

674
00:23:45,029 --> 00:23:42,720
been working together

675
00:23:46,710 --> 00:23:45,039
so if i could just follow up jim green

676
00:23:50,149 --> 00:23:46,720
when you heard this or your predecessor

677
00:23:51,590 --> 00:23:50,159
what did you think

678
00:23:53,269 --> 00:23:51,600
what uh

679
00:23:55,350 --> 00:23:53,279
well first off

680
00:23:59,190 --> 00:23:55,360
uh juno was selected when we came on

681
00:24:00,710 --> 00:23:59,200
board this is jim green and myself

682
00:24:05,269 --> 00:24:00,720
and we were

683
00:24:06,710 --> 00:24:05,279
immediately impressed with how well it

684
00:24:07,669 --> 00:24:06,720
was run

685
00:24:09,909 --> 00:24:07,679
and

686
00:24:12,710 --> 00:24:09,919
the fact that it had been it had spent

687
00:24:15,430 --> 00:24:12,720
some time uh in phase b

688
00:24:16,870 --> 00:24:15,440

and so it was ready to graduate and so

689
00:24:18,789 --> 00:24:16,880
one of the first things that we did was

690
00:24:21,029 --> 00:24:18,799
we ran it through a confirmation review

691
00:24:23,190 --> 00:24:21,039
where we said okay no kidding for sure

692
00:24:24,470 --> 00:24:23,200
for real is this science that we really

693
00:24:26,070 --> 00:24:24,480
want to do

694
00:24:28,950 --> 00:24:26,080
can we do it

695
00:24:30,950 --> 00:24:28,960
at the cost and on schedule that that's

696
00:24:33,110 --> 00:24:30,960
been proposed

697
00:24:34,789 --> 00:24:33,120
derived during the phase b

698
00:24:36,549 --> 00:24:34,799
and all of the answers came back

699
00:24:38,789 --> 00:24:36,559
unanimously yes

700
00:24:40,870 --> 00:24:38,799
and so we said

701
00:24:42,149 --> 00:24:40,880
uh this is compelling science let's move

702
00:24:44,630 --> 00:24:42,159
forward

703
00:24:46,870 --> 00:24:44,640
and we're very excited about it

704
00:24:49,110 --> 00:24:46,880
it's going to tell us a lot about

705
00:24:50,310 --> 00:24:49,120
not just jupiter but i'm sure scott's

706
00:24:52,710 --> 00:24:50,320
mentioned in some of the science

707
00:24:55,029 --> 00:24:52,720
briefings of just about the solar system

708
00:24:56,310 --> 00:24:55,039
in general and how it was formed and

709
00:25:00,070 --> 00:24:56,320
maybe even a little bit about how the

710
00:25:01,909 --> 00:25:00,080
earth was formed so we're very excited

711
00:25:03,750 --> 00:25:01,919
any other questions

712
00:25:05,510 --> 00:25:03,760
all right we have

713
00:25:07,750 --> 00:25:05,520

well let's get craig because he's right

714
00:25:07,760 --> 00:25:11,990
right here

715
00:25:16,390 --> 00:25:14,549
thanks very much it's craig kovald with

716
00:25:19,269 --> 00:25:16,400
aerospace america

717
00:25:21,909 --> 00:25:19,279
for jim adams uh a question right

718
00:25:23,029 --> 00:25:21,919
relative to the decadal

719
00:25:25,669 --> 00:25:23,039
um

720
00:25:28,950 --> 00:25:25,679
now that you've had some time uh

721
00:25:31,029 --> 00:25:28,960
how do things stand with issa on major

722
00:25:32,390 --> 00:25:31,039
issues on the decadal anything new there

723
00:25:35,029 --> 00:25:32,400
relative

724
00:25:37,669 --> 00:25:35,039
mars for example so the the decadal

725
00:25:39,029 --> 00:25:37,679
survey is for those that don't know is a

726
00:25:41,909 --> 00:25:39,039
10 year

727
00:25:44,310 --> 00:25:41,919
outlook of the science that ought to be

728
00:25:48,149 --> 00:25:44,320
pursued by planetary science

729
00:25:50,149 --> 00:25:48,159
from 2013 to 2023 essentially or the end

730
00:25:51,669 --> 00:25:50,159
of 2022

731
00:25:54,630 --> 00:25:51,679
we're in the process

732
00:25:56,789 --> 00:25:54,640
of mapping out our plan on how to

733
00:25:58,710 --> 00:25:56,799
respond to the decadal survey

734
00:26:01,350 --> 00:25:58,720
and international partnerships like in

735
00:26:02,549 --> 00:26:01,360
all of our missions play a key role in

736
00:26:05,350 --> 00:26:02,559
that

737
00:26:07,269 --> 00:26:05,360
it's not quite all firmed up yet but

738
00:26:09,909 --> 00:26:07,279

we're working on that what we're really

739
00:26:12,310 --> 00:26:09,919
excited about is the fact that

740
00:26:15,190 --> 00:26:12,320
juno played a key role in the previous

741
00:26:16,710 --> 00:26:15,200
decadal survey and tells us a lot uh

742
00:26:18,950 --> 00:26:16,720
answers a lot of the questions that were

743
00:26:21,430 --> 00:26:18,960
asked by the previous decadal survey and

744
00:26:23,190 --> 00:26:21,440
so we're looking forward to

745
00:26:24,870 --> 00:26:23,200
doing that in the middle of this decade

746
00:26:27,269 --> 00:26:24,880
as we're working on

747
00:26:29,350 --> 00:26:27,279
responding and putting together missions

748
00:26:31,269 --> 00:26:29,360
that will respond to the next decadal

749
00:26:34,470 --> 00:26:31,279
survey

750
00:26:36,789 --> 00:26:34,480
okay we'll take one more question uh

751
00:26:38,950 --> 00:26:36,799
this lady right in front right here

752
00:26:41,350 --> 00:26:38,960
jackie goddard for the times of london

753
00:26:43,430 --> 00:26:41,360
um this phrase unlocking the mysteries

754
00:26:45,430 --> 00:26:43,440
of the universe is one that folks like

755
00:26:47,350 --> 00:26:45,440
you use a lot in explaining stuff to us

756
00:26:50,070 --> 00:26:47,360
and that we use a lot when we're writing

757
00:26:53,029 --> 00:26:50,080
our articles and whatever um in terms of

758
00:26:55,110 --> 00:26:53,039
this particular mission how great a leap

759
00:26:56,549 --> 00:26:55,120
in understanding are we expecting is it

760
00:26:58,470 --> 00:26:56,559
going to be kind of inching our way

761
00:27:00,470 --> 00:26:58,480
along that scale of understanding or are

762
00:27:02,070 --> 00:27:00,480
we expecting one

763
00:27:03,110 --> 00:27:02,080

giant leap

764
00:27:05,430 --> 00:27:03,120
um

765
00:27:07,909 --> 00:27:05,440
well my belief is that we make progress

766
00:27:08,870 --> 00:27:07,919
by taking many small steps

767
00:27:13,510 --> 00:27:08,880
and

768
00:27:15,590 --> 00:27:13,520
get to do once in a rare while but most

769
00:27:17,990 --> 00:27:15,600
of the progress we make

770
00:27:21,669 --> 00:27:18,000
as humans is is we make small steps and

771
00:27:23,269 --> 00:27:21,679
we just have to keep at it

772
00:27:25,190 --> 00:27:23,279
you know whether this is a giant leap or

773
00:27:27,750 --> 00:27:25,200
a small step maybe is is somewhat

774
00:27:28,870 --> 00:27:27,760
judgment here but i i think that the

775
00:27:30,710 --> 00:27:28,880
real

776
00:27:33,510 --> 00:27:30,720
interest in juno

777
00:27:36,389 --> 00:27:33,520
and and jupiter is that it's really

778
00:27:39,350 --> 00:27:36,399
giving us insight into the very earliest

779
00:27:43,430 --> 00:27:39,360
times of our of our solar system

780
00:27:45,909 --> 00:27:43,440
formation right after the sun formed

781
00:27:48,149 --> 00:27:45,919
to the beginning of the planet the first

782
00:27:49,909 --> 00:27:48,159
planet and uh and in that sense it's a

783
00:27:52,789 --> 00:27:49,919
big leap because

784
00:27:55,269 --> 00:27:52,799
that's a big step to take to get that

785
00:27:58,070 --> 00:27:55,279
first step that goes from a sun

786
00:28:00,789 --> 00:27:58,080
or a star to the planets because

787
00:28:02,389 --> 00:28:00,799
you know the the planets are made a

788
00:28:04,950 --> 00:28:02,399

little bit differently than the sun or

789
00:28:06,389 --> 00:28:04,960
we wouldn't be here today and there is a

790
00:28:08,149 --> 00:28:06,399
difference there we don't really

791
00:28:10,070 --> 00:28:08,159
understand how that happened or what

792
00:28:12,070 --> 00:28:10,080
happened and what the elements or

793
00:28:14,830 --> 00:28:12,080
volatiles were doing early in the solar

794
00:28:17,269 --> 00:28:14,840
system and so that's a big step a big

795
00:28:21,350 --> 00:28:17,279
leap um

796
00:28:26,149 --> 00:28:23,590
imply that that other steps aren't

797
00:28:27,669 --> 00:28:26,159
equally important i mean i think that if

798
00:28:29,430 --> 00:28:27,679
we're going to understand nature and

799
00:28:31,269 --> 00:28:29,440
understand ourselves and our role and

800
00:28:32,870 --> 00:28:31,279
all of the planets we need to keep

801
00:28:34,710 --> 00:28:32,880
looking at all the planets we need to

802
00:28:37,350 --> 00:28:34,720
look at every body we can in the solar

803
00:28:39,029 --> 00:28:37,360
system and in the universe and galaxy

804
00:28:40,549 --> 00:28:39,039
stars everything and really try to

805
00:28:43,990 --> 00:28:40,559
understand how they're different and

806
00:28:44,870 --> 00:28:44,000
what role they play and how we fit in

807
00:28:49,029 --> 00:28:44,880
todd

808
00:28:51,029 --> 00:28:49,039
just curious if

809
00:28:53,110 --> 00:28:51,039
any of you were conscious of the fact

810
00:28:56,549 --> 00:28:53,120
that you guys are the first

811
00:28:57,669 --> 00:28:56,559
post shuttle era launch and

812
00:28:59,990 --> 00:28:57,679
what's your

813
00:29:01,590 --> 00:29:00,000

thoughts if any have been on that and

814
00:29:03,269 --> 00:29:01,600
whether you uh

815
00:29:05,830 --> 00:29:03,279
really could um

816
00:29:09,269 --> 00:29:05,840
kind of kind of feel that

817
00:29:10,789 --> 00:29:09,279
i certainly felt it today as that rocket

818
00:29:12,310 --> 00:29:10,799
was going up

819
00:29:14,630 --> 00:29:12,320
and i think a lot of people around the

820
00:29:16,789 --> 00:29:14,640
center did and i'm just wondering what

821
00:29:19,430 --> 00:29:16,799
your thoughts are on that that's a great

822
00:29:21,430 --> 00:29:19,440
question and maybe all three of us could

823
00:29:22,389 --> 00:29:21,440
answer what we think about that

824
00:29:24,950 --> 00:29:22,399
um

825
00:29:27,029 --> 00:29:24,960
about four months ago i was in an

826
00:29:28,870 --> 00:29:27,039
elevator with charlie bolden

827
00:29:32,389 --> 00:29:28,880
and i said

828
00:29:34,070 --> 00:29:32,399
you know juno is the first launch after

829
00:29:36,070 --> 00:29:34,080
the last shuttle

830
00:29:37,990 --> 00:29:36,080
and we need to find a way

831
00:29:41,430 --> 00:29:38,000
to engage the people that are going to

832
00:29:43,350 --> 00:29:41,440
feel that loss and so i said you know

833
00:29:44,630 --> 00:29:43,360
normally we invite 300 to a thousand

834
00:29:47,350 --> 00:29:44,640
people out to

835
00:29:49,350 --> 00:29:47,360
an expendable launch vehicle launch

836
00:29:52,549 --> 00:29:49,360
i said charlie what do you think

837
00:29:54,389 --> 00:29:52,559
about inviting 10 000 people

838
00:29:56,630 --> 00:29:54,399

and he said that's a great idea let's

839
00:29:58,630 --> 00:29:56,640
figure out how to make that happen

840
00:29:59,990 --> 00:29:58,640
and um you know i immediately backed

841
00:30:01,269 --> 00:30:00,000
away and i said oh well i don't know if

842
00:30:03,510 --> 00:30:01,279
i could do ten thousand maybe five

843
00:30:05,909 --> 00:30:03,520
thousand he said if you don't try

844
00:30:08,070 --> 00:30:05,919
if you don't try then you won't make it

845
00:30:09,430 --> 00:30:08,080
and latest estimates were that we beat

846
00:30:12,149 --> 00:30:09,440
the 10 000

847
00:30:13,350 --> 00:30:12,159
not just invitees but actual people that

848
00:30:16,870 --> 00:30:13,360
watched

849
00:30:18,549 --> 00:30:16,880
and we're extremely excited about

850
00:30:19,990 --> 00:30:18,559
coupling

851
00:30:21,430 --> 00:30:20,000
the uh

852
00:30:24,310 --> 00:30:21,440
the energy

853
00:30:26,870 --> 00:30:24,320
that the nation has with regard to human

854
00:30:30,230 --> 00:30:26,880
space flight into understanding what

855
00:30:32,710 --> 00:30:30,240
we're doing in science because right now

856
00:30:35,190 --> 00:30:32,720
science is really the positive face of

857
00:30:37,510 --> 00:30:35,200
this agency we're looking very forward

858
00:30:40,149 --> 00:30:37,520
to what we can tell the world about what

859
00:30:41,909 --> 00:30:40,159
we're doing in planetary science

860
00:30:44,230 --> 00:30:41,919
and you know stick around it's going to

861
00:30:45,350 --> 00:30:44,240
be a great year we've got grail and msl

862
00:30:47,909 --> 00:30:45,360
coming up

863
00:30:50,630 --> 00:30:47,919

and it's just going to be fantastic

864
00:30:53,430 --> 00:30:50,640
you guys have comments on that

865
00:30:57,029 --> 00:30:53,440
um well i mean it was exciting it's sort

866
00:30:59,350 --> 00:30:57,039
of a privilege i feel um to be in that

867
00:31:01,110 --> 00:30:59,360
that transition spot and have the

868
00:31:03,509 --> 00:31:01,120
attention in the spotlight that comes

869
00:31:04,950 --> 00:31:03,519
with that um you know we didn't plan

870
00:31:06,710 --> 00:31:04,960
this when we were figuring out when to

871
00:31:08,389 --> 00:31:06,720
launch we were just trying to figure out

872
00:31:09,990 --> 00:31:08,399
you know when are we going to finish and

873
00:31:11,669 --> 00:31:10,000
where's jupiter and where's earth and

874
00:31:14,710 --> 00:31:11,679
how do we get there

875
00:31:16,470 --> 00:31:14,720
and uh we picked our launch date and uh

876
00:31:18,789 --> 00:31:16,480
or i should say the launch date picked

877
00:31:20,230 --> 00:31:18,799
us and

878
00:31:22,710 --> 00:31:20,240
and then the shuttle program started to

879
00:31:24,630 --> 00:31:22,720
wind down and of course uh you know

880
00:31:26,389 --> 00:31:24,640
the exact last shuttle danced around a

881
00:31:28,710 --> 00:31:26,399
little bit and we ended up falling on

882
00:31:30,389 --> 00:31:28,720
that uh right where it is i have a great

883
00:31:32,070 --> 00:31:30,399
respect for the human space flight

884
00:31:34,470 --> 00:31:32,080
program and and the shuttle program i

885
00:31:36,470 --> 00:31:34,480
think they achieved incredible things

886
00:31:38,470 --> 00:31:36,480
and so i'm honored to you know be in

887
00:31:39,830 --> 00:31:38,480
this transition uh trying to help out a

888
00:31:41,990 --> 00:31:39,840

little bit i think you're right there's

889
00:31:44,389 --> 00:31:42,000
people that that feel a loss and and

890
00:31:47,509 --> 00:31:44,399
there's also um the public that needs to

891
00:31:50,310 --> 00:31:47,519
understand that um the nasa is more than

892
00:31:52,710 --> 00:31:50,320
about the shuttle um it's really about

893
00:31:55,830 --> 00:31:52,720
exploration in general and just reaching

894
00:31:58,870 --> 00:31:55,840
out trying to understand and and reach

895
00:32:01,110 --> 00:31:58,880
ourselves both physically as humans out

896
00:32:03,669 --> 00:32:01,120
to the stars you know when i was a kid i

897
00:32:05,990 --> 00:32:03,679
used to look up you know from these dark

898
00:32:07,830 --> 00:32:06,000
fields and feel myself hurtling through

899
00:32:09,750 --> 00:32:07,840
space on this planet

900
00:32:11,269 --> 00:32:09,760
you know kind of on a rock i'm curling

901
00:32:12,149 --> 00:32:11,279
through this three-dimensional star

902
00:32:13,509 --> 00:32:12,159
field

903
00:32:15,269 --> 00:32:13,519
i used to imagine this of course i

904
00:32:17,509 --> 00:32:15,279
watched star trek too

905
00:32:19,190 --> 00:32:17,519
and um

906
00:32:20,789 --> 00:32:19,200
and i think that you know reaching out

907
00:32:23,750 --> 00:32:20,799
there trying to get out there is very

908
00:32:25,430 --> 00:32:23,760
important so i you know i i really uh

909
00:32:27,669 --> 00:32:25,440
love this the shuttle program and the

910
00:32:29,830 --> 00:32:27,679
apollo program that came before that but

911
00:32:31,509 --> 00:32:29,840
we're in this magical period and we need

912
00:32:34,230 --> 00:32:31,519
to make sure that everybody realizes

913
00:32:36,549 --> 00:32:34,240

that nasa also reaches out to understand

914
00:32:39,269 --> 00:32:36,559
nature with science and this is a

915
00:32:40,870 --> 00:32:39,279
platform to emphasize that to people and

916
00:32:43,190 --> 00:32:40,880
so i think that

917
00:32:45,669 --> 00:32:43,200
we're fortunate that

918
00:32:48,389 --> 00:32:45,679
to be here and juno fortunately is sort

919
00:32:50,070 --> 00:32:48,399
of an exciting fundamental mission

920
00:32:53,190 --> 00:32:50,080
that can carry that kind of thing

921
00:32:58,470 --> 00:32:56,789
jan you may have your own views

922
00:32:59,909 --> 00:32:58,480
i i would just like i agree with what

923
00:33:01,269 --> 00:32:59,919
jim and scott said and i guess i would

924
00:33:03,590 --> 00:33:01,279
just like to add that

925
00:33:06,230 --> 00:33:03,600
it's uh it's serendipitous that we are

926
00:33:08,549 --> 00:33:06,240
the first mission to launch um in the

927
00:33:10,070 --> 00:33:08,559
post shuttle era and i'd like to think

928
00:33:15,269 --> 00:33:10,080
that the

929
00:33:17,990 --> 00:33:15,279
flight program has generated in the

930
00:33:20,630 --> 00:33:18,000
american and world population

931
00:33:22,549 --> 00:33:20,640
will carry over to the

932
00:33:25,110 --> 00:33:22,559
planetary scientific missions a little

933
00:33:27,029 --> 00:33:25,120
more than it used to as jim pointed out

934
00:33:29,590 --> 00:33:27,039
you know it's unusual to get 10 000

935
00:33:32,149 --> 00:33:29,600
people at a planetary launch

936
00:33:34,070 --> 00:33:32,159
an unmanned launch and so i'm just happy

937
00:33:36,310 --> 00:33:34,080
for the opportunity to

938
00:33:38,870 --> 00:33:36,320

uh publicize the great science that

939
00:33:40,310 --> 00:33:38,880
we're doing and maybe we're getting some

940
00:33:42,470 --> 00:33:40,320
of that because we're riding on the

941
00:33:46,310 --> 00:33:42,480
coattails of the excitement and

942
00:33:47,830 --> 00:33:46,320
emotion of the last shuttle launch

943
00:33:49,669 --> 00:33:47,840
all right that's going to conclude our

944
00:33:51,750 --> 00:33:49,679
launch coverage today

945
00:33:54,310 --> 00:33:51,760
and we're going to close out now with a

946
00:33:55,430 --> 00:33:54,320
replay of the launch from earlier this

947
00:34:05,350 --> 00:33:55,440
afternoon

948
00:34:07,909 --> 00:34:06,950
t minus 10

949
00:34:08,790 --> 00:34:07,919
9

950
00:34:09,829 --> 00:34:08,800
8

951
00:34:10,710 --> 00:34:09,839
7

952
00:34:11,669 --> 00:34:10,720
6

953
00:34:12,629 --> 00:34:11,679
5

954
00:34:13,669 --> 00:34:12,639
4

955
00:34:14,629 --> 00:34:13,679
3

956
00:34:15,510 --> 00:34:14,639
2

957
00:34:16,950 --> 00:34:15,520
1

958
00:34:20,950 --> 00:34:16,960
ignition

959
00:34:23,750 --> 00:34:20,960
and liftoff of the atlas 5 with juno on

960
00:34:25,990 --> 00:34:23,760
a trek to jupiter a planetary piece of

961
00:34:27,109 --> 00:34:26,000
the puzzle on the beginning of our solar

962
00:34:29,109 --> 00:34:27,119
system

963
00:34:31,829 --> 00:34:29,119

patriarch rule program is in progress

964
00:34:36,869 --> 00:34:31,839
vehicle body rates look good

965
00:34:40,069 --> 00:34:38,310
some big chamber pressures have

966
00:34:42,069 --> 00:34:40,079
plateaued rolling all the signatures

967
00:34:53,589 --> 00:34:42,079
look good rd180 operation looks

968
00:34:53,599 --> 00:34:56,389
mach 1

969
00:34:56,399 --> 00:35:05,030
smb chambers continue to roll off