
Preparing for Launch:
#MissionToPsyche Experts Answer
Questions in JPL Clean Room

1
00:00:11,430 --> 00:00:08,390
welcome to nasa's jet propulsion

2
00:00:14,629 --> 00:00:11,440
laboratory in southern california today

3
00:00:16,550 --> 00:00:14,639
we are in a spacecraft assembly facility

4
00:00:18,710 --> 00:00:16,560
clean room which is why everyone you'll

5
00:00:20,470 --> 00:00:18,720
see here is wearing protective gear and

6
00:00:21,429 --> 00:00:20,480
frocks like me

7
00:00:23,109 --> 00:00:21,439
so

8
00:00:25,589 --> 00:00:23,119
in this room spacecraft have been built

9
00:00:27,429 --> 00:00:25,599
for decades but today we've invited

10
00:00:29,189 --> 00:00:27,439
members of the media to the clean room

11
00:00:31,830 --> 00:00:29,199
to learn more about one of jpl's

12
00:00:34,150 --> 00:00:31,840
upcoming mission and that's the psyche

13
00:00:36,310 --> 00:00:34,160

spacecraft it's on a mission to study a

14
00:00:38,950 --> 00:00:36,320
giant asteroid which is believed to be

15
00:00:41,590 --> 00:00:38,960
rich in metal and could give us a unique

16
00:00:44,950 --> 00:00:41,600
opportunity to study how planets like

17
00:00:47,830 --> 00:00:44,960
our own earth may have formed now it's

18
00:00:50,229 --> 00:00:47,840
set to launch in august so soon psyche

19
00:00:53,110 --> 00:00:50,239
is going to leave jpl and head over to

20
00:00:54,549 --> 00:00:53,120
nasa's kennedy space center in florida

21
00:00:56,630 --> 00:00:54,559
and today we have a chance to talk to

22
00:01:00,229 --> 00:00:56,640
two experts so if you have any questions

23
00:01:02,310 --> 00:01:00,239
you'd like to ask use the ask nasa

24
00:01:05,670 --> 00:01:02,320
or leave your questions in the comments

25
00:01:07,750 --> 00:01:05,680
below and first up we have lindsey

26
00:01:09,670 --> 00:01:07,760
ellison patton's the principal

27
00:01:11,590 --> 00:01:09,680
investigator on cycling thank you for

28
00:01:13,910 --> 00:01:11,600
joining us today thank you so much i'm

29
00:01:15,910 --> 00:01:13,920
very excited to talk with you now what

30
00:01:17,190 --> 00:01:15,920
is the first thing people should know

31
00:01:19,510 --> 00:01:17,200
about psyche

32
00:01:21,510 --> 00:01:19,520
all right why do we go to space humans

33
00:01:23,510 --> 00:01:21,520
we can't help it we have to explore

34
00:01:25,109 --> 00:01:23,520
we've always explored our planet now

35
00:01:27,109 --> 00:01:25,119
we're exploring in space

36
00:01:28,710 --> 00:01:27,119
there aren't that many kinds of worlds

37
00:01:30,390 --> 00:01:28,720
and places in our solar system that

38
00:01:32,789 --> 00:01:30,400

we've never had a picture we've never

39
00:01:34,789 --> 00:01:32,799
explored psyche is one of them it's a

40
00:01:36,310 --> 00:01:34,799
new kind of world that's why it's so

41
00:01:38,950 --> 00:01:36,320
exciting to go there

42
00:01:40,950 --> 00:01:38,960
and as a principal investigator what is

43
00:01:42,630 --> 00:01:40,960
your role on the mission

44
00:01:43,830 --> 00:01:42,640
i i am officially the lead of the

45
00:01:45,109 --> 00:01:43,840
mission

46
00:01:46,149 --> 00:01:45,119
but i'm a scientist i don't know

47
00:01:48,230 --> 00:01:46,159
everything

48
00:01:50,389 --> 00:01:48,240
my job is to make sure the science of

49
00:01:52,710 --> 00:01:50,399
the return the science return of the

50
00:01:54,469 --> 00:01:52,720
mission is successful and to try to keep

51
00:01:56,389 --> 00:01:54,479
the team working in the right and best

52
00:01:58,870 --> 00:01:56,399
direction that i possibly can working

53
00:02:01,030 --> 00:01:58,880
with all the other leaders

54
00:02:03,190 --> 00:02:01,040
and now i want to know

55
00:02:06,789 --> 00:02:03,200
what are you most excited about

56
00:02:08,949 --> 00:02:06,799
personally when it comes to psyche

57
00:02:10,710 --> 00:02:08,959
you know i'm very very excited about the

58
00:02:12,790 --> 00:02:10,720
science i'm hoping this is something

59
00:02:14,390 --> 00:02:12,800
very unusual and exciting

60
00:02:15,589 --> 00:02:14,400
but beyond that

61
00:02:17,510 --> 00:02:15,599
i think the reason that i'm most

62
00:02:18,949 --> 00:02:17,520
motivated to do this is because i think

63
00:02:20,949 --> 00:02:18,959

it gives this

64
00:02:23,750 --> 00:02:20,959
story of hope in the future

65
00:02:25,589 --> 00:02:23,760
for humans there's so much that's scary

66
00:02:27,670 --> 00:02:25,599
in the world right now but space

67
00:02:29,510 --> 00:02:27,680
exploration is a story of hope and a

68
00:02:32,150 --> 00:02:29,520
story of what we can do when we all work

69
00:02:33,750 --> 00:02:32,160
together it's kind of a miracle we can

70
00:02:36,470 --> 00:02:33,760
do this and go to space think of the

71
00:02:38,390 --> 00:02:36,480
things we can solve here on earth and

72
00:02:40,869 --> 00:02:38,400
could you tell us a little more about

73
00:02:44,309 --> 00:02:40,879
the psyche mission in general like what

74
00:02:48,710 --> 00:02:46,550
the psyche asteroid of course we named

75
00:02:50,309 --> 00:02:48,720
our spacecraft psyche after the asteroid

76
00:02:52,630 --> 00:02:50,319
where we're going we think it's made

77
00:02:54,869 --> 00:02:52,640
largely of metal we think it could be

78
00:02:57,190 --> 00:02:54,879
part of the metal core of a little

79
00:02:59,589 --> 00:02:57,200
planet that got broken apart and

80
00:03:01,270 --> 00:02:59,599
stranded in the asteroid belt instead of

81
00:03:04,070 --> 00:03:01,280
joining up and becoming a part of

82
00:03:05,509 --> 00:03:04,080
mercury venus earth or mars so if it is

83
00:03:06,949 --> 00:03:05,519
a part of a core

84
00:03:08,630 --> 00:03:06,959
it's the only way humans are ever going

85
00:03:10,229 --> 00:03:08,640
to see a core because we can't go to

86
00:03:11,990 --> 00:03:10,239
ours the pressure is way too much the

87
00:03:14,149 --> 00:03:12,000
temperature is way too much so it's a

88
00:03:16,229 --> 00:03:14,159

way of looking inside of the earth by

89
00:03:18,470 --> 00:03:16,239
going to outer space

90
00:03:20,309 --> 00:03:18,480
and how does it feel to be inside this

91
00:03:22,470 --> 00:03:20,319
clean room right now seeing excitement

92
00:03:24,949 --> 00:03:22,480
behind you

93
00:03:27,830 --> 00:03:24,959
been working on this for 11 years which

94
00:03:30,229 --> 00:03:27,840
is a short time in space mission terms

95
00:03:31,430 --> 00:03:30,239
but it's a long time in anyone's life

96
00:03:33,830 --> 00:03:31,440
and the fact that we've gone from this

97
00:03:36,229 --> 00:03:33,840
tiny idea to this

98
00:03:39,030 --> 00:03:36,239
beautiful giant spacecraft it feels a

99
00:03:40,869 --> 00:03:39,040
bit like a miracle i'm really excited

100
00:03:43,190 --> 00:03:40,879
thank you so much for talking to us can

101
00:03:45,110 --> 00:03:43,200
you kind of give us a little timeline of

102
00:03:47,110 --> 00:03:45,120
what will happen after launch with

103
00:03:49,750 --> 00:03:47,120
psyche yes

104
00:03:51,589 --> 00:03:49,760
so we expect and hope to launch august

105
00:03:53,429 --> 00:03:51,599
1st or thereabouts

106
00:03:55,429 --> 00:03:53,439
so then once it separates from the

107
00:03:57,589 --> 00:03:55,439
rocket the giant solar arrays will

108
00:04:00,070 --> 00:03:57,599
unfold and psyche will start moving out

109
00:04:01,589 --> 00:04:00,080
toward the asteroid in the first year

110
00:04:04,630 --> 00:04:01,599
we're going to test the deep space

111
00:04:06,309 --> 00:04:04,640
optical communications demonstration

112
00:04:09,190 --> 00:04:06,319
which is communicating with the earth

113
00:04:11,110 --> 00:04:09,200

using lasers instead of radio waves and

114
00:04:13,030 --> 00:04:11,120
then eventually after three years we'll

115
00:04:16,310 --> 00:04:13,040
reach the asteroid and we'll start doing

116
00:04:18,229 --> 00:04:16,320
the science of the asteroid itself

117
00:04:20,789 --> 00:04:18,239
and one thing that i think is really

118
00:04:22,069 --> 00:04:20,799
cool is this isn't even all of psyche

119
00:04:23,749 --> 00:04:22,079
right there's going to be more that

120
00:04:25,270 --> 00:04:23,759
people will see when we have the

121
00:04:27,110 --> 00:04:25,280
spacecraft behind us but there'll be the

122
00:04:29,110 --> 00:04:27,120
solar arrays that will be attached to it

123
00:04:30,790 --> 00:04:29,120
that's right our solar arrays are not

124
00:04:33,110 --> 00:04:30,800
attached right now they're being tested

125
00:04:34,950 --> 00:04:33,120
elsewhere but they're huge when they're

126
00:04:36,950 --> 00:04:34,960
completely unfolded as they will be in

127
00:04:38,870 --> 00:04:36,960
space the spacecraft and the solar

128
00:04:41,909 --> 00:04:38,880
arrays are as big as a singles tennis

129
00:04:44,310 --> 00:04:41,919
court and these solar arrays create 20

130
00:04:45,749 --> 00:04:44,320
kilowatts of energy here at the radius

131
00:04:48,950 --> 00:04:45,759
of earth

132
00:04:50,629 --> 00:04:48,960
and exactly where is the psyche asteroid

133
00:04:53,590 --> 00:04:50,639
located

134
00:04:55,590 --> 00:04:53,600
the psyche asteroid orbits in the outer

135
00:04:58,150 --> 00:04:55,600
main belt of the asteroid belt meaning

136
00:05:00,790 --> 00:04:58,160
that it's way out past mars sometimes

137
00:05:03,029 --> 00:05:00,800
closer to jupiter it's very far from the

138
00:05:05,670 --> 00:05:03,039

earth that's its stable orbit out there

139
00:05:07,670 --> 00:05:05,680
in the asteroid belt

140
00:05:09,350 --> 00:05:07,680
well thank you so much lindy for

141
00:05:10,629 --> 00:05:09,360
answering all our questions we might

142
00:05:13,029 --> 00:05:10,639
come back to you if we get some more

143
00:05:14,950 --> 00:05:13,039
social media questions coming in

144
00:05:18,710 --> 00:05:14,960
and if you have a question you'd like to

145
00:05:20,469 --> 00:05:18,720
ask use the hashtag asknasa or leave

146
00:05:22,310 --> 00:05:20,479
your questions in the comments below

147
00:05:24,390 --> 00:05:22,320
next up we're going to go to talk to

148
00:05:27,189 --> 00:05:24,400
project manager henry stone he's

149
00:05:29,430 --> 00:05:27,199
somewhere around here yeah let's see

150
00:05:30,230 --> 00:05:29,440
where he is there he is let's go find

151
00:05:31,670 --> 00:05:30,240
him

152
00:05:33,510 --> 00:05:31,680
hi henry

153
00:05:35,430 --> 00:05:33,520
we are live right now we're hoping we

154
00:05:38,390 --> 00:05:35,440
could ask you a couple questions about

155
00:05:40,790 --> 00:05:38,400
the psychic mission so for you what does

156
00:05:43,270 --> 00:05:40,800
it mean to be a project manager on a

157
00:05:45,189 --> 00:05:43,280
mission like psyche a project manager on

158
00:05:47,590 --> 00:05:45,199
a mission like this well i i equate it

159
00:05:48,550 --> 00:05:47,600
to being like an orchestra conductor

160
00:05:51,110 --> 00:05:48,560
right

161
00:05:52,629 --> 00:05:51,120
building a spacecraft as incredible as

162
00:05:54,550 --> 00:05:52,639
this or any system that's this

163
00:05:55,749 --> 00:05:54,560

sophisticated requires an enormous

164
00:05:57,670 --> 00:05:55,759
number of people

165
00:05:59,990 --> 00:05:57,680
with a lot of different skills

166
00:06:01,270 --> 00:06:00,000
and you got to bring that all together

167
00:06:03,270 --> 00:06:01,280
and you got to make sure it's all

168
00:06:05,830 --> 00:06:03,280
coordinated right everybody's developing

169
00:06:08,070 --> 00:06:05,840
all of their pieces at the right time uh

170
00:06:09,909 --> 00:06:08,080
interacting together properly

171
00:06:11,990 --> 00:06:09,919
in order to build that so it's just

172
00:06:13,990 --> 00:06:12,000
keeping everybody on on the right tune

173
00:06:16,070 --> 00:06:14,000
to make sure that we stay on schedule we

174
00:06:17,270 --> 00:06:16,080
build the right thing and we're ready to

175
00:06:19,590 --> 00:06:17,280
go for launch

176
00:06:21,670 --> 00:06:19,600
ed can you kind of break down the

177
00:06:24,550 --> 00:06:21,680
instruments on psyche

178
00:06:27,749 --> 00:06:24,560
for us uh the the science instruments is

179
00:06:28,629 --> 00:06:27,759
kind of really three plus one all right

180
00:06:30,550 --> 00:06:28,639
um

181
00:06:32,309 --> 00:06:30,560
so in order to get the scientific

182
00:06:34,629 --> 00:06:32,319
measurements we need we have a suite you

183
00:06:36,870 --> 00:06:34,639
can see them up here behind you up on

184
00:06:38,870 --> 00:06:36,880
the far boom there we have a gamma ray

185
00:06:41,110 --> 00:06:38,880
neutron spectrometer that was built at

186
00:06:43,510 --> 00:06:41,120
the applied physics laboratory

187
00:06:45,830 --> 00:06:43,520
and that is going to be used to detect

188
00:06:47,670 --> 00:06:45,840

elemental metallic composition of the

189
00:06:50,710 --> 00:06:47,680
surface of mars looking you know for the

190
00:06:52,550 --> 00:06:50,720
iron nickel aluminum what it's made of

191
00:06:55,350 --> 00:06:52,560
on this other boom here you'll see these

192
00:06:57,110 --> 00:06:55,360
little domes those are two magnetometers

193
00:06:59,110 --> 00:06:57,120
and they will be used to detect whether

194
00:07:00,710 --> 00:06:59,120
or not psyche has a magnetic field and

195
00:07:02,710 --> 00:07:00,720
if so

196
00:07:04,309 --> 00:07:02,720
how strong that field is and what the

197
00:07:06,790 --> 00:07:04,319
characteristics and shape of that

198
00:07:08,629 --> 00:07:06,800
magnetic field are and that's really key

199
00:07:12,150 --> 00:07:08,639
towards helping us understand whether

200
00:07:14,070 --> 00:07:12,160
psyche was an early core uh of an early

201
00:07:16,870 --> 00:07:14,080
planetesimal when the solar system was

202
00:07:18,710 --> 00:07:16,880
formed so that's two of the three the

203
00:07:20,950 --> 00:07:18,720
third of the three key scientific

204
00:07:24,230 --> 00:07:20,960
instruments actually is a pair

205
00:07:26,469 --> 00:07:24,240
of uh telescopic imagers with filter

206
00:07:28,550 --> 00:07:26,479
wheels unfortunately in this

207
00:07:30,550 --> 00:07:28,560
configuration you can't see those

208
00:07:32,950 --> 00:07:30,560
they're pointing up right now at the

209
00:07:33,670 --> 00:07:32,960
ceiling in this room on that top side of

210
00:07:47,909 --> 00:07:33,680
the

211
00:07:49,510 --> 00:07:47,919
understand you know craters and and use

212
00:07:52,230 --> 00:07:49,520
that to discuss uh determine the

213
00:07:54,230 --> 00:07:52,240

relative age of the body but perhaps

214
00:07:56,150 --> 00:07:54,240
most importantly is that each is

215
00:07:57,990 --> 00:07:56,160
equipped with a filter wheel and the

216
00:08:01,270 --> 00:07:58,000
filters have been chosen so that if you

217
00:08:02,550 --> 00:08:01,280
take images at those different light uh

218
00:08:04,230 --> 00:08:02,560
wavelengths

219
00:08:06,710 --> 00:08:04,240
you can actually determine what the

220
00:08:07,589 --> 00:08:06,720
mineralogical composition of the surface

221
00:08:09,510 --> 00:08:07,599
is

222
00:08:11,029 --> 00:08:09,520
so that and and the gamma ray between

223
00:08:12,710 --> 00:08:11,039
the metals and the silicates we can

224
00:08:15,510 --> 00:08:12,720
understand how much of it is a rocky

225
00:08:17,430 --> 00:08:15,520
body how much of this is a metallic body

226
00:08:19,589 --> 00:08:17,440
the fourth one is gravity science this

227
00:08:21,189 --> 00:08:19,599
is a very odd shaped body right it's

228
00:08:21,990 --> 00:08:21,199
kind of like a potato

229
00:08:24,309 --> 00:08:22,000
all right

230
00:08:27,270 --> 00:08:24,319
and it probably will have a very unique

231
00:08:29,350 --> 00:08:27,280
and odd gravitational field we can't

232
00:08:31,749 --> 00:08:29,360
safely go into orbit around that till we

233
00:08:34,230 --> 00:08:31,759
understand what that gravitational field

234
00:08:36,469 --> 00:08:34,240
looks like and so our

235
00:08:38,870 --> 00:08:36,479
x-band telecom system that we use to

236
00:08:40,469 --> 00:08:38,880
communicate to get receive data from and

237
00:08:42,070 --> 00:08:40,479
command the spacecraft

238
00:08:44,389 --> 00:08:42,080

actually does that tracking of the

239
00:08:46,150 --> 00:08:44,399
spacecraft so we start to go into orbit

240
00:08:48,470 --> 00:08:46,160
at a very high orbit

241
00:08:50,150 --> 00:08:48,480
that gravitational field will affect the

242
00:08:51,670 --> 00:08:50,160
motion of the spacecraft and we can

243
00:08:53,509 --> 00:08:51,680
measure that

244
00:08:55,430 --> 00:08:53,519
and then determine and build the

245
00:08:57,829 --> 00:08:55,440
detailed model of the gravitational

246
00:09:00,630 --> 00:08:57,839
field once we have that then we can get

247
00:09:02,389 --> 00:09:00,640
to successively lower and lower orbits

248
00:09:04,470 --> 00:09:02,399
to allow our instruments to get better

249
00:09:06,230 --> 00:09:04,480
and better and more refined measurements

250
00:09:09,269 --> 00:09:06,240
uh to accomplish the science so that's

251
00:09:10,949 --> 00:09:09,279
the science instrument suite for psychic

252
00:09:14,070 --> 00:09:10,959
i like the breakdown and the description

253
00:09:15,350 --> 00:09:14,080
of the potato that's my favorite part

254
00:09:18,630 --> 00:09:15,360
now we have a question coming in on

255
00:09:20,550 --> 00:09:18,640
social media yes elias on facebook asks

256
00:09:23,509 --> 00:09:20,560
how long will it take to complete a

257
00:09:25,430 --> 00:09:23,519
spacecraft with planning and finishing

258
00:09:28,070 --> 00:09:25,440
up to completion so the whole process

259
00:09:31,750 --> 00:09:28,080
the whole process uh well

260
00:09:33,110 --> 00:09:31,760
the earliest concept for this mission

261
00:09:35,350 --> 00:09:33,120
was developed by the principal

262
00:09:36,470 --> 00:09:35,360
investigator over 10 years ago

263
00:09:39,910 --> 00:09:36,480

all right

264
00:09:40,870 --> 00:09:39,920
about five years ago or six years ago or

265
00:09:42,790 --> 00:09:40,880
so

266
00:09:45,030 --> 00:09:42,800
she had approached folks at jpl about

267
00:09:46,790 --> 00:09:45,040
her scientific hypotheses and some

268
00:09:47,990 --> 00:09:46,800
engineers here

269
00:09:50,070 --> 00:09:48,000
said hey

270
00:09:51,910 --> 00:09:50,080
that's a really cool hypothesis and we

271
00:09:53,509 --> 00:09:51,920
think we can develop a spacecraft that

272
00:09:54,310 --> 00:09:53,519
could fly the instruments you need out

273
00:09:56,389 --> 00:09:54,320
there

274
00:09:59,350 --> 00:09:56,399
and so she began working with us and we

275
00:10:00,310 --> 00:09:59,360
put in a proposal to nasa to fly this

276
00:10:02,870 --> 00:10:00,320
mission

277
00:10:03,670 --> 00:10:02,880
um and we were selected about five years

278
00:10:05,430 --> 00:10:03,680
ago

279
00:10:07,190 --> 00:10:05,440
so the the real you know there's that

280
00:10:09,590 --> 00:10:07,200
kind of very early part but once we got

281
00:10:11,670 --> 00:10:09,600
selected and it became serious this is

282
00:10:12,870 --> 00:10:11,680
going to be a mission why

283
00:10:14,630 --> 00:10:12,880
um

284
00:10:16,949 --> 00:10:14,640
five years of development you start with

285
00:10:18,949 --> 00:10:16,959
early design and analysis figuring out

286
00:10:21,509 --> 00:10:18,959
exactly what you need who's going to

287
00:10:23,269 --> 00:10:21,519
provide the various pieces etc

288
00:10:25,509 --> 00:10:23,279

uh and then you start building you start

289
00:10:27,750 --> 00:10:25,519
building up the individual components

290
00:10:29,829 --> 00:10:27,760
testing those and then you move into

291
00:10:31,509 --> 00:10:29,839
system integration and this is the tail

292
00:10:33,750 --> 00:10:31,519
end of system integration that you're

293
00:10:35,509 --> 00:10:33,760
looking at that's taking all the myriad

294
00:10:36,949 --> 00:10:35,519
of pieces that are necessary that were

295
00:10:38,710 --> 00:10:36,959
already tested

296
00:10:40,550 --> 00:10:38,720
at the component level and put them

297
00:10:43,269 --> 00:10:40,560
together to make the overall spacecraft

298
00:10:45,670 --> 00:10:43,279
and then test the overall spacecraft so

299
00:10:47,509 --> 00:10:45,680
that's referred to as atlo

300
00:10:49,430 --> 00:10:47,519
apple is assembly test and launch

301
00:10:51,829 --> 00:10:49,440
operations okay

302
00:10:54,310 --> 00:10:51,839
and and we're in the very final stages

303
00:10:56,870 --> 00:10:54,320
the spacecraft as you see it right here

304
00:10:57,910 --> 00:10:56,880
is essentially how it will be flying in

305
00:10:58,710 --> 00:10:57,920
space

306
00:11:02,790 --> 00:10:58,720
right

307
00:11:04,870 --> 00:11:02,800
you can see all this other equipment

308
00:11:06,630 --> 00:11:04,880
over here is being packed up and stacked

309
00:11:08,630 --> 00:11:06,640
and getting ready for shipment we're

310
00:11:10,790 --> 00:11:08,640
going to be shipping the spacecraft at

311
00:11:13,030 --> 00:11:10,800
the end of this month on april 29th it

312
00:11:15,030 --> 00:11:13,040
will be brought to march air force base

313
00:11:17,269 --> 00:11:15,040

it'll be in a special shipping container

314
00:11:20,310 --> 00:11:17,279
it will be put on a c17

315
00:11:21,910 --> 00:11:20,320
and flown directly into cape canaveral

316
00:11:24,790 --> 00:11:21,920
and then we will

317
00:11:27,110 --> 00:11:24,800
open it up do some more testing and get

318
00:11:28,949 --> 00:11:27,120
ready to start integrating it

319
00:11:33,269 --> 00:11:28,959
loading it on top of the rocket that'll

320
00:11:35,990 --> 00:11:33,279
launch it uh from cape canaveral and

321
00:11:38,310 --> 00:11:36,000
our plan is to launch in august of this

322
00:11:40,310 --> 00:11:38,320
year and get it on its way

323
00:11:42,310 --> 00:11:40,320
from there that's when the actual

324
00:11:44,230 --> 00:11:42,320
mission so to say starts as opposed to

325
00:11:45,670 --> 00:11:44,240
just the project in the building

326
00:11:46,630 --> 00:11:45,680
it's gonna take us three and a half

327
00:11:49,350 --> 00:11:46,640
years

328
00:11:51,269 --> 00:11:49,360
to fly out to psyche we're gonna spiral

329
00:11:53,269 --> 00:11:51,279
out we're gonna pass mars and get a

330
00:11:55,590 --> 00:11:53,279
gravity assist we're gonna use our

331
00:11:56,790 --> 00:11:55,600
electric propulsion engines to thrust

332
00:11:58,949 --> 00:11:56,800
all the way

333
00:12:02,470 --> 00:11:58,959
spiral out catch up with psyche in its

334
00:12:04,790 --> 00:12:02,480
orbit it's way on the outer edge of the

335
00:12:06,790 --> 00:12:04,800
main asteroid belt which is between mars

336
00:12:08,310 --> 00:12:06,800
and jupiter so it's way out there three

337
00:12:14,310 --> 00:12:08,320
times the distance

338
00:12:15,910 --> 00:12:14,320

sun as the earth is so way out there

339
00:12:19,190 --> 00:12:15,920
we'll take three and a half years and

340
00:12:21,750 --> 00:12:19,200
then we will spend two years at psyche

341
00:12:23,990 --> 00:12:21,760
orbiting at successively lower and lower

342
00:12:26,550 --> 00:12:24,000
orbits to take the measurements i was

343
00:12:29,430 --> 00:12:26,560
just talking about to try and prove the

344
00:12:32,230 --> 00:12:29,440
hypothesis as to whether or not psyche

345
00:12:34,230 --> 00:12:32,240
was the core of a very early planet

346
00:12:36,389 --> 00:12:34,240
formed you know in the blink of an eye

347
00:12:39,430 --> 00:12:36,399
when the solar system was created and

348
00:12:42,069 --> 00:12:39,440
that will help us uh to confirm whether

349
00:12:44,870 --> 00:12:42,079
or not our models of the formation are

350
00:12:46,790 --> 00:12:44,880
in fact correct and if they're not the

351
00:12:50,470 --> 00:12:46,800
thing that's really cool is then this

352
00:12:53,829 --> 00:12:50,480
will be an exceptionally unique and odd

353
00:12:55,269 --> 00:12:53,839
uh discovery so no matter what happens

354
00:12:57,990 --> 00:12:55,279
this is going to be a mission of

355
00:13:00,470 --> 00:12:58,000
discovery of what we believe is a

356
00:13:02,629 --> 00:13:00,480
metallic world it was a great answer and

357
00:13:05,350 --> 00:13:02,639
a great question thank you elias we have

358
00:13:08,470 --> 00:13:05,360
another question coming in uh

359
00:13:10,870 --> 00:13:08,480
mir on facebook asks why not study the

360
00:13:12,710 --> 00:13:10,880
nearby asteroids in the asteroid cell

361
00:13:14,710 --> 00:13:12,720
why psyche

362
00:13:17,430 --> 00:13:14,720
um well this is in the asteroid belt

363
00:13:18,389 --> 00:13:17,440

it's on the outer reaches of it okay

364
00:13:21,110 --> 00:13:18,399
but

365
00:13:23,509 --> 00:13:21,120
the the little bit of data we have from

366
00:13:25,590 --> 00:13:23,519
measurements from telescopes where it's

367
00:13:28,069 --> 00:13:25,600
only four little teeny pixels in an

368
00:13:30,230 --> 00:13:28,079
image and from radar data

369
00:13:32,870 --> 00:13:30,240
leads us to the conclusion at the moment

370
00:13:36,389 --> 00:13:32,880
that it is largely metal almost all the

371
00:13:39,189 --> 00:13:36,399
other asteroids are rocky bodies

372
00:13:41,189 --> 00:13:39,199
okay this one stands out as very unique

373
00:13:43,750 --> 00:13:41,199
as having a very high

374
00:13:45,590 --> 00:13:43,760
concentration of metal to explain why

375
00:13:47,350 --> 00:13:45,600
it's so massive it's also

376
00:13:49,590 --> 00:13:47,360
very large you know many of the

377
00:13:51,189 --> 00:13:49,600
asteroids are very very small this is

378
00:13:53,430 --> 00:13:51,199
one of the larger ones it's it's

379
00:13:55,110 --> 00:13:53,440
basically the size of massachusetts

380
00:13:57,509 --> 00:13:55,120
right the entire state

381
00:13:58,470 --> 00:13:57,519
um and and that's what makes it makes it

382
00:14:02,550 --> 00:13:58,480
unique

383
00:14:05,110 --> 00:14:02,560
formation of the solar system

384
00:14:07,590 --> 00:14:05,120
uh we have two more questions coming in

385
00:14:09,910 --> 00:14:07,600
one of them is from kieran on facebook

386
00:14:12,230 --> 00:14:09,920
why haven't optical communications been

387
00:14:13,430 --> 00:14:12,240
used until now for this

388
00:14:15,509 --> 00:14:13,440

ah karen

389
00:14:17,350 --> 00:14:15,519
very good good question so obviously

390
00:14:19,750 --> 00:14:17,360
karen you know that we are flying the

391
00:14:20,629 --> 00:14:19,760
dsoc instrument the deep space optical

392
00:14:23,110 --> 00:14:20,639
comp

393
00:14:25,670 --> 00:14:23,120
that's actually not part of the science

394
00:14:28,150 --> 00:14:25,680
of this mission but we are hosting that

395
00:14:31,430 --> 00:14:28,160
instrument as a technology demonstration

396
00:14:33,030 --> 00:14:31,440
for nasa right so

397
00:14:35,910 --> 00:14:33,040
it happens that that instrument was also

398
00:14:37,910 --> 00:14:35,920
developed here at jpl and the goal is to

399
00:14:39,910 --> 00:14:37,920
try and come up with the means

400
00:14:42,310 --> 00:14:39,920
to communicate with spacecraft in the

401
00:14:44,629 --> 00:14:42,320
future with much higher bandwidth so

402
00:14:46,710 --> 00:14:44,639
that we can have live videos like this

403
00:14:49,110 --> 00:14:46,720
from mars that's exactly what we're

404
00:14:51,509 --> 00:14:49,120
trying to to show how to do that

405
00:14:53,829 --> 00:14:51,519
so that instrument will be communicating

406
00:14:55,829 --> 00:14:53,839
with laser light as opposed to radio

407
00:14:57,670 --> 00:14:55,839
frequency

408
00:14:59,189 --> 00:14:57,680
sending signals right back down to a

409
00:15:01,269 --> 00:14:59,199
telescope here

410
00:15:03,750 --> 00:15:01,279
in california the palomar telescope

411
00:15:06,389 --> 00:15:03,760
where they can detect the individual

412
00:15:07,990 --> 00:15:06,399
photons coming from the spacecraft and

413
00:15:11,269 --> 00:15:08,000

you'll be able to communicate at much

414
00:15:14,230 --> 00:15:11,279
higher rates why why not more

415
00:15:16,550 --> 00:15:14,240
sooner than this yeah well

416
00:15:18,870 --> 00:15:16,560
it is a really really difficult thing to

417
00:15:20,870 --> 00:15:18,880
do you were talking about really large

418
00:15:23,910 --> 00:15:20,880
distances to communicate

419
00:15:25,030 --> 00:15:23,920
and you have to have enough energy

420
00:15:28,310 --> 00:15:25,040
uh to

421
00:15:31,269 --> 00:15:28,320
uh send a light beam down and collect it

422
00:15:33,590 --> 00:15:31,279
when it hits earth right and that

423
00:15:35,590 --> 00:15:33,600
beam is gonna you know expand out and

424
00:15:36,550 --> 00:15:35,600
and get lower and lower power as it gets

425
00:15:39,269 --> 00:15:36,560
to you

426
00:15:40,470 --> 00:15:39,279
so the technology that's a technology

427
00:15:41,829 --> 00:15:40,480
demonstration

428
00:15:43,350 --> 00:15:41,839
of how to

429
00:15:45,749 --> 00:15:43,360
not just

430
00:15:47,269 --> 00:15:45,759
detect a burst of light coming and

431
00:15:48,790 --> 00:15:47,279
telling you what the spacecraft is

432
00:15:51,509 --> 00:15:48,800
trying to say do it down to the

433
00:15:53,269 --> 00:15:51,519
elemental each individual photon is what

434
00:15:54,550 --> 00:15:53,279
makes that instrument so incredibly

435
00:15:55,990 --> 00:15:54,560
sophisticated

436
00:15:57,910 --> 00:15:56,000
in terms of its pointing and

437
00:15:59,430 --> 00:15:57,920
communication ability so

438
00:16:00,870 --> 00:15:59,440

it's taken a long time to get there and

439
00:16:03,430 --> 00:16:00,880
we're looking forward to that being

440
00:16:04,949 --> 00:16:03,440
equally successful to help all our

441
00:16:07,430 --> 00:16:04,959
future missions particularly those to

442
00:16:09,350 --> 00:16:07,440
mars right we've got human exploration

443
00:16:10,629 --> 00:16:09,360
coming up eventually we'd like to have

444
00:16:13,110 --> 00:16:10,639
live video

445
00:16:15,350 --> 00:16:13,120
yes that would be wonderful to see and

446
00:16:16,150 --> 00:16:15,360
the final question we have

447
00:16:17,590 --> 00:16:16,160
is

448
00:16:20,870 --> 00:16:17,600
here and on

449
00:16:23,110 --> 00:16:20,880
oh it's actually terry on facebook i'll

450
00:16:25,110 --> 00:16:23,120
kind of chime in too terry wants to know

451
00:16:27,030 --> 00:16:25,120
what is the most anxiety-inducing part

452
00:16:30,389 --> 00:16:27,040
of the project but also for you what is

453
00:16:33,189 --> 00:16:30,399
the most exciting part

454
00:16:35,670 --> 00:16:33,199
what's the anxiety part

455
00:16:37,990 --> 00:16:35,680
i guess is just

456
00:16:40,150 --> 00:16:38,000
missions like this you can't just launch

457
00:16:42,949 --> 00:16:40,160
any time you want you can't launch when

458
00:16:44,470 --> 00:16:42,959
you're ready so to say you have to it's

459
00:16:46,790 --> 00:16:44,480
planetary you've got to go with a

460
00:16:49,189 --> 00:16:46,800
specific launch window you can't move

461
00:16:51,269 --> 00:16:49,199
that around it's a really hard date

462
00:16:55,670 --> 00:16:51,279
and these are incredibly complex and

463
00:16:57,269 --> 00:16:55,680

sophisticated you know robotic explorers

464
00:16:59,269 --> 00:16:57,279
the the stress of trying to make sure

465
00:17:01,269 --> 00:16:59,279
that you get it all done and tested and

466
00:17:03,990 --> 00:17:01,279
it's ready to go on that fixed date it's

467
00:17:05,270 --> 00:17:04,000
probably the most anxiety

468
00:17:07,750 --> 00:17:05,280
written one and the second part of the

469
00:17:09,990 --> 00:17:07,760
question i'm sorry was the uh most

470
00:17:13,029 --> 00:17:10,000
exciting part for you the most exciting

471
00:17:16,949 --> 00:17:14,470
well it's kind of twofold it's the

472
00:17:18,949 --> 00:17:16,959
science right and going to explore this

473
00:17:19,909 --> 00:17:18,959
body that we no one's ever been to

474
00:17:21,909 --> 00:17:19,919
before

475
00:17:25,270 --> 00:17:21,919
right

476
00:17:26,230 --> 00:17:25,280
the second part for me as an engineer

477
00:17:29,270 --> 00:17:26,240
really

478
00:17:31,510 --> 00:17:29,280
is having the opportunity to work with a

479
00:17:33,190 --> 00:17:31,520
fabulous team of people

480
00:17:34,789 --> 00:17:33,200
specialists in all different areas and

481
00:17:37,190 --> 00:17:34,799
to orchestrate that

482
00:17:39,750 --> 00:17:37,200
in order to build these incredibly

483
00:17:42,230 --> 00:17:39,760
complicated and sophisticated uh pieces

484
00:17:44,310 --> 00:17:42,240
of equipment that is an engineer just

485
00:17:46,549 --> 00:17:44,320
just floats my book

486
00:17:48,549 --> 00:17:46,559
well this is very exciting thank you so

487
00:17:50,390 --> 00:17:48,559
much for talking to us today and there's

488
00:17:51,990 --> 00:17:50,400

lots of members of the media coming in

489
00:17:54,789 --> 00:17:52,000
right now they have questions for you as

490
00:17:57,750 --> 00:17:54,799
well so i'll let you get to that

491
00:17:59,590 --> 00:17:57,760
thank you very much thank you now psyche

492
00:18:01,750 --> 00:17:59,600
is set to launch in august from cape

493
00:18:05,830 --> 00:18:01,760
canaveral florida now to learn more

494
00:18:08,789 --> 00:18:05,840
about the mission follow at nasa gpl and

495
00:18:11,830 --> 00:18:08,799
at nasa solar system and also follow the