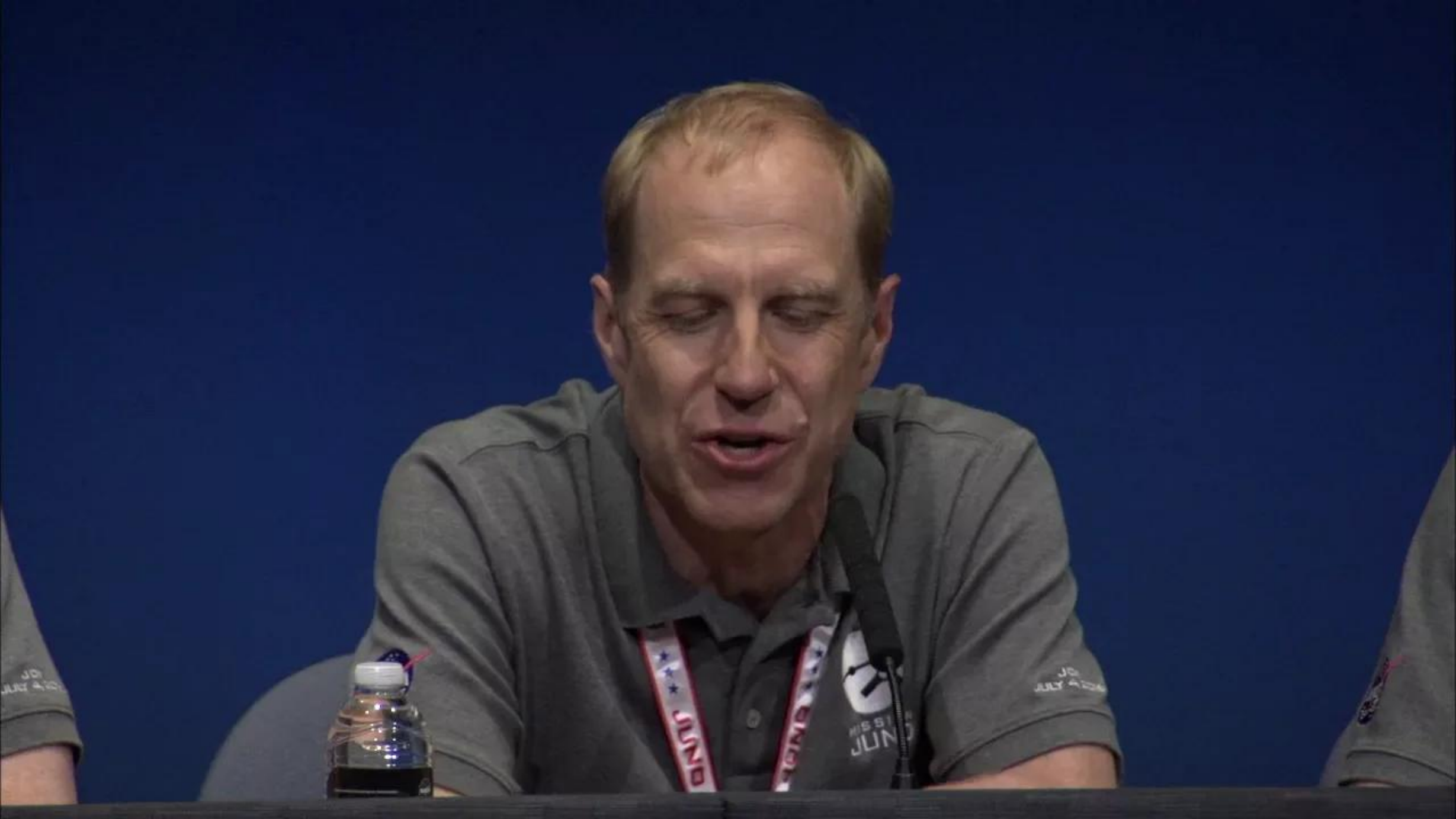

1
00:00:05,110 --> 00:00:03,350
hello my name is d.c eagle of nasa's jet

2
00:00:07,269 --> 00:00:05,120
propulsion laboratory in pasadena

3
00:00:08,470 --> 00:00:07,279
california happy fourth of july

4
00:00:10,230 --> 00:00:08,480
everybody

5
00:00:12,390 --> 00:00:10,240
uh as you can tell by the expressions of

6
00:00:14,950 --> 00:00:12,400
the people to my left it's been a great

7
00:00:17,189 --> 00:00:14,960
independence day here at jpl and here to

8
00:00:20,470 --> 00:00:17,199
talk about the nasa juno mission at

9
00:00:22,630 --> 00:00:20,480
jupiter we have with us today

10
00:00:24,710 --> 00:00:22,640
jeff yoder acting associate

11
00:00:26,550 --> 00:00:24,720
administrator nasa science mission

12
00:00:28,630 --> 00:00:26,560
directorate nasa headquarters in

13
00:00:31,830 --> 00:00:28,640

washington

14
00:00:34,630 --> 00:00:31,840
diane brown juno program executive nasa

15
00:00:41,990 --> 00:00:37,350
scott bolton juno principal investigator

16
00:00:47,910 --> 00:00:44,869
rick neibachen juno project manager from

17
00:00:51,750 --> 00:00:49,590
guy butylshe's director of

18
00:00:56,229 --> 00:00:51,760
interplanetary missions lockheed martin

19
00:01:01,110 --> 00:00:59,110
steve levin juno pro pro project

20
00:01:03,590 --> 00:01:01,120
scientist from jpl

21
00:01:05,429 --> 00:01:03,600
and to start things off we'll go to jeff

22
00:01:06,550 --> 00:01:05,439
yoder jeff

23
00:01:09,109 --> 00:01:06,560
thanks

24
00:01:11,830 --> 00:01:09,119
what a feeling

25
00:01:14,630 --> 00:01:11,840
a mission of this complexity uh to

26
00:01:16,710 --> 00:01:14,640
accomplish tonight is is just truly

27
00:01:18,390 --> 00:01:16,720
amazing and it really highlights the

28
00:01:20,310 --> 00:01:18,400
partnership and the teamwork between

29
00:01:22,870 --> 00:01:20,320
between nasa and our contractors and our

30
00:01:25,990 --> 00:01:22,880
partners to be able to achieve this this

31
00:01:27,830 --> 00:01:26,000
amazing amazing mission

32
00:01:29,350 --> 00:01:27,840
but you know there's one one group that

33
00:01:31,350 --> 00:01:29,360
i also want to thank and that's the

34
00:01:33,030 --> 00:01:31,360
families who really sacrificed their

35
00:01:35,190 --> 00:01:33,040
time to allow the scientists and

36
00:01:37,910 --> 00:01:35,200
engineers to spend the long days the

37
00:01:40,310 --> 00:01:37,920
travel uh to make this happen so to the

38
00:01:41,429 --> 00:01:40,320

family thank you you are part of this

39
00:01:43,270 --> 00:01:41,439
mission

40
00:01:45,510 --> 00:01:43,280
if we could i'd like to uh to roll a

41
00:01:47,670 --> 00:01:45,520
short video that will show some of the

42
00:01:49,350 --> 00:01:47,680
the stress the anxiety the excitement

43
00:01:52,830 --> 00:01:49,360
that led up to uh tonight so if we could

44
00:01:58,469 --> 00:01:55,590
systems go ahead now

45
00:02:00,389 --> 00:01:58,479
yeah we see the expected uh sharp shift

46
00:02:08,229 --> 00:02:00,399
upward and the doppler residuals

47
00:02:11,270 --> 00:02:09,589
call stations on june of course this

48
00:02:18,390 --> 00:02:11,280
time we see the tone for minimum burn

49
00:02:23,990 --> 00:02:20,070
all stations on june accord we have the

50
00:02:24,000 --> 00:02:31,350
juno welcome to jupiter

51
00:02:37,270 --> 00:02:34,550
burping time was 2102 seconds only

52
00:02:46,309 --> 00:02:37,280
differing one second off of the

53
00:02:48,630 --> 00:02:47,190
again

54
00:02:50,949 --> 00:02:48,640
very happy that you could share this

55
00:02:53,190 --> 00:02:50,959
moment with us let me turn this over now

56
00:02:54,470 --> 00:02:53,200
to diane brown

57
00:02:56,309 --> 00:02:54,480
thank you jeff

58
00:02:58,149 --> 00:02:56,319
i i was asked to talk about what it

59
00:03:00,550 --> 00:02:58,159
feels like to have this success and it's

60
00:03:02,070 --> 00:03:00,560
just i mean it's overwhelming the team

61
00:03:03,670 --> 00:03:02,080
the amount of time and effort everyone

62
00:03:05,910 --> 00:03:03,680
put into this and the risks that were

63
00:03:08,070 --> 00:03:05,920

overcome it's amazing i mean the more

64
00:03:09,990 --> 00:03:08,080
you know about the mission you know just

65
00:03:11,030 --> 00:03:10,000
how tricky this was and to have it be

66
00:03:12,710 --> 00:03:11,040
flawless

67
00:03:14,630 --> 00:03:12,720
i mean i really can't put it into words

68
00:03:16,550 --> 00:03:14,640
you imagine what it might feel like but

69
00:03:18,550 --> 00:03:16,560
to actually have it to know that we can

70
00:03:20,949 --> 00:03:18,560
all go to bed tonight not worrying about

71
00:03:23,110 --> 00:03:20,959
what's going to happen tomorrow

72
00:03:25,509 --> 00:03:23,120
it's pretty awesome so i that's that's

73
00:03:30,309 --> 00:03:25,519
really all i can say it's just amazing

74
00:03:30,319 --> 00:03:33,990
nasa did it again

75
00:03:39,030 --> 00:03:35,990
that

76
00:03:44,149 --> 00:03:41,990
and i am so happy to be part of the team

77
00:03:47,509 --> 00:03:44,159
that did that i i mean

78
00:03:49,990 --> 00:03:47,519
this team has worked so hard and we have

79
00:03:52,949 --> 00:03:50,000
just such great people

80
00:03:56,070 --> 00:03:52,959
and it's just a it's almost like a dream

81
00:03:57,110 --> 00:03:56,080
coming true right here and um you know i

82
00:03:58,949 --> 00:03:57,120
was

83
00:04:00,869 --> 00:03:58,959
i had to go back and get my family and

84
00:04:02,949 --> 00:04:00,879
drive them in here this earlier this

85
00:04:04,789 --> 00:04:02,959
evening and they get in the car and

86
00:04:06,789 --> 00:04:04,799
they've lived this i mean my kids are

87
00:04:09,350 --> 00:04:06,799
you know 12 and 13 and their their whole

88
00:04:12,309 --> 00:04:09,360

life has been juno basically

89
00:04:13,910 --> 00:04:12,319
and i'm driving in and they say i said

90
00:04:15,589 --> 00:04:13,920
so that's it i just want you guys to

91
00:04:16,629 --> 00:04:15,599
remember there's some risk here tonight

92
00:04:18,469 --> 00:04:16,639
you know

93
00:04:20,390 --> 00:04:18,479
i said by the time we're driving back to

94
00:04:23,430 --> 00:04:20,400
the hotel tonight either we're going to

95
00:04:30,150 --> 00:04:23,440
be in orbit or we won't

96
00:04:34,710 --> 00:04:32,629
and now the fun begins

97
00:04:36,390 --> 00:04:34,720
the science so let me turn it over to

98
00:04:37,670 --> 00:04:36,400
rick tell you more about what happened

99
00:04:39,350 --> 00:04:37,680
tonight

100
00:04:40,870 --> 00:04:39,360
in a minute but first we have to take

101
00:04:42,710 --> 00:04:40,880
care of some business

102
00:04:44,629 --> 00:04:42,720
so we prepared a contingency

103
00:04:46,390 --> 00:04:44,639
communications procedure

104
00:04:57,270 --> 00:04:46,400
and guess what

105
00:05:02,230 --> 00:04:59,670
so tonight through tones

106
00:05:05,350 --> 00:05:02,240
juno sang to us and it was a song of

107
00:05:09,350 --> 00:05:08,310
do you realize that after a 1.7 billion

108
00:05:12,710 --> 00:05:09,360
dollar

109
00:05:15,830 --> 00:05:12,720
journal a million miles

110
00:05:21,430 --> 00:05:19,270
after a 1.7 billion mile journey

111
00:05:22,550 --> 00:05:21,440
we hit our burn targets within one

112
00:05:24,629 --> 00:05:22,560
second

113
00:05:25,990 --> 00:05:24,639

on a target that was just tens of

114
00:05:28,550 --> 00:05:26,000
kilometers

115
00:05:29,430 --> 00:05:28,560
large isn't that incredible that's how

116
00:05:30,629 --> 00:05:29,440
good

117
00:05:32,790 --> 00:05:30,639
our team is

118
00:05:36,310 --> 00:05:32,800
and that's how well

119
00:05:38,390 --> 00:05:36,320
the juno spacecraft performed the night

120
00:05:40,070 --> 00:05:38,400
you see a handful of people up here but

121
00:05:41,830 --> 00:05:40,080
what we represent

122
00:05:43,350 --> 00:05:41,840
is a team of almost

123
00:05:46,150 --> 00:05:43,360
900 people

124
00:05:48,390 --> 00:05:46,160
that built and launched juno

125
00:05:50,150 --> 00:05:48,400
and roughly 300 people that operated it

126
00:05:53,350 --> 00:05:50,160
and got us all the way through into

127
00:05:54,950 --> 00:05:53,360
jupiter orbit tonight and we have

128
00:05:56,469 --> 00:05:54,960
a lot of team members here with us so

129
00:05:58,950 --> 00:05:56,479
i'd like to shout out to our team

130
00:05:59,909 --> 00:05:58,960
members here in pasadena and we also

131
00:06:01,909 --> 00:05:59,919
have

132
00:06:03,270 --> 00:06:01,919
team members in denver colorado at

133
00:06:05,749 --> 00:06:03,280
lockheed martin

134
00:06:07,270 --> 00:06:05,759
so i'd like to say congratulations to

135
00:06:12,469 --> 00:06:07,280
the team

136
00:06:17,670 --> 00:06:15,909
guy over to you thank you um

137
00:06:20,309 --> 00:06:17,680
there's a saying uh you know it's not

138
00:06:23,189 --> 00:06:20,319

rocket science well today yeah it really

139
00:06:25,510 --> 00:06:23,199
was rocket science okay so to put a

140
00:06:28,309 --> 00:06:25,520
spacecraft in orbit around the most

141
00:06:30,150 --> 00:06:28,319
intense planet in the solar system

142
00:06:32,710 --> 00:06:30,160
you've got to fire the main engine at

143
00:06:34,870 --> 00:06:32,720
exactly the right time at exactly the

144
00:06:37,909 --> 00:06:34,880
right place

145
00:06:40,230 --> 00:06:37,919
that's not easy and it may look easy

146
00:06:41,830 --> 00:06:40,240
when you watch it but behind the scenes

147
00:06:44,469 --> 00:06:41,840
there's a tremendous amount of work that

148
00:06:47,189 --> 00:06:44,479
goes on there's a tremendous amount of

149
00:06:49,830 --> 00:06:47,199
pride and dedication and passion that

150
00:06:51,350 --> 00:06:49,840
this team has put into this and i just

151
00:06:54,950 --> 00:06:51,360
couldn't be prouder to be part of this

152
00:06:57,189 --> 00:06:54,960
partnership uh with nasa uh putting an

153
00:06:58,790 --> 00:06:57,199
orbiter around jupiter is uh you know

154
00:07:01,670 --> 00:06:58,800
that's the reason we all go into this

155
00:07:03,990 --> 00:07:01,680
profession as you know it's science

156
00:07:06,309 --> 00:07:04,000
fiction and yet it's fact

157
00:07:07,589 --> 00:07:06,319
and uh so the spacecraft performed

158
00:07:10,950 --> 00:07:07,599
extremely well

159
00:07:11,990 --> 00:07:10,960
uh we fired our main engine uh and uh

160
00:07:14,150 --> 00:07:12,000
it's uh

161
00:07:15,670 --> 00:07:14,160
right now we've only got tones and we

162
00:07:18,469 --> 00:07:15,680
talked to you a little bit about tones

163
00:07:20,230 --> 00:07:18,479

which is kind of a very low day rate uh

164
00:07:22,230 --> 00:07:20,240
that kind of gives you some milestones

165
00:07:24,629 --> 00:07:22,240
gives you some some basic facts about

166
00:07:26,790 --> 00:07:24,639
how the spacecraft is doing um but we're

167
00:07:28,550 --> 00:07:26,800
just now we've got the spacecraft back

168
00:07:30,550 --> 00:07:28,560
pointed at the sun

169
00:07:32,390 --> 00:07:30,560
and the antenna back on earth we're

170
00:07:34,629 --> 00:07:32,400
starting to get the higher rate data

171
00:07:35,830 --> 00:07:34,639
down and so we've got a kind of a long

172
00:07:37,990 --> 00:07:35,840
night ahead of us because we're going to

173
00:07:40,390 --> 00:07:38,000
be going through that data in meticulous

174
00:07:41,749 --> 00:07:40,400
detail to make sure that the spacecraft

175
00:07:43,350 --> 00:07:41,759
is healthy

176
00:07:44,629 --> 00:07:43,360
and that we're prepared to go forward to

177
00:07:46,790 --> 00:07:44,639
the rest of the mission which is why

178
00:07:48,869 --> 00:07:46,800
we're here to get all that great science

179
00:07:51,430 --> 00:07:48,879
preliminary looks are that the

180
00:07:53,510 --> 00:07:51,440
spacecraft is performing well

181
00:07:54,390 --> 00:07:53,520
it did everything that it needed to do

182
00:07:58,150 --> 00:07:54,400
and

183
00:07:59,350 --> 00:07:58,160
we're very pleased uh with its

184
00:08:00,710 --> 00:07:59,360
performance

185
00:08:02,550 --> 00:08:00,720
but again we've got a lot of work in

186
00:08:04,309 --> 00:08:02,560
front of us to to really dive into that

187
00:08:07,430 --> 00:08:04,319
and see how it's going to do but looking

188
00:08:09,589 --> 00:08:07,440

ahead uh we're anxious to hear the

189
00:08:11,670 --> 00:08:09,599
navigation performance and and the orbit

190
00:08:14,629 --> 00:08:11,680
we're in and then looking ahead to to

191
00:08:16,230 --> 00:08:14,639
really starting to get uh scott and all

192
00:08:18,070 --> 00:08:16,240
his science team all that great science

193
00:08:21,189 --> 00:08:18,080
data which is why we're there so thank

194
00:08:21,990 --> 00:08:21,199
you so and turn over to steve

195
00:08:23,990 --> 00:08:22,000
so

196
00:08:24,830 --> 00:08:24,000
uh

197
00:08:27,830 --> 00:08:24,840
you get

198
00:08:30,309 --> 00:08:27,840
a uh really great dedicated team of a

199
00:08:32,149 --> 00:08:30,319
lot of people working really hard for a

200
00:08:33,589 --> 00:08:32,159
really long time you can do some amazing

201
00:08:35,269 --> 00:08:33,599
things

202
00:08:40,469 --> 00:08:35,279
and

203
00:08:42,790 --> 00:08:40,479
it's also just the beginning

204
00:08:44,470 --> 00:08:42,800
so i want to remind you all

205
00:08:46,550 --> 00:08:44,480
we're looking forward to turning the

206
00:08:47,670 --> 00:08:46,560
science instruments back on in a couple

207
00:08:50,310 --> 00:08:47,680
of days

208
00:08:52,230 --> 00:08:50,320
and what i'm really looking forward to

209
00:08:55,590 --> 00:08:52,240
is getting up close and personal with

210
00:08:57,430 --> 00:08:55,600
jupiter in about 53 days on august 27th

211
00:08:59,509 --> 00:08:57,440
with all of our science instruments on

212
00:09:02,790 --> 00:08:59,519
and taking data and

213
00:09:07,509 --> 00:09:04,230

thanks for a great night to the whole

214
00:09:10,710 --> 00:09:07,519
team and i guess back to scott

215
00:09:20,470 --> 00:09:10,720
so we're there we're in orbit

216
00:09:26,790 --> 00:09:23,990
so as many of you uh may know we

217
00:09:28,550 --> 00:09:26,800
um we're so focused on this uh tricky

218
00:09:32,630 --> 00:09:28,560
maneuver tonight that we shut off all

219
00:09:34,949 --> 00:09:32,640
the instruments um five days earlier

220
00:09:37,269 --> 00:09:34,959
um just to make sure that nothing else

221
00:09:39,990 --> 00:09:37,279
was going on in the spacecraft

222
00:09:42,070 --> 00:09:40,000
but prior to that we managed to collect

223
00:09:44,550 --> 00:09:42,080
some special data that i want to share

224
00:09:46,389 --> 00:09:44,560
with you tonight

225
00:09:48,470 --> 00:09:46,399
and it takes a little bit of an

226
00:09:52,630 --> 00:09:48,480
introduction so that you

227
00:09:56,230 --> 00:09:52,640
can understand what what's going on so

228
00:09:57,750 --> 00:09:56,240
several hundred years ago in 1610

229
00:09:59,829 --> 00:09:57,760
galileo

230
00:10:01,829 --> 00:09:59,839
took the first telescope and pointed it

231
00:10:04,790 --> 00:10:01,839
up in the sky

232
00:10:06,790 --> 00:10:04,800
and he saw jupiter

233
00:10:08,310 --> 00:10:06,800
and he noticed over the course of a

234
00:10:11,829 --> 00:10:08,320
couple of days

235
00:10:12,870 --> 00:10:11,839
that the stars nearby jupiter were

236
00:10:16,389 --> 00:10:12,880
moving

237
00:10:17,590 --> 00:10:16,399
into different positions each night

238
00:10:19,350 --> 00:10:17,600

and

239
00:10:21,269 --> 00:10:19,360
somehow

240
00:10:23,750 --> 00:10:21,279
he figured out

241
00:10:26,790 --> 00:10:23,760
by that fact

242
00:10:29,190 --> 00:10:26,800
that they must be orbiting jupiter

243
00:10:31,509 --> 00:10:29,200
and it was a revelation

244
00:10:32,550 --> 00:10:31,519
and it changed our culture and our

245
00:10:35,910 --> 00:10:32,560
perspective

246
00:10:39,110 --> 00:10:35,920
of ourselves forever

247
00:10:40,389 --> 00:10:39,120
earth was not the center

248
00:10:45,590 --> 00:10:40,399
and

249
00:10:47,430 --> 00:10:45,600
for centuries

250
00:10:49,990 --> 00:10:47,440
we have imagined

251
00:10:51,269 --> 00:10:50,000
how the planets move and how the stars

252
00:10:53,190 --> 00:10:51,279
move

253
00:10:54,949 --> 00:10:53,200
and

254
00:10:58,069 --> 00:10:54,959
we've only been aided with computer

255
00:11:00,710 --> 00:10:58,079
animation or the efforts of hollywood

256
00:11:01,990 --> 00:11:00,720
well tonight that's going to change

257
00:11:04,310 --> 00:11:02,000
because

258
00:11:06,870 --> 00:11:04,320
juno on its approach

259
00:11:09,590 --> 00:11:06,880
managed to capture a movie

260
00:11:10,870 --> 00:11:09,600
of jupiter and its moons

261
00:11:12,550 --> 00:11:10,880
and we're going to show that to you

262
00:11:14,710 --> 00:11:12,560
tonight

263
00:11:16,150 --> 00:11:14,720

and for the first time all of us

264
00:11:18,150 --> 00:11:16,160
together

265
00:11:19,509 --> 00:11:18,160
will actually see the true harmony in

266
00:11:21,350 --> 00:11:19,519
nature

267
00:11:23,750 --> 00:11:21,360
this is what it's about this is what

268
00:11:26,310 --> 00:11:23,760
jupiter and its moons look like this is

269
00:11:29,430 --> 00:11:26,320
what our solar system looks like if you

270
00:11:31,190 --> 00:11:29,440
were to move out it's what the galaxy

271
00:11:34,310 --> 00:11:31,200
looks like

272
00:11:37,509 --> 00:11:34,320
it's what the atoms look like

273
00:11:39,509 --> 00:11:37,519
it's harmony at every scale and so we

274
00:11:41,430 --> 00:11:39,519
finally are touching out to the cosmos

275
00:11:43,910 --> 00:11:41,440
and i'm very happy and pleased to be

276
00:11:44,790 --> 00:11:43,920
able to share this video with you

277
00:11:46,230 --> 00:11:44,800
so

278
00:11:48,710 --> 00:11:46,240
uh we'll need a little bit of the lights

279
00:11:50,629 --> 00:11:48,720
down it's a bit of a dark film it's

280
00:11:52,310 --> 00:11:50,639
pretty far away

281
00:11:55,350 --> 00:11:52,320
and the reason we're able to capture

282
00:11:56,629 --> 00:11:55,360
this video is the camera on juno is very

283
00:11:58,470 --> 00:11:56,639
special

284
00:12:00,150 --> 00:11:58,480
it's not like the ordinary cameras that

285
00:12:04,629 --> 00:12:00,160
go on spacecraft it was designed to

286
00:12:09,430 --> 00:12:07,350
and that required the camera framing to

287
00:12:11,670 --> 00:12:09,440
be very similar

288
00:12:14,230 --> 00:12:11,680

to your iphone or android or whatever

289
00:12:15,910 --> 00:12:14,240
smartphone you happen to carry

290
00:12:17,750 --> 00:12:15,920
so when you look at this video you can

291
00:12:20,150 --> 00:12:17,760
imagine yourself

292
00:12:23,509 --> 00:12:20,160
sitting on a chair on juno

293
00:12:25,750 --> 00:12:23,519
maybe right next to the legos

294
00:12:28,550 --> 00:12:25,760
and you're holding up your phone making

295
00:12:30,389 --> 00:12:28,560
the movie so that you can share it

296
00:12:32,710 --> 00:12:30,399
with your loved ones or friends back

297
00:12:34,710 --> 00:12:32,720
home because you're on vacation and

298
00:12:37,509 --> 00:12:34,720
here's the greatest vacation and journey

299
00:13:10,790 --> 00:12:37,519
i can imagine so here it is uh can we

300
00:13:10,800 --> 00:14:18,230
so

301
00:15:53,509 --> 00:15:22,150
uh

302
00:15:57,350 --> 00:15:55,189
we worked really hard on that and i'd

303
00:15:59,189 --> 00:15:57,360
like to think that

304
00:16:01,670 --> 00:15:59,199
galileo would really have enjoyed that

305
00:16:05,590 --> 00:16:03,509
great thank you scott and we're going to

306
00:16:08,150 --> 00:16:05,600
open it up to questions from here first

307
00:16:09,749 --> 00:16:08,160
at jpl uh please state your name and

308
00:16:10,710 --> 00:16:09,759
media affiliation

309
00:16:15,430 --> 00:16:10,720
and

310
00:16:23,189 --> 00:16:17,269
okay we'll go to questions from social

311
00:16:27,030 --> 00:16:24,710
indeed there's a lot of questions coming

312
00:16:29,189 --> 00:16:27,040
in on social media here um

313
00:16:30,870 --> 00:16:29,199

so scott you mentioned uh this one comes

314
00:16:32,470 --> 00:16:30,880
from twitter user matt here uh you

315
00:16:35,990 --> 00:16:32,480
mentioned that juno is going the fastest

316
00:16:37,509 --> 00:16:36,000
of any spacecraft how fast is it going

317
00:16:38,870 --> 00:16:37,519
uh well it's already slowed down a

318
00:16:41,350 --> 00:16:38,880
little bit

319
00:16:43,590 --> 00:16:41,360
but at the time of the droop of the

320
00:16:45,350 --> 00:16:43,600
jupiter orbit insertion

321
00:16:50,949 --> 00:16:45,360
um i think relative to earth it was

322
00:16:53,030 --> 00:16:50,959
about a 165 000 miles an hour

323
00:16:54,629 --> 00:16:53,040
all right next question here uh comes

324
00:16:57,670 --> 00:16:54,639
from nicole how soon before we start

325
00:16:59,350 --> 00:16:57,680
getting information back about jupiter

326
00:17:00,870 --> 00:16:59,360
so what you saw we've already gotten

327
00:17:02,710 --> 00:17:00,880
some information about jupiter and in

328
00:17:04,870 --> 00:17:02,720
fact that movie actually had some

329
00:17:06,150 --> 00:17:04,880
science in it because

330
00:17:07,909 --> 00:17:06,160
you may have noticed callisto the

331
00:17:10,949 --> 00:17:07,919
outermost moon was dimmer than the other

332
00:17:12,710 --> 00:17:10,959
ones we didn't know that that was a new

333
00:17:15,829 --> 00:17:12,720
science discovery

334
00:17:17,189 --> 00:17:15,839
because at that phase angle calista was

335
00:17:20,549 --> 00:17:17,199
less bright than the other ones we don't

336
00:17:22,150 --> 00:17:20,559
know why we'll have to figure that out

337
00:17:24,069 --> 00:17:22,160
we will turn the science instruments on

338
00:17:27,350 --> 00:17:24,079

about a couple days

339
00:17:29,909 --> 00:17:27,360
and we will start gathering data and

340
00:17:31,029 --> 00:17:29,919
we get our first up and close personal

341
00:17:33,350 --> 00:17:31,039
look

342
00:17:34,150 --> 00:17:33,360
at jupiter with all our eyes and ears

343
00:17:35,590 --> 00:17:34,160
open

344
00:17:38,870 --> 00:17:35,600
at the end of august because our first

345
00:17:42,070 --> 00:17:40,470
wonderful this question comes from

346
00:17:45,110 --> 00:17:42,080
ustream user

347
00:17:47,590 --> 00:17:45,120
t samaloff who asks since the maneuver

348
00:17:49,270 --> 00:17:47,600
was executed nearly perfectly did juno

349
00:17:54,470 --> 00:17:49,280
save any significant amount of fuel that

350
00:17:54,480 --> 00:18:02,310
what a great question

351
00:18:06,390 --> 00:18:04,950
yeah so basically what we'll do is uh as

352
00:18:08,310 --> 00:18:06,400
i said we're getting that telemetry down

353
00:18:10,230 --> 00:18:08,320
right now we just have the tones down

354
00:18:12,549 --> 00:18:10,240
indicating the completion of the burn

355
00:18:14,230 --> 00:18:12,559
and uh and when the burn completed but

356
00:18:16,310 --> 00:18:14,240
what we need to take a look at is the

357
00:18:18,710 --> 00:18:16,320
performance of the main engine and so

358
00:18:20,230 --> 00:18:18,720
that'll be part of the of the expanded

359
00:18:21,590 --> 00:18:20,240
data set that we'll be getting down so

360
00:18:23,990 --> 00:18:21,600
we'll know a little more about how

361
00:18:25,270 --> 00:18:24,000
efficient the engine was uh during the

362
00:18:27,270 --> 00:18:25,280
maneuver

363
00:18:28,470 --> 00:18:27,280

and then we can come back to scott and

364
00:18:29,830 --> 00:18:28,480
tell him if he's got a little bit of

365
00:18:32,630 --> 00:18:29,840
extra to play with

366
00:18:33,990 --> 00:18:32,640
but we're off to an excellent start

367
00:18:36,470 --> 00:18:34,000
thank you rick and guy we have a

368
00:18:38,870 --> 00:18:36,480
question from here at jpl please state

369
00:18:41,190 --> 00:18:38,880
your name immediate affiliation

370
00:18:42,630 --> 00:18:41,200
hi amanda barnettsky in digital

371
00:18:44,470 --> 00:18:42,640
uh that video is pretty awesome could

372
00:18:45,909 --> 00:18:44,480
you tell us a little bit more about

373
00:18:48,150 --> 00:18:45,919
about it scott a little bit why that's

374
00:18:50,950 --> 00:18:48,160
so significant seeing the motion of

375
00:18:54,150 --> 00:18:50,960
those moons around jupiter

376
00:18:56,310 --> 00:18:54,160
sure i mean you know in all of history

377
00:18:59,029 --> 00:18:56,320
we've never really been able to see the

378
00:19:01,830 --> 00:18:59,039
motion of any heavenly body uh against

379
00:19:04,310 --> 00:19:01,840
another i mean juno managed to get when

380
00:19:05,430 --> 00:19:04,320
we flew by the earth a few years ago we

381
00:19:07,190 --> 00:19:05,440
saw

382
00:19:10,150 --> 00:19:07,200
we were able to capture a movie of the

383
00:19:12,390 --> 00:19:10,160
earth and the moon together but we

384
00:19:14,470 --> 00:19:12,400
couldn't see the whole orbit

385
00:19:15,510 --> 00:19:14,480
and i think when you when you can first

386
00:19:18,070 --> 00:19:15,520
realize

387
00:19:20,310 --> 00:19:18,080
how that works you have multiple moons

388
00:19:21,750 --> 00:19:20,320

the galilean moons going around jupiter

389
00:19:24,950 --> 00:19:21,760
and each one

390
00:19:27,350 --> 00:19:24,960
is going around at a different speed

391
00:19:29,110 --> 00:19:27,360
based on its distance away from the

392
00:19:31,270 --> 00:19:29,120
planet i mean this is the king of our

393
00:19:32,630 --> 00:19:31,280
solar system and its disciples going

394
00:19:34,789 --> 00:19:32,640
around it

395
00:19:36,870 --> 00:19:34,799
i mean this is i mean it it's also

396
00:19:39,029 --> 00:19:36,880
representative of nature this is how we

397
00:19:41,110 --> 00:19:39,039
look that's a mini solar system

398
00:19:43,430 --> 00:19:41,120
and so i think it's very it to me it's

399
00:19:45,270 --> 00:19:43,440
very significant because we're finally

400
00:19:48,310 --> 00:19:45,280
able to see

401
00:19:50,390 --> 00:19:48,320
with real video real pictures

402
00:19:53,190 --> 00:19:50,400
this motion and we've only been able to

403
00:19:54,789 --> 00:19:53,200
imagine it up till today

404
00:19:57,110 --> 00:19:54,799
thank you scott and i believe we have a

405
00:19:58,870 --> 00:19:57,120
call uh from ken cramer at universe

406
00:20:00,789 --> 00:19:58,880
today ken

407
00:20:03,990 --> 00:20:00,799
hey thanks for taking my question and uh

408
00:20:06,310 --> 00:20:04,000
congratulations on a great day um yeah

409
00:20:08,549 --> 00:20:06,320
my question is actually i believe you

410
00:20:10,630 --> 00:20:08,559
have changed and enhanced this mission

411
00:20:14,950 --> 00:20:10,640
in the orbital plan you've gone

412
00:20:18,230 --> 00:20:14,960
originally from 11 days and 33 orbits

413
00:20:22,070 --> 00:20:18,240

to 14 days and 37 orbits and a year to

414
00:20:24,950 --> 00:20:22,080
20 months so um i'm wondering how how

415
00:20:26,870 --> 00:20:24,960
did you manage to to do this

416
00:20:28,390 --> 00:20:26,880
tell tell us a little bit about about

417
00:20:30,549 --> 00:20:28,400
that that planning and changing

418
00:20:32,950 --> 00:20:30,559
especially in light of um

419
00:20:34,470 --> 00:20:32,960
you have these radiation hazards so

420
00:20:37,830 --> 00:20:34,480
if you could tell us a little bit about

421
00:20:39,909 --> 00:20:39,029
yeah

422
00:20:41,669 --> 00:20:39,919
okay

423
00:20:42,789 --> 00:20:41,679
i've been voted to take out

424
00:20:45,029 --> 00:20:42,799
um

425
00:20:46,390 --> 00:20:45,039
so originally our our concept was 11

426
00:20:49,029 --> 00:20:46,400
days

427
00:20:51,430 --> 00:20:49,039
and the 33 orbits was the 33 science

428
00:20:53,669 --> 00:20:51,440
orbits there was always um

429
00:20:55,190 --> 00:20:53,679
some phasing orbit that needed to happen

430
00:20:57,270 --> 00:20:55,200
and you had to have a capture orbit and

431
00:20:59,430 --> 00:20:57,280
we didn't usually count that in our

432
00:21:01,510 --> 00:20:59,440
total of the 33 orbits which was really

433
00:21:03,990 --> 00:21:01,520
the science orbits which were mapping

434
00:21:07,830 --> 00:21:04,870
so

435
00:21:10,070 --> 00:21:07,840
from the beginning when we were

436
00:21:11,350 --> 00:21:10,080
designing it that the 11 days was an

437
00:21:12,950 --> 00:21:11,360
example but

438
00:21:14,950 --> 00:21:12,960

but there were other periods that would

439
00:21:17,669 --> 00:21:14,960
work we really what we really cared

440
00:21:21,029 --> 00:21:17,679
about was dropping down over the poles

441
00:21:23,750 --> 00:21:21,039
and capturing each launder longitude and

442
00:21:24,950 --> 00:21:23,760
laying a net or a map around

443
00:21:27,669 --> 00:21:24,960
jupiter

444
00:21:28,710 --> 00:21:27,679
and also during the cruise as we flew

445
00:21:32,470 --> 00:21:28,720
out

446
00:21:35,190 --> 00:21:32,480
spacecraft especially at the earth flyby

447
00:21:38,390 --> 00:21:35,200
we went into safe mode and as we looked

448
00:21:39,830 --> 00:21:38,400
at that i mean it was uh turned out just

449
00:21:42,070 --> 00:21:39,840
to be a uh

450
00:21:43,590 --> 00:21:42,080
a little bit of a hiccup but it wasn't

451
00:21:46,310 --> 00:21:43,600
very serious the spacecraft actually

452
00:21:48,470 --> 00:21:46,320
behaved exactly as we wanted it to and

453
00:21:50,870 --> 00:21:48,480
it nothing bad happened but we started

454
00:21:54,549 --> 00:21:50,880
to look and say okay

455
00:21:59,510 --> 00:21:57,190
we would like to be able to recover

456
00:22:01,990 --> 00:21:59,520
and not lose in orbit and we started to

457
00:22:04,710 --> 00:22:02,000
look at the timeline of how long it took

458
00:22:07,110 --> 00:22:04,720
to recover and was that did we want to

459
00:22:09,110 --> 00:22:07,120
add a couple of days for conservatism to

460
00:22:10,789 --> 00:22:09,120
ensure the science mission

461
00:22:12,710 --> 00:22:10,799
and we looked at

462
00:22:14,870 --> 00:22:12,720
opportunities to do that and we decided

463
00:22:16,390 --> 00:22:14,880

that adding three days

464
00:22:19,190 --> 00:22:16,400
made sense

465
00:22:20,789 --> 00:22:19,200
it didn't change the science it uh and

466
00:22:23,190 --> 00:22:20,799
it made the

467
00:22:25,510 --> 00:22:23,200
probability of success even greater and

468
00:22:28,230 --> 00:22:25,520
that was really the basis of it

469
00:22:31,510 --> 00:22:28,240
the 37 orbits just means that we

470
00:22:34,549 --> 00:22:31,520
counted these two 53-day orbits that we

471
00:22:37,750 --> 00:22:34,559
initially go into the capture period

472
00:22:39,990 --> 00:22:37,760
you still have this basically

473
00:22:41,669 --> 00:22:40,000
the same number of phasing mapping

474
00:22:44,149 --> 00:22:41,679
orbits

475
00:22:46,070 --> 00:22:44,159
or close to the same number so

476
00:22:48,549 --> 00:22:46,080
we also evaluated the radiation which

477
00:22:50,870 --> 00:22:48,559
was another part of your question and um

478
00:22:53,990 --> 00:22:50,880
and it and it wasn't much different you

479
00:22:56,710 --> 00:22:54,000
know juno was designed in a way to take

480
00:22:58,549 --> 00:22:56,720
data and at a very low risk

481
00:23:00,070 --> 00:22:58,559
and because the radiation slowly

482
00:23:02,230 --> 00:23:00,080
accumulates and then as you get to the

483
00:23:05,590 --> 00:23:02,240
later part of the mission it gets faster

484
00:23:06,870 --> 00:23:05,600
and faster accumulation and so

485
00:23:08,390 --> 00:23:06,880
we still retained all of that

486
00:23:10,630 --> 00:23:08,400
conservatism as well

487
00:23:12,149 --> 00:23:10,640
and the over all dose was pretty much

488
00:23:14,070 --> 00:23:12,159

the same

489
00:23:16,310 --> 00:23:14,080
and we designed the spacecraft to a

490
00:23:19,110 --> 00:23:16,320
radiation design margin of a minimum of

491
00:23:22,950 --> 00:23:19,120
two and so we accumulated a little bit

492
00:23:25,190 --> 00:23:22,960
more margin in this mission scenario

493
00:23:26,630 --> 00:23:25,200
and we found only one part that didn't

494
00:23:28,149 --> 00:23:26,640
meet that requirement we did some

495
00:23:30,149 --> 00:23:28,159
additional testing and found out it

496
00:23:32,789 --> 00:23:30,159
worked just fine so it's extremely

497
00:23:35,990 --> 00:23:32,799
resilient design an extremely resilient

498
00:23:37,830 --> 00:23:36,000
spacecraft and it was very easy to uh

499
00:23:40,149 --> 00:23:37,840
have the same level of confidence that

500
00:23:41,510 --> 00:23:40,159
it'll perform as expected just like it

501
00:23:43,590 --> 00:23:41,520
did tonight

502
00:23:46,070 --> 00:23:43,600
i also want to point out something that

503
00:23:48,789 --> 00:23:46,080
it's so we've all have so ingrained in

504
00:23:50,549 --> 00:23:48,799
us on the project that maybe um people

505
00:23:51,510 --> 00:23:50,559
haven't we're assuming people haven't

506
00:23:53,510 --> 00:23:51,520
realized

507
00:23:55,750 --> 00:23:53,520
and that is don't forget the radiation

508
00:23:57,750 --> 00:23:55,760
we accumulate is not just the more time

509
00:23:59,510 --> 00:23:57,760
you spend the more radiation

510
00:24:01,990 --> 00:23:59,520
each time we come in close to the planet

511
00:24:03,990 --> 00:24:02,000
we get a dose of radiation and then the

512
00:24:06,630 --> 00:24:04,000
spacecraft is out far from jupiter and

513
00:24:09,350 --> 00:24:06,640

it's relatively free from that radiation

514
00:24:11,590 --> 00:24:09,360
until we come in close again so uh

515
00:24:13,510 --> 00:24:11,600
changing from 11 days to 14 day orbits

516
00:24:15,510 --> 00:24:13,520
does not mean you get more radiation

517
00:24:16,950 --> 00:24:15,520
because you're there longer it's really

518
00:24:18,390 --> 00:24:16,960
the number of times we come in close to

519
00:24:21,029 --> 00:24:18,400
jupiter that determines how much

520
00:24:22,630 --> 00:24:21,039
radiation we're getting

521
00:24:24,630 --> 00:24:22,640
okay thank you we're going to bring it

522
00:24:26,630 --> 00:24:24,640
back here to jpl please state your name

523
00:24:28,630 --> 00:24:26,640
and media affiliation steve feuderman

524
00:24:29,909 --> 00:24:28,640
from cbs news i want to ask scott and

525
00:24:31,669 --> 00:24:29,919
anyone who wants to answer this i have a

526
00:24:33,350 --> 00:24:31,679
couple questions but first i want to ask

527
00:24:35,350 --> 00:24:33,360
you the moment

528
00:24:37,190 --> 00:24:35,360
that we saw the cheering go up when the

529
00:24:39,269 --> 00:24:37,200
35 minutes had come to an end when you

530
00:24:41,830 --> 00:24:39,279
got the indication that it had gone very

531
00:24:43,430 --> 00:24:41,840
well can you sort of take a step back

532
00:24:45,110 --> 00:24:43,440
and tell us what was going through your

533
00:24:48,789 --> 00:24:45,120
heart and mind after

534
00:24:51,510 --> 00:24:48,799
so many years being part of this project

535
00:24:53,669 --> 00:24:51,520
uh a huge sigh of relief

536
00:24:55,190 --> 00:24:53,679
and excitement i mean we had a counter

537
00:24:56,789 --> 00:24:55,200
that we were watching as the burn

538
00:24:59,110 --> 00:24:56,799

happened and i could see we were in

539
00:25:01,510 --> 00:24:59,120
orbit and it was shrinking and and but

540
00:25:03,269 --> 00:25:01,520
the at that moment

541
00:25:05,830 --> 00:25:03,279
all that went through my mind was wow

542
00:25:08,390 --> 00:25:05,840
this thing was perfect

543
00:25:10,870 --> 00:25:08,400
uh these engineers are amazing

544
00:25:12,870 --> 00:25:10,880
i mean i it was just another example i

545
00:25:14,470 --> 00:25:12,880
i'm continuously amazed at nasa

546
00:25:16,470 --> 00:25:14,480
engineering

547
00:25:19,430 --> 00:25:16,480
and i'm so happy to be a scientist

548
00:25:21,350 --> 00:25:19,440
working with these kind of engineers

549
00:25:23,350 --> 00:25:21,360
and then another question

550
00:25:25,430 --> 00:25:23,360
this really for any of you obviously i'm

551
00:25:28,070 --> 00:25:25,440
guessing you have been fascinated by

552
00:25:30,149 --> 00:25:28,080
science and planetary science since you

553
00:25:31,669 --> 00:25:30,159
were young children

554
00:25:34,549 --> 00:25:31,679
is there a

555
00:25:36,789 --> 00:25:34,559
child-like question you've always

556
00:25:40,830 --> 00:25:36,799
wondered about jupiter that you would

557
00:25:46,630 --> 00:25:44,230
mission i think many of us wonder about

558
00:25:49,190 --> 00:25:46,640
the clouds and the bands and the great

559
00:25:51,750 --> 00:25:49,200
red spot i mean what causes that how

560
00:25:54,149 --> 00:25:51,760
could that stay there for hundreds of

561
00:25:56,549 --> 00:25:54,159
years and why is it changing size now i

562
00:25:58,630 --> 00:25:56,559
mean it's the biggest most mysterious

563
00:26:00,710 --> 00:25:58,640

planet and it's the one we can most

564
00:26:03,430 --> 00:26:00,720
easily see at night so

565
00:26:05,190 --> 00:26:03,440
i think many of us have had questions uh

566
00:26:07,269 --> 00:26:05,200
ever since we looked at the stars and

567
00:26:08,230 --> 00:26:07,279
the planets

568
00:26:09,510 --> 00:26:08,240
anyone else

569
00:26:11,750 --> 00:26:09,520
well i would act at that i've been

570
00:26:13,990 --> 00:26:11,760
fascinated by the red spot but i think

571
00:26:15,909 --> 00:26:14,000
the question that um

572
00:26:17,029 --> 00:26:15,919
comes to my mind that i've had my whole

573
00:26:19,669 --> 00:26:17,039
life

574
00:26:22,830 --> 00:26:19,679
that i'm hoping we get an answer to is

575
00:26:27,990 --> 00:26:25,269
here yeah

576
00:26:30,870 --> 00:26:28,000
that's really um

577
00:26:33,110 --> 00:26:30,880
pretty fundamental to me

578
00:26:35,750 --> 00:26:33,120
okay i'll give an answer that maybe

579
00:26:38,630 --> 00:26:35,760
isn't quite so childlike as an engineer

580
00:26:41,110 --> 00:26:38,640
um i'm really curious how well this

581
00:26:43,350 --> 00:26:41,120
spacecraft's going to perform at in the

582
00:26:46,230 --> 00:26:43,360
radiation of jupiter because there's so

583
00:26:48,149 --> 00:26:46,240
much out in the outer planets right now

584
00:26:49,669 --> 00:26:48,159
that is really exciting not just the

585
00:26:51,110 --> 00:26:49,679
science community but you know the

586
00:26:52,950 --> 00:26:51,120
public as well

587
00:26:55,510 --> 00:26:52,960
and so the more we can learn from an

588
00:26:57,909 --> 00:26:55,520

engineering point of view how to design

589
00:26:59,830 --> 00:26:57,919
spacecraft to go to the outer planets

590
00:27:02,070 --> 00:26:59,840
and especially this is the first solar

591
00:27:03,990 --> 00:27:02,080
powered mission to the outer planets

592
00:27:05,350 --> 00:27:04,000
right so you know instead of using

593
00:27:06,630 --> 00:27:05,360
nuclear power

594
00:27:09,350 --> 00:27:06,640
we're using solar power and that's

595
00:27:10,870 --> 00:27:09,360
really opening up a lot of opportunities

596
00:27:12,390 --> 00:27:10,880
in terms of the types of missions that

597
00:27:14,710 --> 00:27:12,400
we can send out there

598
00:27:15,990 --> 00:27:14,720
so from an engineering point of view

599
00:27:16,789 --> 00:27:16,000
there's so much that we're going to

600
00:27:19,430 --> 00:27:16,799
learn

601
00:27:21,669 --> 00:27:19,440
over the next year and a half

602
00:27:25,350 --> 00:27:21,679
and there you have it engineers versus

603
00:27:27,990 --> 00:27:25,360
scientists is how we look at things

604
00:27:29,990 --> 00:27:28,000
versus children i i gotta say that you

605
00:27:32,470 --> 00:27:30,000
know you look out at the sky at night

606
00:27:34,389 --> 00:27:32,480
and you see things that are brighter and

607
00:27:36,470 --> 00:27:34,399
don't twinkle the way the stars do

608
00:27:39,269 --> 00:27:36,480
and if you watch the sky enough you see

609
00:27:41,590 --> 00:27:39,279
him moving and people probably wondered

610
00:27:42,470 --> 00:27:41,600
for centuries and centuries thousands of

611
00:27:43,909 --> 00:27:42,480
years

612
00:27:45,350 --> 00:27:43,919
what are those things out there and how

613
00:27:46,470 --> 00:27:45,360

did they get there

614
00:27:47,990 --> 00:27:46,480
well

615
00:27:50,630 --> 00:27:48,000
you know we've learned something over

616
00:27:52,789 --> 00:27:50,640
the years about what planets are

617
00:27:54,149 --> 00:27:52,799
and we've learned a little bit about how

618
00:27:55,669 --> 00:27:54,159
do they get there

619
00:27:58,549 --> 00:27:55,679
but that's kind of what we're trying to

620
00:28:01,350 --> 00:27:58,559
answer here right is how did jupiter get

621
00:28:03,190 --> 00:28:01,360
to be jupiter how did our solar system

622
00:28:04,470 --> 00:28:03,200
get to be the solar system where's all

623
00:28:06,470 --> 00:28:04,480
this stuff

624
00:28:07,830 --> 00:28:06,480
you know this amazing universe that we

625
00:28:09,990 --> 00:28:07,840
see

626
00:28:12,310 --> 00:28:10,000
how does that work and how did it begin

627
00:28:14,870 --> 00:28:12,320
so um

628
00:28:17,350 --> 00:28:14,880
there's a there's a whole range from

629
00:28:18,950 --> 00:28:17,360
you know can we do this job and how well

630
00:28:20,389 --> 00:28:18,960
can we make this work

631
00:28:21,750 --> 00:28:20,399
to

632
00:28:23,110 --> 00:28:21,760
wow

633
00:28:25,269 --> 00:28:23,120
where does that come from how does it

634
00:28:27,110 --> 00:28:25,279
how do how did we begin

635
00:28:28,310 --> 00:28:27,120
and that's one of the amazing things

636
00:28:30,310 --> 00:28:28,320
about

637
00:28:32,070 --> 00:28:30,320
working for nasa and working on big

638
00:28:33,990 --> 00:28:32,080

projects as you get to answer big

639
00:28:36,230 --> 00:28:34,000
questions

640
00:28:37,990 --> 00:28:36,240
okay if i can just add from a

641
00:28:39,510 --> 00:28:38,000
from a headquarters perspective with

642
00:28:41,430 --> 00:28:39,520
over when the science mission director

643
00:28:43,669 --> 00:28:41,440
with over 100 missions

644
00:28:45,350 --> 00:28:43,679
each mission helps build upon another

645
00:28:47,510 --> 00:28:45,360
and whether it's our astrophysics or

646
00:28:49,830 --> 00:28:47,520
earth science or or planetary or

647
00:28:51,990 --> 00:28:49,840
heliophysics they really interplay and

648
00:28:54,389 --> 00:28:52,000
what we learn from one helps helps our

649
00:28:57,110 --> 00:28:54,399
future missions so this is just one

650
00:28:58,870 --> 00:28:57,120
tremendous uh piece of the puzzle

651
00:29:01,430 --> 00:28:58,880
of the bigger you know the bigger

652
00:29:03,029 --> 00:29:01,440
mission set

653
00:29:05,190 --> 00:29:03,039
thank you jeff and i believe there's a

654
00:29:07,029 --> 00:29:05,200
question near the back there sir

655
00:29:08,950 --> 00:29:07,039
hi matt caplan from the planetary

656
00:29:10,149 --> 00:29:08,960
society with congratulations for the

657
00:29:12,630 --> 00:29:10,159
whole team

658
00:29:15,190 --> 00:29:12,640
uh easy one i think will you make

659
00:29:17,110 --> 00:29:15,200
another approach video in august or on

660
00:29:21,110 --> 00:29:17,120
one of the following orbits that takes

661
00:29:21,120 --> 00:29:27,430
that's the plan

662
00:29:27,440 --> 00:29:31,830
that's concise

663
00:29:37,269 --> 00:29:33,750

okay great any more questions from the

664
00:29:38,870 --> 00:29:37,279
floor see there's one right there sir

665
00:29:40,630 --> 00:29:38,880
got a question

666
00:29:42,870 --> 00:29:40,640
so what information from this mission

667
00:29:47,990 --> 00:29:42,880
will you use for future missions

668
00:29:52,230 --> 00:29:50,549
so i answer just just a little bit so uh

669
00:29:54,470 --> 00:29:52,240
we mentioned the radiation environment

670
00:29:56,070 --> 00:29:54,480
europa has a really really tough

671
00:29:58,070 --> 00:29:56,080
radiation environment so the things that

672
00:30:00,149 --> 00:29:58,080
we're learning from this mission there

673
00:30:02,149 --> 00:30:00,159
are also lots of firsts in this mission

674
00:30:03,909 --> 00:30:02,159
whether it's you know the solar arrays

675
00:30:05,430 --> 00:30:03,919
the solar power going out this far

676
00:30:08,630 --> 00:30:05,440
something we would look at for europa

677
00:30:10,310 --> 00:30:08,640
also so there's really a lot of uh

678
00:30:11,750 --> 00:30:10,320
a lot of things we would look at but not

679
00:30:13,029 --> 00:30:11,760
only for europa for any of our other

680
00:30:15,830 --> 00:30:13,039
missions that are going out into deep

681
00:30:19,269 --> 00:30:17,669
what things specifically would you be

682
00:30:20,630 --> 00:30:19,279
learning that will be useful for them

683
00:30:22,310 --> 00:30:20,640
future missions

684
00:30:25,190 --> 00:30:22,320
well so as an example the radiation

685
00:30:26,470 --> 00:30:25,200
environment itself how how do our uh how

686
00:30:27,669 --> 00:30:26,480
do our systems operate in this

687
00:30:29,190 --> 00:30:27,679
environment do we have the right

688
00:30:31,029 --> 00:30:29,200

shielding in place

689
00:30:32,710 --> 00:30:31,039
and things like that so it's spacecraft

690
00:30:34,149 --> 00:30:32,720
performance but not only that instrument

691
00:30:36,549 --> 00:30:34,159
performance there are parts of the

692
00:30:38,389 --> 00:30:36,559
instruments that are really outside the

693
00:30:40,149 --> 00:30:38,399
the what we have is our radiation

694
00:30:41,430 --> 00:30:40,159
shielding and so it's really

695
00:30:43,990 --> 00:30:41,440
understanding the health of the

696
00:30:45,909 --> 00:30:44,000
spacecraft the instruments

697
00:30:48,549 --> 00:30:45,919
and the communication system really so

698
00:30:50,230 --> 00:30:48,559
it's it's looking at the total the total

699
00:30:52,070 --> 00:30:50,240
operation

700
00:30:53,909 --> 00:30:52,080
thank you thank you jeff and the

701
00:30:56,549 --> 00:30:53,919
gentleman in the back row douglas

702
00:30:58,470 --> 00:30:56,559
messier from parabolic arc what are the

703
00:31:00,389 --> 00:30:58,480
major constraints on the mission in

704
00:31:03,029 --> 00:31:00,399
terms of the length of time is it the

705
00:31:04,389 --> 00:31:03,039
radiation is it fuel is it all of those

706
00:31:08,470 --> 00:31:04,399
things

707
00:31:09,750 --> 00:31:08,480
it's basically the radiation okay

708
00:31:12,070 --> 00:31:09,760
and can you describe some of the

709
00:31:13,830 --> 00:31:12,080
instruments on board in term just

710
00:31:16,549 --> 00:31:13,840
briefly what you what you'll be

711
00:31:20,149 --> 00:31:16,559
measuring and what instruments you have

712
00:31:23,190 --> 00:31:20,159
um sure so uh we um measure the gravity

713
00:31:24,470 --> 00:31:23,200

field of of jupiter with a radio science

714
00:31:26,470 --> 00:31:24,480
experiment so we're looking at the

715
00:31:28,230 --> 00:31:26,480
communications and the doppler shift and

716
00:31:29,750 --> 00:31:28,240
the frequency so

717
00:31:32,389 --> 00:31:29,760
looking at the acceleration and

718
00:31:34,549 --> 00:31:32,399
deceleration of the spacecraft itself to

719
00:31:36,230 --> 00:31:34,559
study the interior of jupiter we have

720
00:31:38,470 --> 00:31:36,240
magnetometers on board to look at the

721
00:31:40,470 --> 00:31:38,480
magnetic field and how that's generated

722
00:31:43,350 --> 00:31:40,480
deep inside the interior

723
00:31:45,350 --> 00:31:43,360
we have microwave radiometers that

724
00:31:47,669 --> 00:31:45,360
see the heat that's glowing out of

725
00:31:49,909 --> 00:31:47,679
jupiter it's a warm body

726
00:31:51,909 --> 00:31:49,919
it's glowing in the microwave so we

727
00:31:53,990 --> 00:31:51,919
watch that to measure the water and see

728
00:31:56,149 --> 00:31:54,000
how deep the zones and belts in the

729
00:31:59,110 --> 00:31:56,159
great red spot are

730
00:32:02,710 --> 00:31:59,120
we also have ultraviolet and infrared

731
00:32:04,950 --> 00:32:02,720
spectrometer spectrographs and imagers

732
00:32:07,430 --> 00:32:04,960
charged particles high energy and low

733
00:32:08,950 --> 00:32:07,440
energy to study the auroras and the

734
00:32:11,110 --> 00:32:08,960
northern and southern lights which are

735
00:32:13,430 --> 00:32:11,120
the most powerful in the solar system we

736
00:32:14,549 --> 00:32:13,440
have a plasma wave instrument that gives

737
00:32:16,389 --> 00:32:14,559
you the

738
00:32:18,470 --> 00:32:16,399

interaction of these particles with the

739
00:32:20,950 --> 00:32:18,480
magnetic field and how energy is moved

740
00:32:22,389 --> 00:32:20,960
around but it also makes these great

741
00:32:25,750 --> 00:32:22,399
sound

742
00:32:27,750 --> 00:32:25,760
systems where you hear the bow shock

743
00:32:30,549 --> 00:32:27,760
and then finally we have

744
00:32:32,950 --> 00:32:30,559
junocam which gets the visible color

745
00:32:37,029 --> 00:32:32,960
images that you just saw

746
00:32:41,750 --> 00:32:39,990
so we have a very very extensive payload

747
00:32:43,750 --> 00:32:41,760
and all of those are state-of-the-art

748
00:32:45,590 --> 00:32:43,760
instruments that are very very advanced

749
00:32:48,070 --> 00:32:45,600
and something like the microwave is

750
00:32:50,070 --> 00:32:48,080
actually a new instrument

751
00:32:51,590 --> 00:32:50,080
okay thank you scott uh

752
00:32:54,310 --> 00:32:51,600
lady to my left

753
00:32:56,630 --> 00:32:54,320
katherine lieber boeingboing um how

754
00:32:59,430 --> 00:32:56,640
close to real time or how sped up was

755
00:33:02,070 --> 00:32:59,440
the video that we just saw

756
00:33:05,750 --> 00:33:02,080
um i think that video was 17 days and

757
00:33:14,149 --> 00:33:07,830
so

758
00:33:17,269 --> 00:33:16,149
great i believe there's another question

759
00:33:18,230 --> 00:33:17,279
over there

760
00:33:20,389 --> 00:33:18,240
no

761
00:33:22,549 --> 00:33:20,399
all right jason social media a couple

762
00:33:24,070 --> 00:33:22,559
questions for you indeed many people are

763
00:33:25,990 --> 00:33:24,080

actually asking about the junior cam

764
00:33:28,549 --> 00:33:26,000
images that have come up here and i

765
00:33:29,990 --> 00:33:28,559
would like to know if all the raw images

766
00:33:33,669 --> 00:33:30,000
are going to be released or only the

767
00:33:33,679 --> 00:33:39,350
so that's the same set

768
00:33:45,269 --> 00:33:42,549
our plan is to release them all uh we're

769
00:33:47,110 --> 00:33:45,279
not quite ready technically to put all

770
00:33:48,789 --> 00:33:47,120
of those out which is why we made that

771
00:33:50,950 --> 00:33:48,799
movie but yes everything will get

772
00:33:54,230 --> 00:33:50,960
released to the public and they will be

773
00:33:57,750 --> 00:33:55,909
all right next question here uh comes

774
00:33:59,509 --> 00:33:57,760
from a twitter user who asks uh what

775
00:34:01,350 --> 00:33:59,519
will be the first instrument you turn on

776
00:34:03,750 --> 00:34:01,360
and why and what will be the most

777
00:34:07,909 --> 00:34:03,760
important instrument

778
00:34:09,829 --> 00:34:07,919
you're trying to get my science team to

779
00:34:10,790 --> 00:34:09,839
fight with me

780
00:34:15,510 --> 00:34:10,800
um

781
00:34:19,669 --> 00:34:15,520
they're all equally important just like

782
00:34:23,669 --> 00:34:21,510
the and i think they all go on at the

783
00:34:27,829 --> 00:34:23,679
same time just like i feed my children

784
00:34:32,710 --> 00:34:30,069
okay thank you scott uh any

785
00:34:34,950 --> 00:34:32,720
any more questions from here at jpl uh

786
00:34:36,389 --> 00:34:34,960
in the front row there

787
00:34:38,470 --> 00:34:36,399
hi bruce lieberman air and space

788
00:34:39,750 --> 00:34:38,480

magazine um you said that in a couple of

789
00:34:41,990 --> 00:34:39,760
days you'll be turning the instruments

790
00:34:43,829 --> 00:34:42,000
on as you're moving away from jupiter

791
00:34:45,430 --> 00:34:43,839
what what kind of data will you be

792
00:34:47,909 --> 00:34:45,440
taking or will you be

793
00:34:49,190 --> 00:34:47,919
testing the health of the instruments

794
00:34:50,710 --> 00:34:49,200
what what will

795
00:34:51,909 --> 00:34:50,720
what will you be doing after you turn

796
00:34:53,510 --> 00:34:51,919
them on

797
00:34:55,990 --> 00:34:53,520
uh well we'll start taking data

798
00:34:58,950 --> 00:34:56,000
immediately but um but we're not that

799
00:35:01,910 --> 00:34:58,960
close i mean the primary science goals

800
00:35:04,310 --> 00:35:01,920
of juno are associated with the very

801
00:35:05,829 --> 00:35:04,320
very closest approaches to jupiter so

802
00:35:07,510 --> 00:35:05,839
you're looking at a couple of hours so

803
00:35:09,829 --> 00:35:07,520
even being a couple days out means that

804
00:35:11,750 --> 00:35:09,839
you don't get this the gravity science

805
00:35:13,990 --> 00:35:11,760
of the interior and looking deep inside

806
00:35:15,510 --> 00:35:14,000
the thing but we'll turn them all on and

807
00:35:17,349 --> 00:35:15,520
make sure that and some of it will be

808
00:35:18,710 --> 00:35:17,359
calibration

809
00:35:20,710 --> 00:35:18,720
but when you go out into the deep

810
00:35:22,390 --> 00:35:20,720
magnetosphere most of that science is

811
00:35:23,910 --> 00:35:22,400
actually magnetospheric science and

812
00:35:26,950 --> 00:35:23,920
studying of the magnetosphere and the

813
00:35:29,430 --> 00:35:26,960

aurora and how all of that is working

814
00:35:32,310 --> 00:35:29,440
but we will also be taking images as we

815
00:35:35,910 --> 00:35:34,150
okay thank you very much i think that's

816
00:35:39,109 --> 00:35:35,920
going to wrap it up for here

817
00:35:41,190 --> 00:35:39,119
at jpl thank you for joining us for the

818
00:35:42,630 --> 00:35:41,200
post joi briefing

819
00:35:45,510 --> 00:35:42,640
for more information about the juno

820
00:35:48,150 --> 00:35:45,520
mission at jupiter please visit visit us

821
00:35:53,349 --> 00:35:48,160
at www.nasa.gov

822
00:35:56,630 --> 00:35:54,950
and for those of you who want to join in

823
00:35:59,109 --> 00:35:56,640
on the conversation

824
00:36:01,910 --> 00:35:59,119
juno has a facebook as well as twitter

825
00:36:05,990 --> 00:36:01,920
accounts and that's facebook.com

826
00:36:08,390 --> 00:36:06,000
nasajuno and twitter.com nasajuno

827
00:36:09,829 --> 00:36:08,400
after we conclude our broadcast nasa tv

828
00:36:11,670 --> 00:36:09,839
we'll rerun

829
00:36:13,829 --> 00:36:11,680
the limited set of images that we had

830
00:36:15,829 --> 00:36:13,839
but they're great images of course

831
00:36:17,750 --> 00:36:15,839
that we had during this panel discussion

832
00:36:19,510 --> 00:36:17,760
and that's it from here at jpl and