1
00:00:13,669 --> 00:00:12,230
hello i'm jd harrington public affairs

2
00:00:15,350 --> 00:00:13,679
officer for nasa's science mission

3
00:00:17,109 --> 00:00:15,360
directorate from washington dc and

4
00:00:19,349 --> 00:00:17,119
headquarters i'd like to welcome you

5
00:00:21,189 --> 00:00:19,359
today to the mission science briefing

6
00:00:23,189 --> 00:00:21,199
where we'll discuss the planning for

7
00:00:25,509 --> 00:00:23,199
nasa's newest spacecraft the wide field

8
00:00:27,029 --> 00:00:25,519
infrared survey explorer otherwise known

9
00:00:28,150 --> 00:00:27,039
as wise

10
00:00:30,150 --> 00:00:28,160
as for the order of events this

11
00:00:31,910 --> 00:00:30,160
afternoon we have four panelists joining

12
00:00:33,510 --> 00:00:31,920
us this afternoon each we'll give a

13
00:00:35,430 --> 00:00:33,520

short briefing and then we'll open up

14
00:00:36,549 --> 00:00:35,440
the question and answer session i'd like

15
00:00:39,270 --> 00:00:36,559
to take a moment to welcome and

16
00:00:41,510 --> 00:00:39,280
introduce our panelists to my left your

17
00:00:46,229 --> 00:00:41,520
immediate right we have ted wright the

18
00:00:50,630 --> 00:00:48,709
next to ned we have amy meinzer the wise

19
00:00:54,150 --> 00:00:50,640
deputy project scientist from the jet

20
00:00:56,869 --> 00:00:54,160
propulsion laboratory in california

21
00:01:00,470 --> 00:00:56,879
next amy peter eisenhart the wise

22
00:01:02,389 --> 00:01:00,480
project scientists also from jpl

23
00:01:04,310 --> 00:01:02,399
and next to peter john elwell the

24
00:01:05,990 --> 00:01:04,320
project manager for the wise science

25
00:01:09,109 --> 00:01:06,000
instrument for the space dynamics

26
00:01:10,310 --> 00:01:09,119
laboratory in logan utah and with that

27
00:01:12,630 --> 00:01:10,320
i'd like to hand off to the discussion

28
00:01:14,710 --> 00:01:12,640
to our first briefer ned

29
00:01:17,990 --> 00:01:14,720
thank you jd

30
00:01:20,630 --> 00:01:18,000
wise will survey the entire sky

31
00:01:22,950 --> 00:01:20,640
with much greater angular resolution and

32
00:01:25,749 --> 00:01:22,960
sensitivity than previous missions

33
00:01:27,830 --> 00:01:25,759
this means that wise will see

34
00:01:29,429 --> 00:01:27,840
much fainter objects and provide much

35
00:01:31,670 --> 00:01:29,439
sharper images

36
00:01:33,910 --> 00:01:31,680
as a result wives will see hundreds of

37
00:01:35,510 --> 00:01:33,920
millions of objects and of these

38
00:01:37,590 --> 00:01:35,520

millions will have never been seen

39
00:01:40,069 --> 00:01:37,600
before

40
00:01:41,270 --> 00:01:40,079
if i could have the animation the first

41
00:01:43,190 --> 00:01:41,280
animation

42
00:01:44,950 --> 00:01:43,200
it will show how wise is going to survey

43
00:01:46,870 --> 00:01:44,960
the whole sky you'll see wise orbiting

44
00:01:48,310 --> 00:01:46,880
around the earth over the line between

45
00:01:50,550 --> 00:01:48,320
day and night

46
00:01:51,990 --> 00:01:50,560
and as it orbits it maps out a strip of

47
00:01:54,550 --> 00:01:52,000
sky

48
00:01:56,069 --> 00:01:54,560
now as the earth goes around the sun

49
00:01:58,630 --> 00:01:56,079
the strip

50
00:02:00,630 --> 00:01:58,640
of sky being mapped shifts over until

51
00:02:02,789 --> 00:02:00,640
after six months we covered the entire

52
00:02:05,670 --> 00:02:02,799
sky in the infrared giving us an

53
00:02:08,150 --> 00:02:05,680
entirely new view of the universe

54
00:02:09,990 --> 00:02:08,160
now infrared waves are longer than

55
00:02:11,830 --> 00:02:10,000
visible light in fact the

56
00:02:15,270 --> 00:02:11,840
bands that wise

57
00:02:18,150 --> 00:02:15,280
is observing are 5 to 33 times longer

58
00:02:20,390 --> 00:02:18,160
than red light that your eye can see

59
00:02:22,869 --> 00:02:20,400
as a result wise is good for looking at

60
00:02:25,110 --> 00:02:22,879
sources of light that are cooler

61
00:02:26,869 --> 00:02:25,120
than the sun and light bulb filaments

62
00:02:29,510 --> 00:02:26,879
that provide the optical light that we

63
00:02:31,430 --> 00:02:29,520

actually look at

64
00:02:33,750 --> 00:02:31,440
now any object that's warmer than

65
00:02:35,750 --> 00:02:33,760
absolute zero radiates infrared and that

66
00:02:39,830 --> 00:02:35,760
includes objects at room temperature so

67
00:02:44,550 --> 00:02:42,390
ah yes this is a picture of me

68
00:02:46,390 --> 00:02:44,560
in the infrared and you can see what's

69
00:02:48,229 --> 00:02:46,400
happening here where my skin is warmest

70
00:02:50,869 --> 00:02:48,239
near my eyes

71
00:02:53,030 --> 00:02:50,879
it's glowing the brightest

72
00:02:55,430 --> 00:02:53,040
and where my clothes are blocking

73
00:02:58,149 --> 00:02:55,440
holding the heat of my body in

74
00:03:00,149 --> 00:02:58,159
the image is coolest so what we see are

75
00:03:03,270 --> 00:03:00,159
things that are hot are brighter than

76
00:03:06,630 --> 00:03:03,280
things that are cool in the infrared

77
00:03:07,830 --> 00:03:06,640
so previous missions going back 26 plus

78
00:03:09,589 --> 00:03:07,840
years

79
00:03:11,110 --> 00:03:09,599
have mapped the entire sky in the

80
00:03:12,949 --> 00:03:11,120
infrared already

81
00:03:16,149 --> 00:03:12,959
but let's take a picture you know look

82
00:03:18,949 --> 00:03:16,159
at the whole sky image that we have now

83
00:03:21,430 --> 00:03:18,959
that's on the next slide

84
00:03:23,350 --> 00:03:21,440
if we look at this slide we can see

85
00:03:26,390 --> 00:03:23,360
the very thin plane of the milky way and

86
00:03:27,990 --> 00:03:26,400
right into the galactic center

87
00:03:29,750 --> 00:03:28,000
this is very significant because

88
00:03:31,110 --> 00:03:29,760

normally in optical light you can't see

89
00:03:32,789 --> 00:03:31,120
it at all

90
00:03:34,949 --> 00:03:32,799
and the reason this happens is that

91
00:03:36,869 --> 00:03:34,959
infrared light can easily penetrate the

92
00:03:39,750 --> 00:03:36,879
interstellar dust that normally blocks

93
00:03:42,070 --> 00:03:39,760
our view of the center of our galaxy and

94
00:03:44,550 --> 00:03:42,080
in fact we can see radiation from this

95
00:03:47,190 --> 00:03:44,560
dust especially in regions where new

96
00:03:49,190 --> 00:03:47,200
stars are forming now

97
00:03:52,229 --> 00:03:49,200
but if we zoom into the galactic center

98
00:03:56,149 --> 00:03:54,149
okay here's the galactic center as seen

99
00:03:58,390 --> 00:03:56,159
by that mission that was launched 26

100
00:04:01,190 --> 00:03:58,400
years ago

101
00:04:03,190 --> 00:04:01,200
it only had 62 pixels in its camera and

102
00:04:05,830 --> 00:04:03,200
as a result this image of the galactic

103
00:04:07,350 --> 00:04:05,840
center is fairly blurry

104
00:04:09,589 --> 00:04:07,360
but if we

105
00:04:11,509 --> 00:04:09,599
replace that with

106
00:04:13,509 --> 00:04:11,519
you know cameras with more pixels we go

107
00:04:15,270 --> 00:04:13,519
to the next slide

108
00:04:17,270 --> 00:04:15,280
this is what wives will be able to do

109
00:04:20,069 --> 00:04:17,280
over the whole sky

110
00:04:21,430 --> 00:04:20,079
okay this because wise has four million

111
00:04:23,830 --> 00:04:21,440
pixels

112
00:04:27,510 --> 00:04:23,840
it's going to provide this much improved

113
00:04:29,749 --> 00:04:27,520

much sharper image where you can see uh

114
00:04:31,749 --> 00:04:29,759
tremendous number of sources over the

115
00:04:33,430 --> 00:04:31,759
whole sky so far only a few percent of

116
00:04:36,070 --> 00:04:33,440
the sky has been mapped with this kind

117
00:04:38,469 --> 00:04:36,080
of resolution

118
00:04:40,550 --> 00:04:38,479
so wise will provide a road map

119
00:04:44,230 --> 00:04:40,560
now this roadmap will be used by bigger

120
00:04:47,990 --> 00:04:44,240
telescopes like hubble keck the

121
00:04:51,189 --> 00:04:48,000
james webb space telescope sophia

122
00:04:52,710 --> 00:04:51,199
in order to study interesting objects

123
00:04:56,950 --> 00:04:52,720
so

124
00:04:58,710 --> 00:04:56,960
wise is going to provide

125
00:05:00,710 --> 00:04:58,720
a wide angle view it's like the

126
00:05:02,070 --> 00:05:00,720
wide-angle lens on a

127
00:05:03,990 --> 00:05:02,080
camera

128
00:05:06,310 --> 00:05:04,000
whereas these large telescopes are like

129
00:05:07,990 --> 00:05:06,320
telephoto lenses on a camera

130
00:05:10,390 --> 00:05:08,000
and you use them to provide detailed

131
00:05:12,230 --> 00:05:10,400
images and zoomed in small areas on the

132
00:05:14,629 --> 00:05:12,240
sky

133
00:05:17,189 --> 00:05:14,639
so wise is taking a four color image

134
00:05:19,430 --> 00:05:17,199
every 11 seconds this is very fast for a

135
00:05:22,070 --> 00:05:19,440
space astronomy mission and as a result

136
00:05:23,670 --> 00:05:22,080
wise will take millions of images over

137
00:05:25,350 --> 00:05:23,680
the mission

138
00:05:27,830 --> 00:05:25,360

we'll stitch these together to give a

139
00:05:30,070 --> 00:05:27,840
panoramic view of the whole sky

140
00:05:33,749 --> 00:05:30,080
and on this view we're going to see many

141
00:05:35,510 --> 00:05:33,759
interesting asteroids stars and galaxies

142
00:05:37,189 --> 00:05:35,520
but i'm sure that the most interesting

143
00:05:39,830 --> 00:05:37,199
things that we actually see are going to

144
00:05:41,909 --> 00:05:39,840
be total surprises because we just

145
00:05:43,909 --> 00:05:41,919
haven't looked at you know this volume

146
00:05:46,469 --> 00:05:43,919
of the universe before

147
00:05:47,990 --> 00:05:46,479
now i've worked on wise for 12 years

148
00:05:49,830 --> 00:05:48,000
and it's been a long haul and it's

149
00:05:53,110 --> 00:05:49,840
almost ready to launch

150
00:05:57,110 --> 00:05:53,120
but what i'm looking forward to

151
00:05:59,749 --> 00:05:57,120
this year for christmas is wise data

152
00:06:01,430 --> 00:05:59,759
now i'll pass it over to amy meinzer the

153
00:06:03,830 --> 00:06:01,440
deputy project scientist who's going to

154
00:06:05,430 --> 00:06:03,840
tell us about the interesting asteroids

155
00:06:07,590 --> 00:06:05,440
that wise will see

156
00:06:09,430 --> 00:06:07,600
well thanks a lot ned so it's really

157
00:06:11,430 --> 00:06:09,440
great to get to be here finally to tell

158
00:06:12,950 --> 00:06:11,440
you all about wise we're so close to

159
00:06:15,749 --> 00:06:12,960
launch now and it's tremendously

160
00:06:18,390 --> 00:06:15,759
exciting and as ned mentioned wise is an

161
00:06:21,110 --> 00:06:18,400
all-sky infrared survey so you can kind

162
00:06:23,830 --> 00:06:21,120
of think of it as the the gps map to the

163
00:06:25,350 --> 00:06:23,840

universe in the infrared and as such

164
00:06:26,950 --> 00:06:25,360
it's going to show us things that are

165
00:06:28,790 --> 00:06:26,960
some of the most distant

166
00:06:31,590 --> 00:06:28,800
distant objects in the universe like far

167
00:06:33,270 --> 00:06:31,600
away galaxies but it'll also teach us a

168
00:06:35,990 --> 00:06:33,280
lot about our earth's very nearest

169
00:06:38,469 --> 00:06:36,000
neighbors the asteroids and the comets

170
00:06:41,110 --> 00:06:38,479
so i have an animation here that shows

171
00:06:43,270 --> 00:06:41,120
that most asteroids in our solar system

172
00:06:45,270 --> 00:06:43,280
reside in the main asteroid belt and

173
00:06:47,029 --> 00:06:45,280
that's between mars and jupiter and you

174
00:06:49,430 --> 00:06:47,039
can see those as the blue dots or the

175
00:06:51,589 --> 00:06:49,440
bluish greenish dots in the animation

176
00:06:53,430 --> 00:06:51,599
but some asteroids have orbits that take

177
00:06:55,830 --> 00:06:53,440
them close to the earth's orbit and we

178
00:06:56,950 --> 00:06:55,840
call these the near-earth objects

179
00:06:58,629 --> 00:06:56,960
of course

180
00:07:00,230 --> 00:06:58,639
they have some potential to collide with

181
00:07:01,749 --> 00:07:00,240
the earth so we would like to learn more

182
00:07:04,070 --> 00:07:01,759
about this population of near-earth

183
00:07:06,230 --> 00:07:04,080
objects now we expect that wise will

184
00:07:08,629 --> 00:07:06,240
discover about a hundred thousand new

185
00:07:11,110 --> 00:07:08,639
asteroids in the main asteroid belt and

186
00:07:12,629 --> 00:07:11,120
several hundred new near-earth objects

187
00:07:14,469 --> 00:07:12,639
so it should teach us a lot about the

188
00:07:16,230 --> 00:07:14,479

asteroid population

189
00:07:18,469 --> 00:07:16,240
now as ned mentioned anything that's

190
00:07:20,070 --> 00:07:18,479
warmer than about absolute zero emits

191
00:07:22,390 --> 00:07:20,080
some amount of infrared light and in

192
00:07:23,430 --> 00:07:22,400
fact i'm pouring out infrared light as i

193
00:07:25,510 --> 00:07:23,440
sit here

194
00:07:27,589 --> 00:07:25,520
so since asteroids are about the same

195
00:07:29,830 --> 00:07:27,599
distance from the sun the near earth

196
00:07:31,830 --> 00:07:29,840
objects anyway as the earth we expect

197
00:07:33,350 --> 00:07:31,840
them to be about room temperature and

198
00:07:35,430 --> 00:07:33,360
that means they're going to glow very

199
00:07:38,150 --> 00:07:35,440
brightly in infrared light

200
00:07:40,070 --> 00:07:38,160
now i have a set of four sample images

201
00:07:42,309 --> 00:07:40,080
from another nasa infrared telescope

202
00:07:44,390 --> 00:07:42,319
called the spitzer space telescope and

203
00:07:46,550 --> 00:07:44,400
this is going to show you how

204
00:07:48,150 --> 00:07:46,560
infrared is a powerful tool for finding

205
00:07:50,230 --> 00:07:48,160
new asteroids and for characterizing

206
00:07:52,469 --> 00:07:50,240
them if i could have the next animation

207
00:07:54,070 --> 00:07:52,479
you can see these four frames of data

208
00:07:56,309 --> 00:07:54,080
and the reason the asteroid appears to

209
00:07:57,909 --> 00:07:56,319
jump back is because they're looped but

210
00:08:00,230 --> 00:07:57,919
basically what you're seeing is that the

211
00:08:01,909 --> 00:08:00,240
asteroid is a very red dot that's

212
00:08:03,189 --> 00:08:01,919
because it's glowing very brightly in

213
00:08:05,189 --> 00:08:03,199

the infrared

214
00:08:06,790 --> 00:08:05,199
and it's moving which makes it easy to

215
00:08:09,189 --> 00:08:06,800
distinguish from the other stars and

216
00:08:10,950 --> 00:08:09,199
galaxies in the image so wise is going

217
00:08:13,189 --> 00:08:10,960
to be a very powerful tool for finding

218
00:08:15,270 --> 00:08:13,199
new asteroids now the spitzer space

219
00:08:17,510 --> 00:08:15,280
telescope is only able to survey about

220
00:08:19,909 --> 00:08:17,520
one percent of the entire sky in detail

221
00:08:21,749 --> 00:08:19,919
as ned mentioned it's like a telephoto

222
00:08:24,230 --> 00:08:21,759
zoom lens so it's very good at getting

223
00:08:25,749 --> 00:08:24,240
detail on specific objects but if you

224
00:08:27,350 --> 00:08:25,759
really want to find a lot of new

225
00:08:29,670 --> 00:08:27,360
asteroids and comets you need to look

226
00:08:32,149 --> 00:08:29,680
over a much larger area of the sky and

227
00:08:34,070 --> 00:08:32,159
that's what wise is going to do

228
00:08:35,589 --> 00:08:34,080
so as i mentioned infrared is a very

229
00:08:37,589 --> 00:08:35,599
good way of not only just finding the

230
00:08:39,269 --> 00:08:37,599
asteroids but also characterizing them

231
00:08:41,430 --> 00:08:39,279
learning more about them

232
00:08:42,389 --> 00:08:41,440
i have here a couple of rocks

233
00:08:44,230 --> 00:08:42,399
and

234
00:08:47,430 --> 00:08:44,240
one of these rocks here as you can see

235
00:08:50,710 --> 00:08:47,440
is is small but very shiny and the other

236
00:08:52,470 --> 00:08:50,720
one here is larger but it's dark now if

237
00:08:53,670 --> 00:08:52,480
these two rocks were floating in space

238
00:08:56,070 --> 00:08:53,680

and we could look at them with a visible

239
00:08:58,070 --> 00:08:56,080
light telescope these two rocks would

240
00:09:00,550 --> 00:08:58,080
look about the same size and that's

241
00:09:02,550 --> 00:09:00,560
because the small shiny one is going to

242
00:09:03,990 --> 00:09:02,560
reflect about as much sunlight as this

243
00:09:06,230 --> 00:09:04,000
big dark one

244
00:09:08,230 --> 00:09:06,240
however with an infrared telescope we're

245
00:09:10,389 --> 00:09:08,240
actually able to see the heat that's

246
00:09:13,030 --> 00:09:10,399
being directly emitted from these two

247
00:09:15,350 --> 00:09:13,040
objects so the big dark object is going

248
00:09:17,590 --> 00:09:15,360
to emit more infrared light and it will

249
00:09:19,350 --> 00:09:17,600
appear brighter to an infrared telescope

250
00:09:21,269 --> 00:09:19,360
so this means we get a more accurate

251
00:09:22,949 --> 00:09:21,279
measurement of the object's true size

252
00:09:25,430 --> 00:09:22,959
with the infrared telescope than we do

253
00:09:28,230 --> 00:09:25,440
with a visible telescope

254
00:09:30,470 --> 00:09:28,240
so in addition to just measuring their

255
00:09:31,910 --> 00:09:30,480
sizes we can also use the infrared data

256
00:09:34,070 --> 00:09:31,920
to learn more about the asteroids

257
00:09:36,550 --> 00:09:34,080
compositions we'd like to know whether

258
00:09:39,110 --> 00:09:36,560
or not the asteroids are on average soft

259
00:09:41,350 --> 00:09:39,120
and squishy like a marshmallow or hard

260
00:09:42,870 --> 00:09:41,360
and dense like a piece of solid metal

261
00:09:44,389 --> 00:09:42,880
and that's an important thing to know if

262
00:09:46,790 --> 00:09:44,399
we are to someday plan a future

263
00:09:48,630 --> 00:09:46,800

mitigation campaign in the event in the

264
00:09:50,070 --> 00:09:48,640
unlikely event that we do discover an

265
00:09:51,670 --> 00:09:50,080
asteroid that's on a collision course

266
00:09:53,509 --> 00:09:51,680
course with the earth

267
00:09:55,829 --> 00:09:53,519
so wise will teach us a great deal about

268
00:09:57,509 --> 00:09:55,839
the asteroid population so we may not

269
00:09:58,710 --> 00:09:57,519
have bruce willis on our science team

270
00:10:01,190 --> 00:09:58,720
you know going around blowing up

271
00:10:02,949 --> 00:10:01,200
asteroids but wise will teach us about

272
00:10:04,870 --> 00:10:02,959
how many there are how many are dark

273
00:10:06,630 --> 00:10:04,880
versus how many are bright

274
00:10:08,310 --> 00:10:06,640
how big they are what their sizes are

275
00:10:10,710 --> 00:10:08,320
and what they're made out of and with

276
00:10:12,710 --> 00:10:10,720
that i'm going to hand it over to our

277
00:10:14,069 --> 00:10:12,720
project scientist peter eisenhart who's

278
00:10:16,310 --> 00:10:14,079
going to tell us about some of the other

279
00:10:19,509 --> 00:10:16,320
great science wise we'll do

280
00:10:21,190 --> 00:10:19,519
thanks amy so as we've been saying wise

281
00:10:23,430 --> 00:10:21,200
is going to observe everything in the

282
00:10:25,590 --> 00:10:23,440
universe that is further away from the

283
00:10:27,590 --> 00:10:25,600
sun than the earth is amy's just told

284
00:10:29,750 --> 00:10:27,600
you about some of the closest objects

285
00:10:30,710 --> 00:10:29,760
asteroids that come near to the earth

286
00:10:31,829 --> 00:10:30,720
i'll be

287
00:10:33,509 --> 00:10:31,839
telling you

288
00:10:35,110 --> 00:10:33,519

moving beyond the solar system and

289
00:10:36,790 --> 00:10:35,120
telling you about some of the

290
00:10:38,710 --> 00:10:36,800
superlative objects that we'll find in

291
00:10:40,310 --> 00:10:38,720
the rest of the universe including the

292
00:10:41,509 --> 00:10:40,320
nearest stars and the most luminous

293
00:10:44,470 --> 00:10:41,519
galaxies

294
00:10:46,230 --> 00:10:44,480
now in the next graphic we see

295
00:10:48,630 --> 00:10:46,240
some stars here are sun in the upper

296
00:10:50,150 --> 00:10:48,640
left and then a lower mass star and you

297
00:10:52,230 --> 00:10:50,160
can see that it's cooler and therefore

298
00:10:54,630 --> 00:10:52,240
it's putting out more of its radiation

299
00:10:56,310 --> 00:10:54,640
in the infrared as we go to lower and

300
00:10:58,470 --> 00:10:56,320
lower masses we get to about eight

301
00:11:00,630 --> 00:10:58,480
percent of the mass of the sun or

302
00:11:01,750 --> 00:11:00,640
equivalently about 80 times the mass of

303
00:11:03,910 --> 00:11:01,760
jupiter

304
00:11:06,069 --> 00:11:03,920
stars can't sustain fusion anymore

305
00:11:08,790 --> 00:11:06,079
that's the nuclear fusion reaction that

306
00:11:11,269 --> 00:11:08,800
keeps the sun hot and so over billions

307
00:11:14,310 --> 00:11:11,279
of years these failed stars or brown

308
00:11:16,630 --> 00:11:14,320
dwarfs will cool off until they become

309
00:11:18,790 --> 00:11:16,640
invisible at optical wavelengths but

310
00:11:20,310 --> 00:11:18,800
they remain bright in the infrared that

311
00:11:22,710 --> 00:11:20,320
wise will observe

312
00:11:25,030 --> 00:11:22,720
now in the next graphic we're looking at

313
00:11:27,030 --> 00:11:25,040

the known stars within about 25 light

314
00:11:28,470 --> 00:11:27,040
years of the sun this is a artist's

315
00:11:29,829 --> 00:11:28,480
visualization

316
00:11:31,509 --> 00:11:29,839
but these are all the stars that we know

317
00:11:33,110 --> 00:11:31,519
about within 25 light years of the sun

318
00:11:35,269 --> 00:11:33,120
it's right down in the middle there you

319
00:11:38,069 --> 00:11:35,279
can see that some of them are are bright

320
00:11:40,150 --> 00:11:38,079
but quite a number of them are faint

321
00:11:41,910 --> 00:11:40,160
now we know from other studies that

322
00:11:43,829 --> 00:11:41,920
there should be about as many failed

323
00:11:46,470 --> 00:11:43,839
stars or brown dwarves as there are

324
00:11:48,870 --> 00:11:46,480
ordinary stars but among these 100 or so

325
00:11:50,710 --> 00:11:48,880
nearby neighbors within 25 light years

326
00:11:52,470 --> 00:11:50,720
only a handful of those are actually

327
00:11:54,710 --> 00:11:52,480
brown dwarfs

328
00:11:56,150 --> 00:11:54,720
and there should be about equal numbers

329
00:11:57,670 --> 00:11:56,160
of brown doors and ordinary stars so

330
00:11:59,590 --> 00:11:57,680
there should be something like 100 brown

331
00:12:01,590 --> 00:11:59,600
doors in this volume of space we don't

332
00:12:03,990 --> 00:12:01,600
know where they are because they're too

333
00:12:05,110 --> 00:12:04,000
cool to emit in the optical light that

334
00:12:06,629 --> 00:12:05,120
we're studying

335
00:12:08,389 --> 00:12:06,639
what we have to do is look in the

336
00:12:09,990 --> 00:12:08,399
infrared and we have to look everywhere

337
00:12:11,750 --> 00:12:10,000
that's shown in the next graphic that's

338
00:12:13,910 --> 00:12:11,760

exactly what wise will do

339
00:12:17,030 --> 00:12:13,920
we're going to find these nearby cool

340
00:12:18,790 --> 00:12:17,040
brown doors and transform our view of

341
00:12:20,710 --> 00:12:18,800
the solar neighborhood

342
00:12:23,030 --> 00:12:20,720
now there's even a chance

343
00:12:25,190 --> 00:12:23,040
pretty good chance about 50 50 that one

344
00:12:27,910 --> 00:12:25,200
of these nearby brown dwarves might be

345
00:12:29,829 --> 00:12:27,920
closer to the sun than any star that we

346
00:12:31,750 --> 00:12:29,839
now know of the closest star that we

347
00:12:33,670 --> 00:12:31,760
know of now is called proxima centauri

348
00:12:35,269 --> 00:12:33,680
it's about four light years away and

349
00:12:37,910 --> 00:12:35,279
there could be a brown dwarf that's even

350
00:12:39,990 --> 00:12:37,920
closer there's also evidence that brown

351
00:12:41,269 --> 00:12:40,000
dwarfs host planetary systems just like

352
00:12:43,350 --> 00:12:41,279
our sun does

353
00:12:44,949 --> 00:12:43,360
and that's the type of observation that

354
00:12:46,790 --> 00:12:44,959
will be possible with a follow-up

355
00:12:49,190 --> 00:12:46,800
observation such as with the james webb

356
00:12:51,990 --> 00:12:49,200
space telescope and so

357
00:12:54,230 --> 00:12:52,000
there's a chance that the next planetary

358
00:12:56,310 --> 00:12:54,240
system beyond our own solar system

359
00:12:57,910 --> 00:12:56,320
that's visited by humanity will be

360
00:13:00,389 --> 00:12:57,920
around the brown dwarf

361
00:13:02,710 --> 00:13:00,399
that is discovered by wise

362
00:13:05,590 --> 00:13:02,720
well i'm now going to leap far beyond

363
00:13:07,190 --> 00:13:05,600

the solar system i'm going to move not

364
00:13:08,790 --> 00:13:07,200
10 light years away not hundreds of

365
00:13:10,550 --> 00:13:08,800
light years away where we expect to see

366
00:13:13,590 --> 00:13:10,560
star forming regions or forming

367
00:13:14,790 --> 00:13:13,600
planetary systems or tens of thousands

368
00:13:16,069 --> 00:13:14,800
of light years away where we'll be

369
00:13:18,230 --> 00:13:16,079
mapping out the structure of our own

370
00:13:20,389 --> 00:13:18,240
milky way galaxy i'm going to leave our

371
00:13:21,910 --> 00:13:20,399
galaxy behind entirely go millions of

372
00:13:22,870 --> 00:13:21,920
light years away as shown in the next

373
00:13:25,430 --> 00:13:22,880
graphic

374
00:13:27,670 --> 00:13:25,440
here's an example of a relatively nearby

375
00:13:29,190 --> 00:13:27,680
galaxy some millions of light years away

376
00:13:31,829 --> 00:13:29,200
it's called the cigar galaxy or

377
00:13:33,350 --> 00:13:31,839
astronomers call it messier 82. on the

378
00:13:35,030 --> 00:13:33,360
left you see

379
00:13:37,350 --> 00:13:35,040
a visible light image it looks

380
00:13:38,790 --> 00:13:37,360
relatively normal a little bit disturbed

381
00:13:41,269 --> 00:13:38,800
there's a dust lane running across the

382
00:13:42,790 --> 00:13:41,279
middle but when you look in the infrared

383
00:13:44,550 --> 00:13:42,800
in the spitzer picture shown on the

384
00:13:47,110 --> 00:13:44,560
right you can see that something truly

385
00:13:48,949 --> 00:13:47,120
dramatic and unusual is going on here

386
00:13:51,030 --> 00:13:48,959
and what's going on is that this galaxy

387
00:13:52,870 --> 00:13:51,040
is churning out new stars

388
00:13:54,949 --> 00:13:52,880

10 times higher at a rate 10 times

389
00:13:57,269 --> 00:13:54,959
higher than our our entire milky way

390
00:13:59,110 --> 00:13:57,279
galaxy even though this galaxy is

391
00:14:01,509 --> 00:13:59,120
actually quite a bit smaller than our

392
00:14:03,430 --> 00:14:01,519
own milky way galaxy there's a lot of

393
00:14:05,269 --> 00:14:03,440
dust associated with that star formation

394
00:14:06,629 --> 00:14:05,279
process and it gets heated up and starts

395
00:14:08,949 --> 00:14:06,639
glowing in the infrared and that's why

396
00:14:11,829 --> 00:14:08,959
we see that dramatic infrared picture

397
00:14:13,829 --> 00:14:11,839
well our predecessor survey the infrared

398
00:14:15,670 --> 00:14:13,839
astronomical satellite

399
00:14:17,350 --> 00:14:15,680
discovered that there's a even more

400
00:14:19,829 --> 00:14:17,360
extreme class of galaxies called

401
00:14:22,470 --> 00:14:19,839
ultraluminous infrared galaxies these

402
00:14:24,710 --> 00:14:22,480
have over a trillion times the

403
00:14:26,550 --> 00:14:24,720
luminosity of the sun most of it coming

404
00:14:28,389 --> 00:14:26,560
out in the infrared

405
00:14:30,069 --> 00:14:28,399
and they're forming stars at a rate

406
00:14:31,990 --> 00:14:30,079
dozens of times higher than the cigar

407
00:14:34,069 --> 00:14:32,000
galaxy we were just looking at maybe

408
00:14:36,470 --> 00:14:34,079
even hundreds of times higher

409
00:14:39,030 --> 00:14:36,480
now studies with spitzer have shown that

410
00:14:41,269 --> 00:14:39,040
galaxies like that are rare today but

411
00:14:42,790 --> 00:14:41,279
they were common 10 billion years ago

412
00:14:45,430 --> 00:14:42,800
when the universe was three or four

413
00:14:47,189 --> 00:14:45,440

times younger than it is today

414
00:14:49,829 --> 00:14:47,199
wise has the sensitivity we're designed

415
00:14:51,990 --> 00:14:49,839
to have the sensitivity to see

416
00:14:54,310 --> 00:14:52,000
these dusty cataclysmically forming

417
00:14:56,470 --> 00:14:54,320
galaxies out to a distance of of 10

418
00:14:58,310 --> 00:14:56,480
billion light years or even more

419
00:15:00,790 --> 00:14:58,320
and so we're going to find the most

420
00:15:03,269 --> 00:15:00,800
super duper hyper ultra luminous

421
00:15:05,750 --> 00:15:03,279
infrared forming galaxies in the entire

422
00:15:09,110 --> 00:15:05,760
universe and we'll see just how extreme

423
00:15:11,509 --> 00:15:09,120
this galaxy formation process can get

424
00:15:13,670 --> 00:15:11,519
well i've told you about some of the

425
00:15:15,189 --> 00:15:13,680
extreme examples that that wise is going

426
00:15:17,269 --> 00:15:15,199
to observe and of course we'll observe

427
00:15:20,230 --> 00:15:17,279
everything in between these nearby stars

428
00:15:22,389 --> 00:15:20,240
and brown doors but one of the most

429
00:15:23,750 --> 00:15:22,399
exciting aspects of wise uh the the

430
00:15:25,430 --> 00:15:23,760
thing that really gives it tremendous

431
00:15:27,110 --> 00:15:25,440
longevity is that you can keep coming

432
00:15:28,870 --> 00:15:27,120
back to it

433
00:15:31,590 --> 00:15:28,880
if there's some object that we discover

434
00:15:33,829 --> 00:15:31,600
years later after the survey is is long

435
00:15:35,670 --> 00:15:33,839
gone uh you can that survey will still

436
00:15:37,110 --> 00:15:35,680
be there to go back to and and see what

437
00:15:38,790 --> 00:15:37,120
the infrared properties of that new

438
00:15:40,870 --> 00:15:38,800

object were like

439
00:15:42,710 --> 00:15:40,880
today 26 years after the infrared

440
00:15:44,629 --> 00:15:42,720
astronomical satellite survey there's

441
00:15:46,629 --> 00:15:44,639
still hundreds of papers being written

442
00:15:48,790 --> 00:15:46,639
every year hundreds of new papers that

443
00:15:50,870 --> 00:15:48,800
refer to that infrared astronomical

444
00:15:52,870 --> 00:15:50,880
satellite survey and that's why we like

445
00:15:55,430 --> 00:15:52,880
to say that the legacy of all sky

446
00:15:56,710 --> 00:15:55,440
surveys will endure for decades

447
00:15:58,629 --> 00:15:56,720
and now to tell you a little bit more

448
00:16:00,870 --> 00:15:58,639
about the instrument that's going to

449
00:16:02,150 --> 00:16:00,880
carry out this super duper survey uh

450
00:16:03,590 --> 00:16:02,160
here's john elwell from the space

451
00:16:05,189 --> 00:16:03,600
dynamics lab

452
00:16:06,870 --> 00:16:05,199
thanks peter

453
00:16:08,629 --> 00:16:06,880
now that you've heard about all the

454
00:16:09,990 --> 00:16:08,639
super duper

455
00:16:11,829 --> 00:16:10,000
objects that the astronomers hope to

456
00:16:13,509 --> 00:16:11,839
discover with the images from wise i'd

457
00:16:15,189 --> 00:16:13,519
like to tell you a little bit about the

458
00:16:17,110 --> 00:16:15,199
wise instrument itself

459
00:16:19,350 --> 00:16:17,120
wise was built over the last five years

460
00:16:21,670 --> 00:16:19,360
at the space dynamics laboratory of utah

461
00:16:23,749 --> 00:16:21,680
state university in logan utah but as

462
00:16:25,590 --> 00:16:23,759
with any complex instrument it requires

463
00:16:28,069 --> 00:16:25,600

input from many organizations across the

464
00:16:29,110 --> 00:16:28,079
country including starting with jplr

465
00:16:30,629 --> 00:16:29,120
customer

466
00:16:33,110 --> 00:16:30,639
and i'll point out a few of those

467
00:16:35,269 --> 00:16:33,120
organizations as i go through

468
00:16:36,790 --> 00:16:35,279
the first graphic is a photo of the wise

469
00:16:38,389 --> 00:16:36,800
instrument

470
00:16:40,629 --> 00:16:38,399
as ad sdl

471
00:16:42,069 --> 00:16:40,639
uh wise is basically a digital camera

472
00:16:43,590 --> 00:16:42,079
just like one you'd buy and put in your

473
00:16:45,110 --> 00:16:43,600
purse or your pocket

474
00:16:47,110 --> 00:16:45,120
a little bit larger though it's about

475
00:16:48,790 --> 00:16:47,120
six feet tall it's five feet in diameter

476
00:16:51,910 --> 00:16:48,800
and the instrument weighs about 800

477
00:16:53,509 --> 00:16:51,920
pounds so why do we need an 800 pound

478
00:16:55,670 --> 00:16:53,519
camera to take digital pictures of the

479
00:16:57,590 --> 00:16:55,680
sky there are two primary reasons that

480
00:16:58,790 --> 00:16:57,600
wise is so large

481
00:17:00,710 --> 00:16:58,800
the first is that we want to take

482
00:17:02,550 --> 00:17:00,720
pictures of very faint faraway objects

483
00:17:04,150 --> 00:17:02,560
as the astronomers have described and to

484
00:17:05,029 --> 00:17:04,160
do that we have to collect a lot of

485
00:17:06,870 --> 00:17:05,039
light

486
00:17:09,990 --> 00:17:06,880
if we move to the next graphic you can

487
00:17:11,590 --> 00:17:10,000
see what wise looks like on the inside

488
00:17:13,270 --> 00:17:11,600

you can see pointed out in the drawing

489
00:17:15,590 --> 00:17:13,280
at the center of wise is a is a

490
00:17:19,429 --> 00:17:15,600
telescope this telescope is manufactured

491
00:17:21,909 --> 00:17:19,439
by l3 ssg in boston massachusetts the

492
00:17:24,470 --> 00:17:21,919
telescope collects the faint light from

493
00:17:26,630 --> 00:17:24,480
space and focuses it onto our cameras

494
00:17:28,470 --> 00:17:26,640
which we call detectors

495
00:17:29,750 --> 00:17:28,480
there are four detectors in wise you can

496
00:17:30,830 --> 00:17:29,760
see those pointed out in the drawing

497
00:17:32,789 --> 00:17:30,840
near the

498
00:17:35,270 --> 00:17:32,799
bottom and the detectors were made in

499
00:17:37,029 --> 00:17:35,280
california by drs technologies they

500
00:17:39,029 --> 00:17:37,039
received the light gathered by the

501
00:17:40,789 --> 00:17:39,039
telescope and each detector looks at a

502
00:17:42,470 --> 00:17:40,799
different color light but all the

503
00:17:46,310 --> 00:17:42,480
different colors of light that detectors

504
00:17:48,070 --> 00:17:46,320
look at are as infrared light or heat

505
00:17:50,390 --> 00:17:48,080
that brings us to the second reason that

506
00:17:52,310 --> 00:17:50,400
wise is so large because wise takes

507
00:17:53,669 --> 00:17:52,320
pictures of infrared light or heat we

508
00:17:55,909 --> 00:17:53,679
have to keep the telescope and the

509
00:17:57,510 --> 00:17:55,919
detectors themselves very cold

510
00:17:59,110 --> 00:17:57,520
otherwise all we would see is our own

511
00:18:00,950 --> 00:17:59,120
heat sort of like going out in the

512
00:18:02,470 --> 00:18:00,960
middle of the night to look at the stars

513
00:18:04,150 --> 00:18:02,480

and shining a bright flashlight in your

514
00:18:06,310 --> 00:18:04,160
own eyes

515
00:18:07,830 --> 00:18:06,320
to keep the optics cold we put wise into

516
00:18:10,310 --> 00:18:07,840
a giant thermos bottle called the

517
00:18:11,590 --> 00:18:10,320
cryostat which you can see also pointed

518
00:18:13,029 --> 00:18:11,600
out in the drawing

519
00:18:15,110 --> 00:18:13,039
the chrystal was manufactured in

520
00:18:16,470 --> 00:18:15,120
california by lockheed martin advanced

521
00:18:17,990 --> 00:18:16,480
technology center

522
00:18:20,230 --> 00:18:18,000
the class track keeps the heat from the

523
00:18:23,110 --> 00:18:20,240
sun and earth off the wise instrument

524
00:18:24,549 --> 00:18:23,120
and it lets us keep the inside cold

525
00:18:27,029 --> 00:18:24,559
but to get cold in the first place we

526
00:18:28,630 --> 00:18:27,039
need some ice cubes and for wise our ice

527
00:18:30,870 --> 00:18:28,640
is stored in some donut-shaped tanks

528
00:18:32,470 --> 00:18:30,880
inside the cryostat the dark blue donut

529
00:18:34,310 --> 00:18:32,480
around the detectors near the bottom is

530
00:18:36,549 --> 00:18:34,320
one of those tanks

531
00:18:38,470 --> 00:18:36,559
now we don't use water ice to cool wise

532
00:18:40,230 --> 00:18:38,480
because it isn't cold enough we fill the

533
00:18:42,150 --> 00:18:40,240
tanks with hydrogen ice or solid

534
00:18:44,070 --> 00:18:42,160
hydrogen which turns out to be a great

535
00:18:45,270 --> 00:18:44,080
ice cube for us

536
00:18:48,390 --> 00:18:45,280
it freezes at about the right

537
00:18:49,830 --> 00:18:48,400
temperature minus 430 degrees fahrenheit

538
00:18:51,909 --> 00:18:49,840

and it takes a lot of heat to melt

539
00:18:53,750 --> 00:18:51,919
hydrogen ice so our ice cubes last a

540
00:18:58,150 --> 00:18:53,760
long time they'll keep us cold for about

541
00:18:59,590 --> 00:18:58,160
10 months on orbit the next slide

542
00:19:01,110 --> 00:18:59,600
shows a view of the completed wise

543
00:19:02,230 --> 00:19:01,120
instrument from the point of view of a

544
00:19:03,909 --> 00:19:02,240
star

545
00:19:05,669 --> 00:19:03,919
you can see into the instrument and you

546
00:19:07,190 --> 00:19:05,679
can see the gold circle in the center is

547
00:19:08,789 --> 00:19:07,200
the first mirror of the telescope

548
00:19:11,029 --> 00:19:08,799
there's about another dozen mirrors

549
00:19:13,270 --> 00:19:11,039
after it to focus the light onto our

550
00:19:14,950 --> 00:19:13,280
detectors

551
00:19:17,270 --> 00:19:14,960
although hydrogen ice is a great way to

552
00:19:18,710 --> 00:19:17,280
keep wise cold on orbit it requires a

553
00:19:20,310 --> 00:19:18,720
lot of effort on the ground to fill the

554
00:19:22,230 --> 00:19:20,320
tanks with hydrogen and to freeze them

555
00:19:23,909 --> 00:19:22,240
the next graphic shows one of our

556
00:19:25,430 --> 00:19:23,919
technicians in the process of filling

557
00:19:27,350 --> 00:19:25,440
wise with hydrogen

558
00:19:29,029 --> 00:19:27,360
it takes us about three weeks to fill it

559
00:19:32,870 --> 00:19:29,039
slowly fill the tanks

560
00:19:35,590 --> 00:19:33,830
thank you

561
00:19:37,270 --> 00:19:35,600
it takes about three weeks to fill those

562
00:19:39,430 --> 00:19:37,280
tanks and freeze the hydrogen and to

563
00:19:41,270 --> 00:19:39,440

prepare the instrument for flight

564
00:19:43,270 --> 00:19:41,280
the photo was taken this photo was taken

565
00:19:45,990 --> 00:19:43,280
shortly before we moved wise out to the

566
00:19:48,310 --> 00:19:46,000
launch pad and put it on the rocket

567
00:19:50,470 --> 00:19:48,320
so in summary wise is basically a large

568
00:19:52,549 --> 00:19:50,480
digital camera which will take

569
00:19:55,110 --> 00:19:52,559
pictures of the sky in infrared light

570
00:19:56,870 --> 00:19:55,120
for the astronomical community

571
00:19:58,310 --> 00:19:56,880
it's been a very exciting project to be

572
00:20:00,630 --> 00:19:58,320
part of and

573
00:20:02,310 --> 00:20:00,640
with that i'll hand it back to jd

574
00:20:04,230 --> 00:20:02,320
thank you john we're now open to the

575
00:20:06,230 --> 00:20:04,240
question and answer session

576
00:20:08,310 --> 00:20:06,240
if you would as a reminder please wait

577
00:20:10,390 --> 00:20:08,320
until we get the microphone to you uh

578
00:20:12,950 --> 00:20:10,400
start by identifying yourself and your

579
00:20:14,230 --> 00:20:12,960
media affiliation and if you would

580
00:20:16,470 --> 00:20:14,240
direct your question to a specific

581
00:20:19,430 --> 00:20:16,480
panelist to avoid any confusion we ask

582
00:20:20,870 --> 00:20:19,440
that you remain seated and refrain from

583
00:20:22,390 --> 00:20:20,880
leaving the room until the conference

584
00:20:23,750 --> 00:20:22,400
actually ends with that do we have any

585
00:20:25,750 --> 00:20:23,760
questions here in the in the off

586
00:20:27,830 --> 00:20:25,760
audience okay stand by

587
00:20:29,590 --> 00:20:27,840
hi nora wallace santa barbara news press

588
00:20:31,430 --> 00:20:29,600

perhaps this is for dr eisenhart but

589
00:20:33,190 --> 00:20:31,440
anybody could address it i tried it the

590
00:20:34,470 --> 00:20:33,200
previous panel but i'm looking for i

591
00:20:37,029 --> 00:20:34,480
understand the wow factor of the

592
00:20:38,630 --> 00:20:37,039
scientist science and this and why you

593
00:20:40,390 --> 00:20:38,640
all are excited about it but why should

594
00:20:42,230 --> 00:20:40,400
someone on the ground someone that we

595
00:20:43,590 --> 00:20:42,240
write for every day be interested in

596
00:20:45,990 --> 00:20:43,600
this mission

597
00:20:47,270 --> 00:20:46,000
what does it mean for their lives

598
00:20:48,789 --> 00:20:47,280
sure i'll take that

599
00:20:50,710 --> 00:20:48,799
uh

600
00:20:53,029 --> 00:20:50,720
well when i was a little kid i i used to

601
00:20:54,390 --> 00:20:53,039
wonder how could anybody not be

602
00:20:56,630 --> 00:20:54,400
interested in the whole universe and i

603
00:20:58,789 --> 00:20:56,640
think i think that childlike wonder at

604
00:21:00,950 --> 00:20:58,799
what's in the universe is is still there

605
00:21:02,710 --> 00:21:00,960
in all of us and so you know at the most

606
00:21:04,310 --> 00:21:02,720
basic level we're seeing everything in

607
00:21:05,510 --> 00:21:04,320
the universe and and we're really

608
00:21:08,390 --> 00:21:05,520
uncovering

609
00:21:10,149 --> 00:21:08,400
new panoply's of of of the universe that

610
00:21:13,350 --> 00:21:10,159
that haven't been done before but in

611
00:21:15,830 --> 00:21:13,360
terms of more immediate concerns as amy

612
00:21:17,350 --> 00:21:15,840
described we're going to learn a lot

613
00:21:19,430 --> 00:21:17,360

about the

614
00:21:21,029 --> 00:21:19,440
risks associated with the near-earth

615
00:21:23,270 --> 00:21:21,039
object population

616
00:21:25,430 --> 00:21:23,280
now that's not to overstate that risk

617
00:21:27,430 --> 00:21:25,440
but it's not a trivial risk either after

618
00:21:30,390 --> 00:21:27,440
all the dinosaurs we now believe were

619
00:21:32,390 --> 00:21:30,400
wiped out by a fairly large asteroid and

620
00:21:35,430 --> 00:21:32,400
and we still don't know that much about

621
00:21:37,510 --> 00:21:35,440
the total numbers or the sizes

622
00:21:39,190 --> 00:21:37,520
of the asteroid population and wise is

623
00:21:42,390 --> 00:21:39,200
really going to tell us tremendous

624
00:21:44,470 --> 00:21:42,400
amount of information about that

625
00:21:45,909 --> 00:21:44,480
and then similarly i think

626
00:21:47,909 --> 00:21:45,919
most people

627
00:21:48,789 --> 00:21:47,919
would be interested to know that there

628
00:21:50,950 --> 00:21:48,799
are

629
00:21:52,549 --> 00:21:50,960
all these nearby stars out there that we

630
00:21:54,230 --> 00:21:52,559
haven't yet discovered

631
00:21:56,070 --> 00:21:54,240
and to me i think that's probably the

632
00:21:57,990 --> 00:21:56,080
most exciting

633
00:22:00,230 --> 00:21:58,000
discovery that we hope that wise will

634
00:22:02,230 --> 00:22:00,240
make of course we can't guarantee that

635
00:22:04,070 --> 00:22:02,240
there will be a brown dwarf closer than

636
00:22:05,750 --> 00:22:04,080
any star we now know of but we can

637
00:22:08,390 --> 00:22:05,760
guarantee that there will be lots and

638
00:22:12,230 --> 00:22:08,400

lots of nearby stars discovered by wise

639
00:22:14,710 --> 00:22:12,240
that we don't know about now

640
00:22:16,549 --> 00:22:14,720
all right any other questions

641
00:22:19,830 --> 00:22:16,559
all right scully santa maria times the

642
00:22:22,710 --> 00:22:19,840
long poke record um how long

643
00:22:24,789 --> 00:22:22,720
or once the the hydrogen is gone and um

644
00:22:26,310 --> 00:22:24,799
is there any kind of mission left or is

645
00:22:29,270 --> 00:22:26,320
the mission pretty much from your

646
00:22:31,990 --> 00:22:29,280
standpoint gone at that point

647
00:22:35,110 --> 00:22:32,000
i can answer that the

648
00:22:37,270 --> 00:22:35,120
hydrogen is essential for operating the

649
00:22:38,630 --> 00:22:37,280
long wavelength two bands

650
00:22:40,310 --> 00:22:38,640
of wise

651
00:22:42,310 --> 00:22:40,320
but we believe that the short wavelength

652
00:22:44,390 --> 00:22:42,320
two bands will still operate

653
00:22:46,950 --> 00:22:44,400
even after the hydrogen is gone the

654
00:22:49,029 --> 00:22:46,960
interior of wise will still be very cold

655
00:22:51,909 --> 00:22:49,039
uh about liquid nitrogen temperature

656
00:22:53,590 --> 00:22:51,919
instead of solid hydrogen temperature

657
00:22:56,710 --> 00:22:53,600
and so there is the possibility of a

658
00:22:58,950 --> 00:22:56,720
warm mission so we may

659
00:23:01,029 --> 00:22:58,960
funding permitting continue operating

660
00:23:03,270 --> 00:23:01,039
for three months after the

661
00:23:08,149 --> 00:23:03,280
hydrogen runs out to complete a second

662
00:23:11,510 --> 00:23:09,830
all right any additional questions all

663
00:23:13,830 --> 00:23:11,520

right nora wallace again dr eisenhardt

664
00:23:15,430 --> 00:23:13,840
i'm not picking on you but um this comes

665
00:23:16,950 --> 00:23:15,440
back also from the november press

666
00:23:18,470 --> 00:23:16,960
conference but you talked and today as

667
00:23:20,950 --> 00:23:18,480
well about the scientific studies

668
00:23:22,549 --> 00:23:20,960
conducted from the mission in 83 and you

669
00:23:24,950 --> 00:23:22,559
spoke about hundreds of papers every

670
00:23:26,950 --> 00:23:24,960
year what's the expectation

671
00:23:28,870 --> 00:23:26,960
for wise i mean are people

672
00:23:30,870 --> 00:23:28,880
lined up scientists lined up waiting for

673
00:23:33,110 --> 00:23:30,880
this data not just for christmas but

674
00:23:34,710 --> 00:23:33,120
they are we have uh because we're

675
00:23:36,390 --> 00:23:34,720
observing the whole universe we actually

676
00:23:38,470 --> 00:23:36,400
have a fairly sizable science team we

677
00:23:40,789 --> 00:23:38,480
have 21 members on our science team that

678
00:23:42,470 --> 00:23:40,799
study everything from asteroids to

679
00:23:44,310 --> 00:23:42,480
distant quasars to the structure of the

680
00:23:45,190 --> 00:23:44,320
whole universe

681
00:23:47,750 --> 00:23:45,200
and

682
00:23:50,789 --> 00:23:47,760
we've been getting i would say

683
00:23:53,110 --> 00:23:50,799
several inquiries every day now about

684
00:23:56,549 --> 00:23:53,120
somebody wants an early look at the wise

685
00:23:58,230 --> 00:23:56,559
data can we just give them a sneak peek

686
00:23:59,830 --> 00:23:58,240
just as it's coming out

687
00:24:01,909 --> 00:23:59,840
and we can't really respond to every

688
00:24:03,909 --> 00:24:01,919

request like that because

689
00:24:06,390 --> 00:24:03,919
we're actually working very hard to get

690
00:24:07,990 --> 00:24:06,400
the data out to everybody as fast as we

691
00:24:10,149 --> 00:24:08,000
possibly can

692
00:24:12,390 --> 00:24:10,159
so there's there's a lot of interest

693
00:24:13,990 --> 00:24:12,400
we've been talking with

694
00:24:15,990 --> 00:24:14,000
other all sky surveys

695
00:24:18,070 --> 00:24:16,000
such as the the planck satellite which

696
00:24:19,590 --> 00:24:18,080
last launched earlier this year we've

697
00:24:21,430 --> 00:24:19,600
just concluded some preliminary

698
00:24:23,350 --> 00:24:21,440
agreements with them about

699
00:24:24,789 --> 00:24:23,360
looking for sources that match up with

700
00:24:26,630 --> 00:24:24,799
the planck survey

701
00:24:28,070 --> 00:24:26,640
and we're exploring

702
00:24:32,710 --> 00:24:28,080
similar

703
00:24:39,029 --> 00:24:32,720
sky surveys so i would say the the

704
00:24:42,310 --> 00:24:40,950
another question

705
00:24:43,669 --> 00:24:42,320
sorry

706
00:24:45,590 --> 00:24:43,679
and i don't know who to address this to

707
00:24:47,510 --> 00:24:45,600
but i wondered i don't cover the james

708
00:24:49,029 --> 00:24:47,520
webb mission and i haven't learned so

709
00:24:51,269 --> 00:24:49,039
much about it so i'll apologize from

710
00:24:53,510 --> 00:24:51,279
that standpoint but can it be adjusted

711
00:24:55,510 --> 00:24:53,520
at all depending on what wise fines can

712
00:24:56,870 --> 00:24:55,520
its mission be

713
00:24:59,029 --> 00:24:56,880

retract

714
00:25:00,549 --> 00:24:59,039
take this uh the james webb space

715
00:25:03,269 --> 00:25:00,559
telescope

716
00:25:05,510 --> 00:25:03,279
will be a pointed observatory

717
00:25:06,630 --> 00:25:05,520
so it will only image a small part of

718
00:25:08,470 --> 00:25:06,640
the sky

719
00:25:11,350 --> 00:25:08,480
and you need to point it at an

720
00:25:13,190 --> 00:25:11,360
interesting field in order to get you

721
00:25:15,430 --> 00:25:13,200
know the optimum results

722
00:25:17,830 --> 00:25:15,440
and so in fact

723
00:25:20,549 --> 00:25:17,840
sources that wise fines

724
00:25:22,549 --> 00:25:20,559
will be rather high on the list i expect

725
00:25:24,470 --> 00:25:22,559
of targets that the james webb space

726
00:25:26,230 --> 00:25:24,480
telescope's looking at

727
00:25:28,390 --> 00:25:26,240
and so while it's not changing the

728
00:25:29,909 --> 00:25:28,400
design of the james webb space telescope

729
00:25:32,070 --> 00:25:29,919
before it gets built

730
00:25:34,070 --> 00:25:32,080
it will definitely change the scientific

731
00:25:37,590 --> 00:25:34,080
program of the james webb telescope once

732
00:25:40,710 --> 00:25:39,110
okay another question here in the front

733
00:25:42,470 --> 00:25:40,720
when should the from

734
00:25:46,310 --> 00:25:42,480
people who are so eager for the images

735
00:25:50,870 --> 00:25:48,470
i could answer that uh we have a

736
00:25:52,549 --> 00:25:50,880
we have a commitment to release images

737
00:25:53,590 --> 00:25:52,559
uh within one month of the start of the

738
00:25:55,430 --> 00:25:53,600

survey

739
00:25:57,750 --> 00:25:55,440
and so we'll definitely be doing that

740
00:26:00,310 --> 00:25:57,760
and i expect we'll as we uncover

741
00:26:02,230 --> 00:26:00,320
particularly spectacular interesting

742
00:26:03,990 --> 00:26:02,240
objects as we're as we're pouring over

743
00:26:05,750 --> 00:26:04,000
the data making sure that it has the

744
00:26:07,590 --> 00:26:05,760
quality that we need it to

745
00:26:09,669 --> 00:26:07,600
we'll probably be releasing additional

746
00:26:12,549 --> 00:26:09,679
images but the the major

747
00:26:15,110 --> 00:26:12,559
image release and catalog release

748
00:26:17,750 --> 00:26:15,120
they'll be in two phases the first one

749
00:26:20,230 --> 00:26:17,760
six months after the end of the survey

750
00:26:21,990 --> 00:26:20,240
and as john said we're expecting that

751
00:26:23,830 --> 00:26:22,000
survey to last

752
00:26:25,990 --> 00:26:23,840
the hydrogen to last about 10 months so

753
00:26:27,909 --> 00:26:26,000
that should take us through october and

754
00:26:29,750 --> 00:26:27,919
then six months after that we'll release

755
00:26:32,950 --> 00:26:29,760
the first half of the survey data and

756
00:26:35,510 --> 00:26:32,960
that will be out in april of 2011.

757
00:26:38,149 --> 00:26:35,520
and then a second and final release will

758
00:26:39,669 --> 00:26:38,159
be not quite a year later in march of

759
00:26:41,750 --> 00:26:39,679
2012.

760
00:26:44,230 --> 00:26:41,760
now that may seem like a long time to

761
00:26:46,630 --> 00:26:44,240
reporters but in fact for astronomers

762
00:26:48,710 --> 00:26:46,640
this is a frighteningly rapid

763
00:26:50,310 --> 00:26:48,720

release because uh it's just a

764
00:26:52,149 --> 00:26:50,320
tremendous amount of data and we have to

765
00:26:52,870 --> 00:26:52,159
get it right we don't want to be putting

766
00:26:54,470 --> 00:26:52,880
out

767
00:26:56,149 --> 00:26:54,480
poor quality data we don't want people

768
00:26:59,029 --> 00:26:56,159
to be finding

769
00:27:00,549 --> 00:26:59,039
detector defects or little glints from

770
00:27:02,710 --> 00:27:00,559
the moon or something like we want to be

771
00:27:04,630 --> 00:27:02,720
sure that sources in that catalog are

772
00:27:06,710 --> 00:27:04,640
reliable and worthy of follow-up with

773
00:27:09,990 --> 00:27:06,720
the james webb or or the keck telescope

774
00:27:12,230 --> 00:27:10,000
or or other telescopes

775
00:27:13,269 --> 00:27:12,240
all right

776
00:27:15,590 --> 00:27:13,279
no problem

777
00:27:17,430 --> 00:27:15,600
um dr mainzer in november and also um dr

778
00:27:19,830 --> 00:27:17,440
eisenhower in this press conference you

779
00:27:21,190 --> 00:27:19,840
both talked about mitigation measures

780
00:27:23,430 --> 00:27:21,200
for better planning

781
00:27:24,710 --> 00:27:23,440
for the unknown asteroids and i noticed

782
00:27:26,630 --> 00:27:24,720
that some of the media coverage after

783
00:27:28,470 --> 00:27:26,640
november talked that that was what they

784
00:27:33,350 --> 00:27:28,480
highlighted and i wanted to talk to you

785
00:27:37,750 --> 00:27:36,070
i don't know analysis or campaigns to to

786
00:27:39,990 --> 00:27:37,760
help the government of

787
00:27:42,630 --> 00:27:40,000
if something like this were to emerge

788
00:27:44,710 --> 00:27:42,640

well i would say that the the best uh

789
00:27:47,029 --> 00:27:44,720
mitigation strategy if you will for

790
00:27:49,190 --> 00:27:47,039
asteroids that wise can contribute is

791
00:27:51,510 --> 00:27:49,200
prevention the best thing to do is learn

792
00:27:53,590 --> 00:27:51,520
more about the asteroid population as of

793
00:27:55,350 --> 00:27:53,600
today we know of approximately six

794
00:27:56,630 --> 00:27:55,360
thousand near-earth objects whose orbits

795
00:27:57,669 --> 00:27:56,640
take them close to the earth now that

796
00:27:59,750 --> 00:27:57,679
doesn't mean that they're going to hit

797
00:28:00,950 --> 00:27:59,760
the earth but it means that their orbits

798
00:28:02,789 --> 00:28:00,960
are close enough that we want to pay

799
00:28:04,950 --> 00:28:02,799
some attention to them that's about 6

800
00:28:06,950 --> 00:28:04,960
000 objects and we estimate though that

801
00:28:08,070 --> 00:28:06,960
the total population is in the tens of

802
00:28:10,389 --> 00:28:08,080
thousands

803
00:28:12,389 --> 00:28:10,399
so we only actually have identified a

804
00:28:13,909 --> 00:28:12,399
fairly small fraction of the total

805
00:28:15,590 --> 00:28:13,919
population of the earth objects out

806
00:28:17,590 --> 00:28:15,600
there so we would like to know more

807
00:28:19,110 --> 00:28:17,600
about the population and that's what

808
00:28:21,269 --> 00:28:19,120
wise is going to teach us it will tell

809
00:28:23,350 --> 00:28:21,279
us about how many there are what their

810
00:28:24,870 --> 00:28:23,360
true size distribution looks like so how

811
00:28:26,470 --> 00:28:24,880
many of what size

812
00:28:28,070 --> 00:28:26,480
how many dark ones are there how many

813
00:28:29,510 --> 00:28:28,080

bright ones are there and we'll learn

814
00:28:31,110 --> 00:28:29,520
something about their compositions and

815
00:28:32,070 --> 00:28:31,120
that's going to help guide future

816
00:28:33,830 --> 00:28:32,080
missions

817
00:28:37,029 --> 00:28:33,840
should they need to plan an actual

818
00:28:40,950 --> 00:28:38,149
all right

819
00:28:42,230 --> 00:28:40,960
any other questions

820
00:28:44,389 --> 00:28:42,240
all right

821
00:28:45,909 --> 00:28:44,399
my last question how eager we've kind of

822
00:28:47,430 --> 00:28:45,919
heard some from

823
00:28:49,669 --> 00:28:47,440
someone but how eager are the rest of

824
00:28:51,029 --> 00:28:49,679
you to see this mission and to be this

825
00:28:52,549 --> 00:28:51,039
close to it and then

826
00:28:57,990 --> 00:28:52,559
how frustrating is it to see this

827
00:29:03,669 --> 00:29:00,710
well i could take a stab at that

828
00:29:06,389 --> 00:29:03,679
we're very eager we've been uh

829
00:29:08,310 --> 00:29:06,399
the sdl crew has been um

830
00:29:11,669 --> 00:29:08,320
servicing this instrument up here at

831
00:29:14,470 --> 00:29:11,679
vandenberg since october 23rd 24 7.

832
00:29:16,230 --> 00:29:14,480
and uh we're anxious to to see it

833
00:29:17,830 --> 00:29:16,240
launched successfully

834
00:29:19,909 --> 00:29:17,840
but not so anxious that we want to take

835
00:29:21,350 --> 00:29:19,919
risks we want it successful and if we

836
00:29:23,430 --> 00:29:21,360
need to stick around another few weeks

837
00:29:28,230 --> 00:29:23,440
to get the right weather conditions

838
00:29:31,269 --> 00:29:29,750

i would add for my part in terms of

839
00:29:32,710 --> 00:29:31,279
excitement

840
00:29:35,350 --> 00:29:32,720
i'm trying hard not to jump up and down

841
00:29:38,070 --> 00:29:36,630
all right with that we're going to close

842
00:29:39,669 --> 00:29:38,080
out our science briefing today i'd like

843
00:29:40,870 --> 00:29:39,679
to thank our panelists for taking the

844
00:29:42,710 --> 00:29:40,880
time to

845
00:29:44,149 --> 00:29:42,720
to join us today and if you'd like

846
00:29:45,590 --> 00:29:44,159
further information about the wise

847
00:29:48,389 --> 00:29:45,600
mission join us on the web at

848
00:29:50,470 --> 00:29:48,399
www.nasa.gov

849
00:29:52,710 --> 00:29:50,480
wise look forward to a great launch