
Wide-fi

1
00:00:11,190 --> 00:00:09,110
good afternoon i'm j.d harrington nasa

2
00:00:13,350 --> 00:00:11,200
public affairs officer for the science

3
00:00:15,190 --> 00:00:13,360
mission directorate in washington d.c

4
00:00:16,630 --> 00:00:15,200
i'd like to welcome you to today's media

5
00:00:18,390 --> 00:00:16,640
conference where we'll discuss the

6
00:00:20,630 --> 00:00:18,400
mission and launch of

7
00:00:22,790 --> 00:00:20,640
nasa's newest spacecraft the wide field

8
00:00:24,870 --> 00:00:22,800
in frair infrared survey explorer

9
00:00:26,790 --> 00:00:24,880
otherwise known as wise

10
00:00:29,269 --> 00:00:26,800
wise is scheduled to launch no earlier

11
00:00:31,349 --> 00:00:29,279
than december 9th aboard a united launch

12
00:00:33,990 --> 00:00:31,359
alliance delta ii rocket from nasa's

13
00:00:35,990 --> 00:00:34,000

space launch complex 2 in vandenberg air

14
00:00:38,310 --> 00:00:36,000
force base california once in orbit

15
00:00:40,869 --> 00:00:38,320
around earth wise will scan the entire

16
00:00:42,950 --> 00:00:40,879
sky and infrared wavelengths unveiling

17
00:00:44,470 --> 00:00:42,960
hundreds of thousands of asteroids and

18
00:00:46,630 --> 00:00:44,480
hundreds of millions of stars and

19
00:00:48,150 --> 00:00:46,640
galaxies during the next hour you'll

20
00:00:49,670 --> 00:00:48,160
hear what our scientists and engineers

21
00:00:51,110 --> 00:00:49,680
have been doing to prepare for this

22
00:00:52,310 --> 00:00:51,120
exciting mission

23
00:00:54,310 --> 00:00:52,320
as for the order of events this

24
00:00:55,910 --> 00:00:54,320
afternoon we'll have five panelists

25
00:00:57,350 --> 00:00:55,920
joining us each we'll give a short

26
00:00:59,750 --> 00:00:57,360
briefing and then we'll open the phone

27
00:01:01,270 --> 00:00:59,760
lines for questions and answers

28
00:01:03,670 --> 00:01:01,280
i'd like to take a moment to welcome and

29
00:01:06,230 --> 00:01:03,680
introduce our panelists joining us today

30
00:01:08,070 --> 00:01:06,240
first we have dr john morris nasa's

31
00:01:12,390 --> 00:01:08,080
astrophysics division director at nasa

32
00:01:19,510 --> 00:01:14,550
we have ned wright the wise principal

33
00:01:24,390 --> 00:01:22,870
bill iris the wise project manager from

34
00:01:27,429 --> 00:01:24,400
the jet propulsion laboratory in

35
00:01:34,230 --> 00:01:29,749
amy meinzer the wise deputy project

36
00:01:39,190 --> 00:01:36,390
and peter eisenhart the wise project

37
00:01:40,789 --> 00:01:39,200
scientist also from jpl and with that

38
00:01:43,429 --> 00:01:40,799

i'd like to hand the discussion off to

39
00:01:45,190 --> 00:01:43,439
john morris john

40
00:01:47,590 --> 00:01:45,200
hey thanks jd

41
00:01:49,749 --> 00:01:47,600
and uh welcome to everybody

42
00:01:52,550 --> 00:01:49,759
we're very excited here to be uh

43
00:01:55,350 --> 00:01:52,560
launching wise which is nasa's latest

44
00:01:57,749 --> 00:01:55,360
mission in the explorer program

45
00:01:59,749 --> 00:01:57,759
it will map the entire infrared sky to

46
00:02:03,030 --> 00:01:59,759
exquisite sensitivity

47
00:02:06,550 --> 00:02:03,040
and will enable breakthrough science

48
00:02:07,910 --> 00:02:06,560
the launch of wise caps a series of uh

49
00:02:10,150 --> 00:02:07,920
missions that have launched for the

50
00:02:11,830 --> 00:02:10,160
nasa's astrophysics division over the

51
00:02:16,550 --> 00:02:11,840
past two years

52
00:02:18,229 --> 00:02:16,560
we had uh glassed fermi in june of 2008.

53
00:02:20,830 --> 00:02:18,239
the kepler mission

54
00:02:23,589 --> 00:02:20,840
launched last march

55
00:02:26,150 --> 00:02:23,599
2009 hubble service hubble space

56
00:02:28,949 --> 00:02:26,160
telescope servicing mission 4 in may of

57
00:02:31,190 --> 00:02:28,959
2009 and then also

58
00:02:32,869 --> 00:02:31,200
the european space agency's herschel and

59
00:02:34,070 --> 00:02:32,879
planck missions on which nasa is a

60
00:02:37,350 --> 00:02:34,080
partner

61
00:02:40,070 --> 00:02:37,360
launched also in may of 2009 all those

62
00:02:43,910 --> 00:02:40,080
satellites are up uh doing great science

63
00:02:46,229 --> 00:02:43,920

now and we're about to launch wise

64
00:02:49,670 --> 00:02:46,239
so let me go to the first graphic which

65
00:02:51,509 --> 00:02:49,680
shows our current portfolio of missions

66
00:02:53,990 --> 00:02:51,519
we see along the bottom there you see

67
00:02:55,110 --> 00:02:54,000
hubble in the on the right side chandra

68
00:02:56,470 --> 00:02:55,120
and spitzer those are great

69
00:02:58,869 --> 00:02:56,480
observatories

70
00:03:02,630 --> 00:02:58,879
we've added as i mentioned kepler on the

71
00:03:05,270 --> 00:03:02,640
lower left and fermi on the upper right

72
00:03:07,190 --> 00:03:05,280
we also have the international missions

73
00:03:09,910 --> 00:03:07,200
uh that are labeled there either the

74
00:03:11,350 --> 00:03:09,920
european space agency or the japanese

75
00:03:14,229 --> 00:03:11,360
space agency

76
00:03:16,309 --> 00:03:14,239
uh on xmm integral suzaku and then

77
00:03:18,470 --> 00:03:16,319
herschel and planck as i mentioned

78
00:03:20,070 --> 00:03:18,480
we also have a very important component

79
00:03:21,509 --> 00:03:20,080
of our program

80
00:03:25,990 --> 00:03:21,519
which is the explorer program

81
00:03:28,470 --> 00:03:26,000
represented by swift rxte galex and wmap

82
00:03:30,630 --> 00:03:28,480
and now in the next graph

83
00:03:33,190 --> 00:03:30,640
we're about to add y's

84
00:03:35,509 --> 00:03:33,200
not shown to scale although i'm sure

85
00:03:37,910 --> 00:03:35,519
ned would like the 40 meter version of

86
00:03:40,309 --> 00:03:37,920
wise the 40 centimeter version is what

87
00:03:41,589 --> 00:03:40,319
this is and it's large to represent its

88
00:03:44,550 --> 00:03:41,599

newness

89
00:03:46,470 --> 00:03:44,560
now wise is going to do an infrared sky

90
00:03:49,830 --> 00:03:46,480
survey and it's going to

91
00:03:51,990 --> 00:03:49,840
add to the scientific capabilities

92
00:03:53,750 --> 00:03:52,000
of spitzer and herschel in particular

93
00:03:55,190 --> 00:03:53,760
which will be able to do follow-up

94
00:03:57,509 --> 00:03:55,200
observations

95
00:03:58,710 --> 00:03:57,519
based on new targets discovered in the y

96
00:04:01,190 --> 00:03:58,720
survey

97
00:04:02,470 --> 00:04:01,200
hubble will also be used to follow it up

98
00:04:05,030 --> 00:04:02,480
and this

99
00:04:07,589 --> 00:04:05,040
sky survey will leave a legacy for

100
00:04:09,750 --> 00:04:07,599
scientists to mine in order to support

101
00:04:12,710 --> 00:04:09,760
future missions such as sophia and the

102
00:04:15,190 --> 00:04:12,720
james webb space telescope

103
00:04:16,390 --> 00:04:15,200
finally i wanted to mention that wise is

104
00:04:18,870 --> 00:04:16,400
launching here at the end of the

105
00:04:19,749 --> 00:04:18,880
international year of astronomy

106
00:04:21,990 --> 00:04:19,759
and

107
00:04:23,909 --> 00:04:22,000
we've spent the last year along with

108
00:04:25,510 --> 00:04:23,919
many organizations around the world

109
00:04:27,270 --> 00:04:25,520
talking about the excitement of

110
00:04:30,150 --> 00:04:27,280
astronomy and astrophysics it's

111
00:04:33,270 --> 00:04:30,160
accessibility to the public and how it

112
00:04:35,510 --> 00:04:33,280
generates inspiration for students to go

113
00:04:38,150 --> 00:04:35,520

into stem careers for example

114
00:04:40,629 --> 00:04:38,160
and wise has a vigorous

115
00:04:42,469 --> 00:04:40,639
education and public outreach program

116
00:04:45,270 --> 00:04:42,479
and many teachers and students will be

117
00:04:47,590 --> 00:04:45,280
participating in that so now let me hand

118
00:04:50,070 --> 00:04:47,600
it over to the principal investigator dr

119
00:04:52,070 --> 00:04:50,080
ned wright thank you john

120
00:04:54,230 --> 00:04:52,080
so wise will survey the sky with much

121
00:04:57,110 --> 00:04:54,240
improved resolution and sensitivity than

122
00:04:59,430 --> 00:04:57,120
previous surveys this means the wives

123
00:05:01,830 --> 00:04:59,440
will get much sharper pictures

124
00:05:04,790 --> 00:05:01,840
and be able to see much fainter objects

125
00:05:07,830 --> 00:05:04,800
and as a result it will see about

126
00:05:09,029 --> 00:05:07,840
a few hundreds of millions of objects

127
00:05:10,790 --> 00:05:09,039
now

128
00:05:12,629 --> 00:05:10,800
many of these are stars and galaxies so

129
00:05:15,029 --> 00:05:12,639
we can see at other wavelengths but for

130
00:05:18,070 --> 00:05:15,039
millions of them y's will be the first

131
00:05:19,670 --> 00:05:18,080
time that we've ever seen these objects

132
00:05:22,230 --> 00:05:19,680
so let me just say a little bit about

133
00:05:24,469 --> 00:05:22,240
how wise is going to do its sky survey

134
00:05:27,110 --> 00:05:24,479
so if we have the first animation going

135
00:05:30,629 --> 00:05:27,120
we can see that wise is orbiting around

136
00:05:33,510 --> 00:05:30,639
the earth following a path across the

137
00:05:36,310 --> 00:05:33,520
line between day and night on the earth

138
00:05:38,790 --> 00:05:36,320

and as it orbits it

139
00:05:40,629 --> 00:05:38,800
surveys a strip of sky and as the earth

140
00:05:42,870 --> 00:05:40,639
orbits around the sun

141
00:05:45,350 --> 00:05:42,880
that strip of sky moves over

142
00:05:47,749 --> 00:05:45,360
and after six months we've completed to

143
00:05:49,670 --> 00:05:47,759
survey the entire sky giving us a new

144
00:05:51,749 --> 00:05:49,680
view of the universe

145
00:05:54,469 --> 00:05:51,759
now infrared waves

146
00:05:56,230 --> 00:05:54,479
are longer than the waves of optical

147
00:05:58,629 --> 00:05:56,240
light and so

148
00:06:02,390 --> 00:05:58,639
why is this looking at light waves that

149
00:06:05,990 --> 00:06:02,400
are 5 to 33 times longer than the waves

150
00:06:08,710 --> 00:06:06,000
of red light that your eyes can see

151
00:06:10,710 --> 00:06:08,720
as a result infrared bands are good for

152
00:06:13,430 --> 00:06:10,720
studying cooler objects that are cooler

153
00:06:16,230 --> 00:06:13,440
than the sun or light bulb filaments

154
00:06:17,990 --> 00:06:16,240
that produce the light we see

155
00:06:20,710 --> 00:06:18,000
now all objects that are warmer than

156
00:06:22,870 --> 00:06:20,720
absolute zero produce infrared light

157
00:06:25,909 --> 00:06:22,880
and so if we look at the next graphic

158
00:06:28,950 --> 00:06:25,919
you have an infrared picture of me

159
00:06:31,110 --> 00:06:28,960
and the warmer parts of me that's the

160
00:06:34,309 --> 00:06:31,120
skin around my eyes actually produce the

161
00:06:35,990 --> 00:06:34,319
brightest infrared radiation

162
00:06:38,550 --> 00:06:36,000
and the dimmest parts of the picture are

163
00:06:42,950 --> 00:06:38,560

where my clothes are blocking the heat

164
00:06:47,749 --> 00:06:45,350
so previous surveys

165
00:06:49,430 --> 00:06:47,759
going back 26 years have produced a

166
00:06:50,710 --> 00:06:49,440
survey of the skies shown in the next

167
00:06:53,510 --> 00:06:50,720
graphic

168
00:06:55,270 --> 00:06:53,520
so this is an image of the whole sky and

169
00:06:57,510 --> 00:06:55,280
of course it's dominated by the closest

170
00:06:59,110 --> 00:06:57,520
galaxy which is our own

171
00:07:01,029 --> 00:06:59,120
and because infrared radiation can

172
00:07:02,790 --> 00:07:01,039
penetrate through the dust that blocks

173
00:07:05,029 --> 00:07:02,800
our optical view of the center of the

174
00:07:05,749 --> 00:07:05,039
galaxy the center is quite bright as is

175
00:07:11,589 --> 00:07:05,759
the

176
00:07:13,189 --> 00:07:11,599
so it's a very thin disc that we're

177
00:07:16,070 --> 00:07:13,199
looking at

178
00:07:17,670 --> 00:07:16,080
now you can also see that the dust that

179
00:07:19,589 --> 00:07:17,680
infrared can penetrate through is

180
00:07:21,670 --> 00:07:19,599
actually radiating infrared light so you

181
00:07:23,189 --> 00:07:21,680
see the diffuse red emission in this

182
00:07:25,430 --> 00:07:23,199
false color image that's actually

183
00:07:27,270 --> 00:07:25,440
infrared radiation from dust

184
00:07:29,110 --> 00:07:27,280
and this comes primarily from regions

185
00:07:33,510 --> 00:07:29,120
where new stars are forming so this is

186
00:07:39,430 --> 00:07:36,950
so if we zoom in to the galactic center

187
00:07:41,430 --> 00:07:39,440
in the next graphic then we can see that

188
00:07:43,350 --> 00:07:41,440

previous surveys have given us a fairly

189
00:07:46,550 --> 00:07:43,360
blurry image when you actually look at

190
00:07:48,550 --> 00:07:46,560
this all sky survey carefully and that's

191
00:07:51,189 --> 00:07:48,560
because uh the camera that took this

192
00:07:52,629 --> 00:07:51,199
picture in particular only had 62 pixels

193
00:07:54,710 --> 00:07:52,639
total

194
00:07:56,629 --> 00:07:54,720
so obviously nowadays we can do much

195
00:07:59,430 --> 00:07:56,639
better and so with wise if we go to the

196
00:08:01,189 --> 00:07:59,440
next graphic you can see the kind of

197
00:08:03,510 --> 00:08:01,199
resolution we hope to achieve wise

198
00:08:05,350 --> 00:08:03,520
actually is carrying 4 million pixels so

199
00:08:07,830 --> 00:08:05,360
that's quite an improvement over 62

200
00:08:09,110 --> 00:08:07,840
pixels

201
00:08:11,029 --> 00:08:09,120
so with this

202
00:08:12,710 --> 00:08:11,039
wise

203
00:08:14,309 --> 00:08:12,720
improved resolution by the way i should

204
00:08:15,830 --> 00:08:14,319
point out this is real data here but

205
00:08:18,150 --> 00:08:15,840
we've actually only observed a very

206
00:08:19,990 --> 00:08:18,160
small slice of the sky to date

207
00:08:22,550 --> 00:08:20,000
with this improved resolution and wise

208
00:08:26,550 --> 00:08:22,560
we'll do it over the whole sky

209
00:08:28,150 --> 00:08:26,560
so wise will give us a um

210
00:08:30,710 --> 00:08:28,160
a road map

211
00:08:33,029 --> 00:08:30,720
that will be used by big telescopes as

212
00:08:34,870 --> 00:08:33,039
john mentioned we have the hubble we

213
00:08:37,430 --> 00:08:34,880

have spitzer we have herschel and we

214
00:08:39,589 --> 00:08:37,440
will have the james webb space telescope

215
00:08:41,750 --> 00:08:39,599
but wise will provide the road map so

216
00:08:44,230 --> 00:08:41,760
that they can visit or point at the most

217
00:08:46,389 --> 00:08:44,240
interesting objects in the sky

218
00:08:48,630 --> 00:08:46,399
so wise is very much like a

219
00:08:49,750 --> 00:08:48,640
wide-angle lens taking an all-sky

220
00:08:51,350 --> 00:08:49,760
picture

221
00:08:53,829 --> 00:08:51,360
and the big telescopes are like

222
00:08:56,949 --> 00:08:53,839
telephoto lenses and you know both are

223
00:08:59,750 --> 00:08:56,959
necessary for a skillful photographer

224
00:09:00,870 --> 00:08:59,760
so wise is going to be taking a lot of

225
00:09:02,870 --> 00:09:00,880
data

226
00:09:05,110 --> 00:09:02,880
so we're going to be taking a four color

227
00:09:07,030 --> 00:09:05,120
image we have four different bands every

228
00:09:09,110 --> 00:09:07,040
11 seconds and we'll be doing that

229
00:09:11,110 --> 00:09:09,120
essentially continuously throughout the

230
00:09:13,350 --> 00:09:11,120
duration of the mission and that works

231
00:09:15,110 --> 00:09:13,360
out to millions of images

232
00:09:18,230 --> 00:09:15,120
we will stitch these together to make a

233
00:09:20,070 --> 00:09:18,240
panoramic view of the whole sky

234
00:09:22,550 --> 00:09:20,080
and this will then

235
00:09:24,949 --> 00:09:22,560
reveal to us many interesting objects we

236
00:09:27,190 --> 00:09:24,959
expect certainly to see many asteroids

237
00:09:29,430 --> 00:09:27,200
stars and galaxies

238
00:09:31,829 --> 00:09:29,440

but really i'll be surprised

239
00:09:33,509 --> 00:09:31,839
if i'm not surprised by finding the

240
00:09:36,389 --> 00:09:33,519
unexpected because we're going to find

241
00:09:38,870 --> 00:09:36,399
things that nobody has imagined yet and

242
00:09:40,230 --> 00:09:38,880
with that i'll pass it on to bill iris

243
00:09:43,269 --> 00:09:40,240
thanks ned

244
00:09:45,829 --> 00:09:43,279
um i'd like to tell you about uh some of

245
00:09:48,150 --> 00:09:45,839
the who and the what of wise

246
00:09:49,590 --> 00:09:48,160
uh first the who we're a team of uh

247
00:09:51,509 --> 00:09:49,600
astronomers

248
00:09:53,269 --> 00:09:51,519
from academia and engineers from

249
00:09:56,389 --> 00:09:53,279
academia

250
00:09:59,509 --> 00:09:56,399
nasa laboratories and and industry that

251
00:10:02,949 --> 00:09:59,519
came together in 2002 to successfully

252
00:10:04,550 --> 00:10:02,959
win a competition to build wise

253
00:10:06,710 --> 00:10:04,560
uh we have people from the jet

254
00:10:08,710 --> 00:10:06,720
propulsion laboratory where we manage

255
00:10:12,310 --> 00:10:08,720
the project and where we will do mission

256
00:10:15,030 --> 00:10:12,320
operations we have astronomers from

257
00:10:17,430 --> 00:10:15,040
california institute of technology

258
00:10:19,430 --> 00:10:17,440
where at the infrared processing and

259
00:10:21,030 --> 00:10:19,440
analysis lab we will process the

260
00:10:23,750 --> 00:10:21,040
millions of pictures that ned just

261
00:10:26,630 --> 00:10:23,760
described we're going to take for wise

262
00:10:28,710 --> 00:10:26,640
we have two major subcontractors who are

263
00:10:30,829 --> 00:10:28,720

very important to our project ball

264
00:10:33,190 --> 00:10:30,839
aerospace corporation in boulder

265
00:10:36,069 --> 00:10:33,200
colorado uh built the spacecraft for

266
00:10:38,710 --> 00:10:36,079
wise and the space dynamics laboratory

267
00:10:39,750 --> 00:10:38,720
of logan utah built the instrument for

268
00:10:42,069 --> 00:10:39,760
wise

269
00:10:43,590 --> 00:10:42,079
so i'm going to shift now from

270
00:10:45,990 --> 00:10:43,600
who we are let me just say one more

271
00:10:48,710 --> 00:10:46,000
thing we are we are a part of nasa's

272
00:10:50,790 --> 00:10:48,720
explorers program that program is has a

273
00:10:52,310 --> 00:10:50,800
long and successful history and is

274
00:10:53,269 --> 00:10:52,320
managed out of the goddard space flight

275
00:10:54,069 --> 00:10:53,279
center

276
00:10:55,750 --> 00:10:54,079
um

277
00:10:57,829 --> 00:10:55,760
we we uh

278
00:10:59,190 --> 00:10:57,839
we have a satellite model here

279
00:11:01,350 --> 00:10:59,200
that i'm going to

280
00:11:03,750 --> 00:11:01,360
use to illustrate the basic design of

281
00:11:06,710 --> 00:11:03,760
wise this is about a 10th scale the

282
00:11:08,949 --> 00:11:06,720
satellite weighs about 1400 pounds

283
00:11:10,150 --> 00:11:08,959
it's got two major pieces it's got an

284
00:11:12,630 --> 00:11:10,160
instrument

285
00:11:13,990 --> 00:11:12,640
which is a basically a telescope within

286
00:11:15,350 --> 00:11:14,000
a thermos bottle i'll tell you more

287
00:11:17,990 --> 00:11:15,360
about that in a bit

288
00:11:19,990 --> 00:11:18,000

and a spacecraft down below

289
00:11:21,670 --> 00:11:20,000
which contains all of the functions

290
00:11:23,030 --> 00:11:21,680
required to power

291
00:11:24,790 --> 00:11:23,040
control

292
00:11:26,949 --> 00:11:24,800
communicate

293
00:11:28,949 --> 00:11:26,959
calculate

294
00:11:31,750 --> 00:11:28,959
the activities of the spacecraft once in

295
00:11:34,230 --> 00:11:31,760
orbit um it's got a solar panel that

296
00:11:36,470 --> 00:11:34,240
provides all the power we need about 500

297
00:11:37,829 --> 00:11:36,480
watts in orbit and

298
00:11:40,389 --> 00:11:37,839
in a large

299
00:11:42,389 --> 00:11:40,399
antenna that will point to the tracking

300
00:11:45,110 --> 00:11:42,399
data relay satellite system that nasa

301
00:11:46,150 --> 00:11:45,120
operates in an orbit much above us

302
00:11:47,430 --> 00:11:46,160
so

303
00:11:48,630 --> 00:11:47,440
on my first

304
00:11:51,829 --> 00:11:48,640
graphic

305
00:11:54,629 --> 00:11:51,839
i have a picture of the real-wise

306
00:11:57,190 --> 00:11:54,639
this is the satellite in a

307
00:11:59,750 --> 00:11:57,200
test chamber at ball aerospace

308
00:12:01,910 --> 00:11:59,760
corporation in boulder colorado

309
00:12:03,829 --> 00:12:01,920
where where the satellite was exposed

310
00:12:05,750 --> 00:12:03,839
for about two weeks to the space

311
00:12:08,550 --> 00:12:05,760
environment

312
00:12:10,710 --> 00:12:08,560
from

313
00:12:12,389 --> 00:12:10,720

in the vacuum environment of space

314
00:12:14,629 --> 00:12:12,399
that's the test went very well there you

315
00:12:16,470 --> 00:12:14,639
can see a ball aerospace technician uh

316
00:12:18,150 --> 00:12:16,480
hooking up some uh temperature

317
00:12:20,069 --> 00:12:18,160
transducers to the spacecraft and you

318
00:12:22,150 --> 00:12:20,079
can also see it's sort of obvious that

319
00:12:24,310 --> 00:12:22,160
little red thing there that's a cover

320
00:12:26,870 --> 00:12:24,320
over one of our two star trackers we in

321
00:12:28,470 --> 00:12:26,880
fact wise is one big telescope and two

322
00:12:30,870 --> 00:12:28,480
little telescopes

323
00:12:32,470 --> 00:12:30,880
this star tracker takes images visible

324
00:12:35,269 --> 00:12:32,480
images of the sky

325
00:12:37,829 --> 00:12:35,279
which it compares to image to images in

326
00:12:39,750 --> 00:12:37,839
its computer and relays information to

327
00:12:41,269 --> 00:12:39,760
the spacecraft computer as to where the

328
00:12:43,030 --> 00:12:41,279
spacecraft is pointing that's very

329
00:12:45,670 --> 00:12:43,040
important for wise to achieve its

330
00:12:46,470 --> 00:12:45,680
objective of pointing precisely at these

331
00:12:48,470 --> 00:12:46,480
uh

332
00:12:49,910 --> 00:12:48,480
million places in the sky where it will

333
00:12:50,870 --> 00:12:49,920
take its pictures

334
00:12:53,190 --> 00:12:50,880
so

335
00:12:56,230 --> 00:12:53,200
in the next photograph

336
00:12:57,590 --> 00:12:56,240
i'm switching gears now to the uh

337
00:12:59,829 --> 00:12:57,600
to the instrument

338
00:13:01,750 --> 00:12:59,839

uh here you see a technician assembling

339
00:13:04,550 --> 00:13:01,760
the instrument at the space dynamics lab

340
00:13:06,790 --> 00:13:04,560
in logan utah uh you're looking at wise

341
00:13:08,470 --> 00:13:06,800
from the point of view of a star

342
00:13:10,710 --> 00:13:08,480
the photon just before it enters the

343
00:13:12,310 --> 00:13:10,720
telescope of wise

344
00:13:13,269 --> 00:13:12,320
you're looking at the primary mirror

345
00:13:18,230 --> 00:13:13,279
it's

346
00:13:21,190 --> 00:13:18,240
behind it there are

347
00:13:22,550 --> 00:13:21,200
12 other gold-coated aluminum mirrors

348
00:13:24,550 --> 00:13:22,560
that image

349
00:13:27,269 --> 00:13:24,560
the stars onto

350
00:13:28,710 --> 00:13:27,279
the eyes of wise one of which i have

351
00:13:30,710 --> 00:13:28,720
here

352
00:13:34,069 --> 00:13:30,720
this is a

353
00:13:36,870 --> 00:13:34,079
infrared array detector it's a one mega

354
00:13:39,110 --> 00:13:36,880
megapixel array uh it doesn't look that

355
00:13:41,269 --> 00:13:39,120
much different from your digital camera

356
00:13:43,750 --> 00:13:41,279
array if you have a really uh nice one a

357
00:13:45,670 --> 00:13:43,760
big array and a new digital camera uh

358
00:13:47,269 --> 00:13:45,680
but it's very specialized it's designed

359
00:13:49,910 --> 00:13:47,279
to to uh

360
00:13:52,790 --> 00:13:49,920
to convert infrared energy into electric

361
00:13:54,310 --> 00:13:52,800
electrical signals and so these arrays

362
00:13:56,069 --> 00:13:54,320
are behind this telescope that i

363
00:13:59,230 --> 00:13:56,079

described and both the telescope and

364
00:14:02,550 --> 00:13:59,240
this array need to be cooled to minus

365
00:14:04,389 --> 00:14:02,560
440 degrees kelvin so that so that these

366
00:14:06,949 --> 00:14:04,399
objects that our astronomers want to

367
00:14:08,870 --> 00:14:06,959
detect uh can be detected rather than

368
00:14:12,310 --> 00:14:08,880
the the heat from the the objects

369
00:14:13,990 --> 00:14:12,320
themselves we do that by by cooling the

370
00:14:16,710 --> 00:14:14,000
telescope with a

371
00:14:17,750 --> 00:14:16,720
a cryostat and on my next picture you

372
00:14:20,550 --> 00:14:17,760
can see

373
00:14:23,269 --> 00:14:20,560
uh that cryostat being filled with the

374
00:14:25,189 --> 00:14:23,279
coolant which is a hydrogen gas that's

375
00:14:28,310 --> 00:14:25,199
converted to liquid

376
00:14:32,069 --> 00:14:28,320
and uh and ultimately then to a solid we

377
00:14:34,470 --> 00:14:32,079
have now 40 pounds of solid hydrogen in

378
00:14:37,030 --> 00:14:34,480
our in our cryostat some people think it

379
00:14:39,430 --> 00:14:37,040
looks like r2d2 without wheels it's kind

380
00:14:41,910 --> 00:14:39,440
of a funny looking thing it's a lot of

381
00:14:45,590 --> 00:14:41,920
complicated plumbing to do this job uh

382
00:14:47,110 --> 00:14:45,600
the job is complete now and and so we're

383
00:14:48,870 --> 00:14:47,120
ready to go and we're really excited

384
00:14:51,590 --> 00:14:48,880
about it uh

385
00:14:54,870 --> 00:14:51,600
we're going to move our satellite out to

386
00:14:57,030 --> 00:14:54,880
the pad the launch pad at vandenberg

387
00:14:58,470 --> 00:14:57,040
air force base in california on friday

388
00:15:00,310 --> 00:14:58,480

morning early in the morning when the

389
00:15:01,189 --> 00:15:00,320
wind doesn't blow we hope

390
00:15:05,750 --> 00:15:01,199
and

391
00:15:08,870 --> 00:15:05,760
uh this year

392
00:15:11,189 --> 00:15:08,880
so with that once we're in orbit uh

393
00:15:14,629 --> 00:15:11,199
we're uh at about a 200

394
00:15:16,230 --> 00:15:14,639
320 mile circular orbit from which uh

395
00:15:18,710 --> 00:15:16,240
the astronomers will be making their

396
00:15:20,470 --> 00:15:18,720
observations and and dr amy meinzer

397
00:15:22,069 --> 00:15:20,480
who's our deputy project scientist will

398
00:15:23,110 --> 00:15:22,079
tell you how much fun those are going to

399
00:15:25,030 --> 00:15:23,120
be

400
00:15:26,629 --> 00:15:25,040
all right thanks bill so i'm really

401
00:15:28,550 --> 00:15:26,639
excited to get to tell you about some of

402
00:15:30,470 --> 00:15:28,560
the science that wise is going to do

403
00:15:31,350 --> 00:15:30,480
it's a it's great that we're so close to

404
00:15:33,829 --> 00:15:31,360
launch

405
00:15:36,150 --> 00:15:33,839
and as ned and john have said wise is an

406
00:15:38,069 --> 00:15:36,160
all-sky infrared survey so you could

407
00:15:39,430 --> 00:15:38,079
kind of think of it as the google map to

408
00:15:40,949 --> 00:15:39,440
the universe

409
00:15:42,470 --> 00:15:40,959
in addition to finding some of the most

410
00:15:43,910 --> 00:15:42,480
distant objects in the universe it's

411
00:15:46,069 --> 00:15:43,920
also going to find some of those that

412
00:15:47,670 --> 00:15:46,079
are closest to our own home are in our

413
00:15:48,949 --> 00:15:47,680

own solar system and that is the

414
00:15:50,949 --> 00:15:48,959
asteroids

415
00:15:52,389 --> 00:15:50,959
so in my next animation

416
00:15:54,150 --> 00:15:52,399
you can see a

417
00:15:55,189 --> 00:15:54,160
map of our solar system it's a bird's

418
00:15:56,790 --> 00:15:55,199
eye view

419
00:15:58,230 --> 00:15:56,800
and you can see that most asteroids in

420
00:16:00,069 --> 00:15:58,240
the solar system live in the main

421
00:16:01,350 --> 00:16:00,079
asteroid belt which is between mars and

422
00:16:03,269 --> 00:16:01,360
jupiter and that's between the red and

423
00:16:04,949 --> 00:16:03,279
the purple lines in the graphic

424
00:16:06,949 --> 00:16:04,959
but there are some asteroids whose

425
00:16:08,710 --> 00:16:06,959
orbits take them close to the earth's

426
00:16:11,189 --> 00:16:08,720
and you can see those as the red dots

427
00:16:12,790 --> 00:16:11,199
here in the animation

428
00:16:15,749 --> 00:16:12,800
now it turns out that wise is going to

429
00:16:18,150 --> 00:16:15,759
be finding about 100 000 new asteroids

430
00:16:19,990 --> 00:16:18,160
in the main asteroid belt and we expect

431
00:16:22,389 --> 00:16:20,000
it's going to find several hundred new

432
00:16:23,670 --> 00:16:22,399
asteroids that get to get too close to

433
00:16:25,430 --> 00:16:23,680
earth's orbit and we call these the

434
00:16:27,430 --> 00:16:25,440
near-earth objects so these are

435
00:16:29,430 --> 00:16:27,440
asteroids and comets whose orbits take

436
00:16:31,110 --> 00:16:29,440
them close to earth's orbit

437
00:16:32,790 --> 00:16:31,120
so a hundred thousand new main belt

438
00:16:34,629 --> 00:16:32,800

asteroids and a few hundred new

439
00:16:36,870 --> 00:16:34,639
near-earth objects

440
00:16:38,949 --> 00:16:36,880
now as ned mentioned all objects that

441
00:16:41,269 --> 00:16:38,959
are hotter than absolute zero emit some

442
00:16:43,110 --> 00:16:41,279
amount of infrared radiation in fact i'm

443
00:16:45,590 --> 00:16:43,120
pouring out infrared light right now as

444
00:16:47,829 --> 00:16:45,600
i sit here and in particular objects

445
00:16:50,629 --> 00:16:47,839
that are close to room temperature emit

446
00:16:52,710 --> 00:16:50,639
very strongly in infrared light so you

447
00:16:54,389 --> 00:16:52,720
can imagine that if you take an asteroid

448
00:16:56,870 --> 00:16:54,399
and you put it at the same distance from

449
00:16:58,470 --> 00:16:56,880
the sun as the earth it's going to emit

450
00:17:00,790 --> 00:16:58,480
a lot of infrared light it's going to

451
00:17:03,269 --> 00:17:00,800
glow very brightly in infrared

452
00:17:05,270 --> 00:17:03,279
in my next animation you can see some

453
00:17:06,949 --> 00:17:05,280
sample data taken from another nasa

454
00:17:09,270 --> 00:17:06,959
infrared telescope called the spitzer

455
00:17:12,309 --> 00:17:09,280
space telescope and this shows four

456
00:17:13,590 --> 00:17:12,319
frames of actual data of an asteroid and

457
00:17:15,510 --> 00:17:13,600
it's on a loop which is why it keeps

458
00:17:17,590 --> 00:17:15,520
jumping back but you can see the

459
00:17:19,750 --> 00:17:17,600
asteroid stands out very distinctly in

460
00:17:21,429 --> 00:17:19,760
the infrared data it shows up as a red

461
00:17:23,510 --> 00:17:21,439
dot that's moving

462
00:17:25,270 --> 00:17:23,520
it's very bright in the infrared and it

463
00:17:27,350 --> 00:17:25,280

looks quite different than the stars in

464
00:17:29,350 --> 00:17:27,360
the image and because it's moving it's

465
00:17:31,669 --> 00:17:29,360
also very easy to detect

466
00:17:33,590 --> 00:17:31,679
so infrared is a very powerful way of

467
00:17:36,070 --> 00:17:33,600
finding new asteroids

468
00:17:37,909 --> 00:17:36,080
now in in fact spitzer was only able to

469
00:17:40,310 --> 00:17:37,919
survey about one percent of the entire

470
00:17:42,950 --> 00:17:40,320
sky in detail so if you want to find

471
00:17:44,549 --> 00:17:42,960
large numbers of near-earth objects like

472
00:17:46,870 --> 00:17:44,559
the asteroids and comets that we expect

473
00:17:49,029 --> 00:17:46,880
to find with wise you need to survey a

474
00:17:50,470 --> 00:17:49,039
much larger area and that's what wise is

475
00:17:53,110 --> 00:17:50,480
going to do

476
00:17:55,510 --> 00:17:53,120
so as i said we'll be finding lots of

477
00:17:58,390 --> 00:17:55,520
dark asteroids with wise

478
00:18:00,549 --> 00:17:58,400
now i have here two rocks

479
00:18:02,870 --> 00:18:00,559
and one of these rocks is sort of a

480
00:18:04,710 --> 00:18:02,880
light and shiny color and the other one

481
00:18:05,990 --> 00:18:04,720
is a much darker color sort of like a

482
00:18:08,230 --> 00:18:06,000
piece of coal

483
00:18:09,990 --> 00:18:08,240
to a visible light telescope the light

484
00:18:11,990 --> 00:18:10,000
asteroid over here is going to show up

485
00:18:14,549 --> 00:18:12,000
more distinctly because it reflects a

486
00:18:16,950 --> 00:18:14,559
lot more sunlight whereas this dark

487
00:18:18,870 --> 00:18:16,960
object over here even though it's larger

488
00:18:21,830 --> 00:18:18,880

would appear much fainter to a visible

489
00:18:23,590 --> 00:18:21,840
light telescope but in infrared light

490
00:18:25,990 --> 00:18:23,600
both of these objects look equally

491
00:18:27,750 --> 00:18:26,000
bright and in fact this dark asteroid

492
00:18:29,909 --> 00:18:27,760
over here may stand out more to an

493
00:18:31,830 --> 00:18:29,919
infrared telescope because what you're

494
00:18:33,350 --> 00:18:31,840
seeing is the heat that's being radiated

495
00:18:35,590 --> 00:18:33,360
from the asteroid

496
00:18:38,150 --> 00:18:35,600
so wise is going to find a lot of these

497
00:18:40,950 --> 00:18:38,160
dark hidden objects that are easily

498
00:18:44,150 --> 00:18:40,960
missed by visible light telescopes

499
00:18:46,310 --> 00:18:44,160
so dark asteroids can't hide from wise

500
00:18:48,150 --> 00:18:46,320
and wise will also tell us something

501
00:18:49,990 --> 00:18:48,160
about the composition of the population

502
00:18:52,310 --> 00:18:50,000
of asteroids both in the near earth

503
00:18:53,909 --> 00:18:52,320
regime and also in the main belt it's

504
00:18:55,990 --> 00:18:53,919
going to give us some information as to

505
00:18:58,630 --> 00:18:56,000
whether asteroids are typically light

506
00:19:01,350 --> 00:18:58,640
and fluffy like a marshmallow or heavy

507
00:19:04,150 --> 00:19:01,360
metal so it'll tell us about composition

508
00:19:05,990 --> 00:19:04,160
as well as the true numbers of asteroids

509
00:19:08,070 --> 00:19:06,000
so in this sense because it will help us

510
00:19:09,510 --> 00:19:08,080
find the dark hidden asteroids and

511
00:19:11,909 --> 00:19:09,520
because it's going to tell us about the

512
00:19:14,549 --> 00:19:11,919
asteroids compositions wise is going to

513
00:19:17,029 --> 00:19:14,559

help us prepare for the future so we can

514
00:19:19,029 --> 00:19:17,039
better plan mitigation campaigns for

515
00:19:20,789 --> 00:19:19,039
potentially hazardous asteroids

516
00:19:22,630 --> 00:19:20,799
and with that i'm going to pass it off

517
00:19:25,669 --> 00:19:22,640
to the mission's project scientist dr

518
00:19:27,029 --> 00:19:25,679
peter eisenhart thanks amy

519
00:19:28,470 --> 00:19:27,039
so as we've been saying why is this

520
00:19:30,230 --> 00:19:28,480
going to observe everything in the

521
00:19:31,909 --> 00:19:30,240
universe that's further away from the

522
00:19:33,669 --> 00:19:31,919
sun than the earth is and amy's just

523
00:19:34,870 --> 00:19:33,679
told you about the objects that come

524
00:19:36,950 --> 00:19:34,880
closest to the earth the nearest

525
00:19:39,270 --> 00:19:36,960
asteroids i'm going to move on out

526
00:19:41,350 --> 00:19:39,280
beyond our solar system and tell you

527
00:19:42,630 --> 00:19:41,360
about some of the superlative objects

528
00:19:44,710 --> 00:19:42,640
that we'll find in the rest of the

529
00:19:46,789 --> 00:19:44,720
universe the closest stars and the most

530
00:19:48,470 --> 00:19:46,799
luminous galaxies

531
00:19:51,029 --> 00:19:48,480
so in the next graphic

532
00:19:52,710 --> 00:19:51,039
we see a representation of several stars

533
00:19:53,990 --> 00:19:52,720
beginning with our sun in the upper left

534
00:19:56,470 --> 00:19:54,000
corner

535
00:19:58,549 --> 00:19:56,480
and then as we move to lower mass stars

536
00:20:00,390 --> 00:19:58,559
stars become cooler and therefore they

537
00:20:01,909 --> 00:20:00,400
put out more of their light in the

538
00:20:04,390 --> 00:20:01,919

infrared wavelengths that wise is

539
00:20:06,549 --> 00:20:04,400
sensitive to if we go to lower masses

540
00:20:08,870 --> 00:20:06,559
still we get to what's called a brown

541
00:20:11,029 --> 00:20:08,880
dwarf or failed star these are objects

542
00:20:13,190 --> 00:20:11,039
that have less than about eight percent

543
00:20:15,669 --> 00:20:13,200
of the mass of the sun or equivalently

544
00:20:17,270 --> 00:20:15,679
about 80 times the mass of jupiter and

545
00:20:18,950 --> 00:20:17,280
you can see jupiter there for scale it's

546
00:20:22,070 --> 00:20:18,960
only a little bit smaller but much less

547
00:20:23,830 --> 00:20:22,080
massive so these are brown dwarves or

548
00:20:25,270 --> 00:20:23,840
failed stars are putting out essentially

549
00:20:27,590 --> 00:20:25,280
all of their light in the infrared and

550
00:20:29,590 --> 00:20:27,600
they're optically invisible so wise is

551
00:20:31,110 --> 00:20:29,600
going to find lots and lots of brown

552
00:20:33,190 --> 00:20:31,120
doors

553
00:20:34,549 --> 00:20:33,200
so if we if we look at the solar

554
00:20:37,669 --> 00:20:34,559
neighborhood as shown in the next

555
00:20:39,830 --> 00:20:37,679
graphic this is a a simulation of the

556
00:20:41,350 --> 00:20:39,840
neighborhood of the sun

557
00:20:43,590 --> 00:20:41,360
using the star systems that we know

558
00:20:45,350 --> 00:20:43,600
about now going out to a distance of 25

559
00:20:47,830 --> 00:20:45,360
light years from the sun and there are

560
00:20:48,710 --> 00:20:47,840
about 100 star systems in this volume of

561
00:20:50,230 --> 00:20:48,720
space

562
00:20:51,590 --> 00:20:50,240
you can see that some of those stars are

563
00:20:53,190 --> 00:20:51,600

much brighter than the sun but a lot of

564
00:20:54,710 --> 00:20:53,200
them are fainter

565
00:20:56,950 --> 00:20:54,720
now what's interesting is that from

566
00:20:58,710 --> 00:20:56,960
previous studies astronomers know that

567
00:21:00,470 --> 00:20:58,720
there should be roughly as many fail

568
00:21:03,190 --> 00:21:00,480
stars or brown dwarfs

569
00:21:05,750 --> 00:21:03,200
that can't sustain the fusion reaction

570
00:21:07,750 --> 00:21:05,760
which is what keeps the sun warm

571
00:21:09,590 --> 00:21:07,760
as as the fusing stars that we see here

572
00:21:11,270 --> 00:21:09,600
are the ones that that stay hot and glow

573
00:21:12,789 --> 00:21:11,280
in visible light

574
00:21:15,190 --> 00:21:12,799
so

575
00:21:17,029 --> 00:21:15,200
of of these hundred nearest stars

576
00:21:19,669 --> 00:21:17,039
only a handful of those are actually

577
00:21:21,110 --> 00:21:19,679
brown dwarfs and so there should be lots

578
00:21:22,310 --> 00:21:21,120
and lots of more brown dwarfs in there

579
00:21:24,870 --> 00:21:22,320
but we just don't know where they are

580
00:21:26,789 --> 00:21:24,880
well wise is going to survey the whole

581
00:21:28,549 --> 00:21:26,799
sky and find these nearest neighbors as

582
00:21:30,630 --> 00:21:28,559
shown in the next graphic

583
00:21:33,110 --> 00:21:30,640
and that's going to transform our view

584
00:21:35,029 --> 00:21:33,120
of the solar neighborhood

585
00:21:37,590 --> 00:21:35,039
and it's possible that one of these

586
00:21:39,750 --> 00:21:37,600
nearby brown doors is even closer to the

587
00:21:41,270 --> 00:21:39,760
sun than any star that we now know of

588
00:21:43,590 --> 00:21:41,280

closest star that we know of now is

589
00:21:45,270 --> 00:21:43,600
called proxima centauri it's about four

590
00:21:46,710 --> 00:21:45,280
light years away

591
00:21:50,070 --> 00:21:46,720
brown dwarfs

592
00:21:52,230 --> 00:21:50,080
evidence for planets around them and so

593
00:21:53,909 --> 00:21:52,240
we might also be finding the nearest

594
00:21:55,750 --> 00:21:53,919
planetary systems that's evidence that

595
00:21:57,669 --> 00:21:55,760
would come from follow-up observations

596
00:21:59,190 --> 00:21:57,679
with more powerful pointer telescopes

597
00:22:00,549 --> 00:21:59,200
such as the james webb that john

598
00:22:02,870 --> 00:22:00,559
mentioned

599
00:22:04,789 --> 00:22:02,880
okay i'm now going to leap beyond

600
00:22:07,029 --> 00:22:04,799
our solar neighborhood

601
00:22:08,950 --> 00:22:07,039
i'm going to talk about

602
00:22:10,470 --> 00:22:08,960
objects that are not hundreds of light

603
00:22:12,710 --> 00:22:10,480
years away not thousands of light years

604
00:22:14,070 --> 00:22:12,720
away but millions and billions of light

605
00:22:15,590 --> 00:22:14,080
years away are going to leave our galaxy

606
00:22:17,270 --> 00:22:15,600
behind and go to

607
00:22:18,310 --> 00:22:17,280
a nearby galaxy shown in the next

608
00:22:21,029 --> 00:22:18,320
graphic

609
00:22:24,470 --> 00:22:21,039
and this one is called the cigar galaxy

610
00:22:26,870 --> 00:22:24,480
also known by astronomers as messier m82

611
00:22:29,190 --> 00:22:26,880
on the left you can see a picture of the

612
00:22:31,110 --> 00:22:29,200
cigar galaxy invisible light

613
00:22:32,230 --> 00:22:31,120

you can see that it's relatively normal

614
00:22:34,470 --> 00:22:32,240
looking it's got a little bit of

615
00:22:36,149 --> 00:22:34,480
disturbance a dustband running across it

616
00:22:37,909 --> 00:22:36,159
but when we go to the infrared view

617
00:22:40,870 --> 00:22:37,919
that's shown on the right which is from

618
00:22:42,070 --> 00:22:40,880
data from the spitzer infrared telescope

619
00:22:44,310 --> 00:22:42,080
you can see that something truly

620
00:22:47,029 --> 00:22:44,320
dramatic is going on here and what's

621
00:22:50,230 --> 00:22:47,039
going on in fact is that

622
00:22:52,710 --> 00:22:50,240
m82 the cigar galaxy is is a starburst

623
00:22:54,789 --> 00:22:52,720
galaxy it's forming stars at a very high

624
00:22:56,710 --> 00:22:54,799
rate 10 times higher than our entire

625
00:22:58,310 --> 00:22:56,720
milky way galaxy even though this is

626
00:22:59,510 --> 00:22:58,320
actually a smaller galaxy than the milky

627
00:23:01,669 --> 00:22:59,520
way

628
00:23:03,669 --> 00:23:01,679
our predecessor survey the infrared

629
00:23:05,590 --> 00:23:03,679
astronomical satellite discovered

630
00:23:08,390 --> 00:23:05,600
there's a class of objects called

631
00:23:10,470 --> 00:23:08,400
ultraluminous infrared galaxies that

632
00:23:12,070 --> 00:23:10,480
shine with the over the trillion times

633
00:23:14,549 --> 00:23:12,080
the light of the sun and most of that

634
00:23:16,710 --> 00:23:14,559
light comes out in the infrared and

635
00:23:19,190 --> 00:23:16,720
these are super star burst galaxies that

636
00:23:20,789 --> 00:23:19,200
are forming stars at a rate that's even

637
00:23:23,029 --> 00:23:20,799
dozens of times higher than the cigar

638
00:23:24,950 --> 00:23:23,039

galaxy maybe even hundreds of times

639
00:23:27,430 --> 00:23:24,960
higher so these are are really

640
00:23:29,350 --> 00:23:27,440
cataclysmic galaxies in formation

641
00:23:30,950 --> 00:23:29,360
they're rare today

642
00:23:32,310 --> 00:23:30,960
but from studies with spitzer we

643
00:23:34,149 --> 00:23:32,320
actually know that they were much more

644
00:23:35,990 --> 00:23:34,159
common 10 billion years ago when the

645
00:23:38,070 --> 00:23:36,000
universe was three or four times younger

646
00:23:40,390 --> 00:23:38,080
than it is today now wise has been

647
00:23:42,870 --> 00:23:40,400
designed so they can detect

648
00:23:44,630 --> 00:23:42,880
these cataclysmic dusty forming galaxies

649
00:23:45,750 --> 00:23:44,640
out to a distance of 10 billion light

650
00:23:47,430 --> 00:23:45,760
years

651
00:23:50,230 --> 00:23:47,440
over the entire sky so we're going to

652
00:23:51,590 --> 00:23:50,240
find the most super duper hyper ultra

653
00:23:53,750 --> 00:23:51,600
luminous forming galaxies in the

654
00:23:56,470 --> 00:23:53,760
universe and we'll see just how extreme

655
00:23:58,230 --> 00:23:56,480
this forming galaxy process can get

656
00:24:00,549 --> 00:23:58,240
and these are also going to be the most

657
00:24:02,710 --> 00:24:00,559
rewarding objects for follow-up studies

658
00:24:03,750 --> 00:24:02,720
with more powerful pointed telescopes

659
00:24:05,590 --> 00:24:03,760
such as

660
00:24:09,190 --> 00:24:05,600
upcoming sofia herschel which is in

661
00:24:11,990 --> 00:24:09,200
orbit and and the upcoming james webb

662
00:24:14,230 --> 00:24:12,000
so to sort of wrap things up here wise

663
00:24:16,630 --> 00:24:14,240

is going to carry out a sensitive

664
00:24:18,630 --> 00:24:16,640
infrared map of the entire sky and it

665
00:24:19,990 --> 00:24:18,640
will allow us to learn lots of things

666
00:24:22,310 --> 00:24:20,000
about the objects that we already know

667
00:24:24,149 --> 00:24:22,320
about and find even more superlative

668
00:24:26,149 --> 00:24:24,159
examples closest the closest stars which

669
00:24:27,269 --> 00:24:26,159
i described and the most luminous

670
00:24:29,430 --> 00:24:27,279
galaxies

671
00:24:31,350 --> 00:24:29,440
but perhaps the greatest benefit of an

672
00:24:32,950 --> 00:24:31,360
all-sky survey is that you can keep

673
00:24:34,950 --> 00:24:32,960
coming back to it

674
00:24:36,789 --> 00:24:34,960
there are objects that are likely to be

675
00:24:38,310 --> 00:24:36,799
discovered years after the y survey is

676
00:24:40,149 --> 00:24:38,320
complete and if you want to know the

677
00:24:42,230 --> 00:24:40,159
infrared properties of those objects you

678
00:24:44,070 --> 00:24:42,240
can come back to the y survey and the

679
00:24:45,990 --> 00:24:44,080
catalog and atlas will tell you all

680
00:24:47,990 --> 00:24:46,000
about it

681
00:24:50,310 --> 00:24:48,000
there are papers hundreds of papers

682
00:24:51,669 --> 00:24:50,320
being published today by astronomers

683
00:24:53,590 --> 00:24:51,679
based on the

684
00:24:55,350 --> 00:24:53,600
infrared astronomical satellite survey

685
00:24:56,950 --> 00:24:55,360
25 years ago

686
00:24:58,549 --> 00:24:56,960
still every year we get hundreds of new

687
00:25:00,230 --> 00:24:58,559
papers that refer to that survey so

688
00:25:02,230 --> 00:25:00,240

that's why we like to say that the

689
00:25:03,350 --> 00:25:02,240
legacy of all sky surveys endures for

690
00:25:04,710 --> 00:25:03,360
decades

691
00:25:07,510 --> 00:25:04,720
thanks

692
00:25:08,870 --> 00:25:07,520
and you've heard from our panelists now

693
00:25:10,710 --> 00:25:08,880
we're open to the question and answer

694
00:25:12,549 --> 00:25:10,720
portion of our briefing

695
00:25:14,230 --> 00:25:12,559
we could have the media start by

696
00:25:17,430 --> 00:25:14,240
identifying yourself your media

697
00:25:18,950 --> 00:25:17,440
affiliation and if possible please

698
00:25:21,029 --> 00:25:18,960
target your question to a specific

699
00:25:23,029 --> 00:25:21,039
panelist if at all possible to eliminate

700
00:25:25,350 --> 00:25:23,039
any confusion and for those on the phone

701
00:25:27,669 --> 00:25:25,360
bridge if you have a question

702
00:25:29,269 --> 00:25:27,679
push the star one keys on your telephone

703
00:25:30,310 --> 00:25:29,279
to let the operator know that you have a

704
00:25:36,710 --> 00:25:30,320
question

705
00:25:42,870 --> 00:25:39,830
okay we have somebody on online from jpl

706
00:25:44,630 --> 00:25:42,880
go on you're on

707
00:25:47,029 --> 00:25:44,640
hi this is emma gallegos from the

708
00:25:48,630 --> 00:25:47,039
pasadena star news and i just wanted to

709
00:25:50,710 --> 00:25:48,640
know more about what the budget is for

710
00:25:52,870 --> 00:25:50,720
wise

711
00:25:54,710 --> 00:25:52,880
i'll take that

712
00:25:57,590 --> 00:25:54,720
the budget for for the entire wise

713
00:25:59,510 --> 00:25:57,600

project is about 320 million dollars

714
00:26:01,269 --> 00:25:59,520
that includes the development of the

715
00:26:03,110 --> 00:26:01,279
satellite the development of mission

716
00:26:04,870 --> 00:26:03,120
operations execution of the mission

717
00:26:09,110 --> 00:26:04,880
operations and and

718
00:26:13,430 --> 00:26:10,470
all right thank you

719
00:26:18,310 --> 00:26:13,440
uh our next uh person on the phone is

720
00:26:22,230 --> 00:26:20,230
hi thank you um i was wondering if you

721
00:26:24,070 --> 00:26:22,240
could talk a little bit about how big

722
00:26:25,430 --> 00:26:24,080
this satellite is in terms that people

723
00:26:27,990 --> 00:26:25,440
could understand if it's i don't know

724
00:26:30,230 --> 00:26:28,000
the size of a car or a bus and then how

725
00:26:33,269 --> 00:26:30,240
far um up in our orbit will it be like

726
00:26:35,909 --> 00:26:33,279
how many miles up will it be

727
00:26:37,909 --> 00:26:35,919
let me i'll take that one too

728
00:26:39,510 --> 00:26:37,919
our media guide says it's about the size

729
00:26:41,430 --> 00:26:39,520
of a polar bear

730
00:26:43,350 --> 00:26:41,440
now most of us don't run into polar

731
00:26:46,230 --> 00:26:43,360
bears fortunately but uh

732
00:26:48,070 --> 00:26:46,240
the the the analogy i like is it's about

733
00:26:49,830 --> 00:26:48,080
the size of a race car and it's more

734
00:26:52,310 --> 00:26:49,840
sort of like compare it to a race car

735
00:26:53,830 --> 00:26:52,320
it's a very highly efficient machine

736
00:26:57,510 --> 00:26:53,840
custom machine

737
00:26:59,669 --> 00:26:57,520
about 1400 pounds so it's a small car

738
00:27:01,669 --> 00:26:59,679

that would also be a reasonable analogy

739
00:27:05,510 --> 00:27:01,679
for people's uh daily experience as far

740
00:27:07,669 --> 00:27:05,520
as the orbit it's 325 miles above the

741
00:27:09,830 --> 00:27:07,679
surface of the earth circular and it

742
00:27:12,390 --> 00:27:09,840
runs along the day night terminator so

743
00:27:16,149 --> 00:27:12,400
it's sort of looking at sunset sunrise

744
00:27:23,029 --> 00:27:17,190
all right do we have any other questions

745
00:27:26,310 --> 00:27:24,870
okay well then we're going to uh go

746
00:27:28,710 --> 00:27:26,320
ahead and conclude today's media

747
00:27:30,950 --> 00:27:28,720
conference uh if you'd i'd like to thank

748
00:27:32,630 --> 00:27:30,960
the panelists first off before we close

749
00:27:34,549 --> 00:27:32,640
uh appreciate your time and if you'd

750
00:27:38,549 --> 00:27:34,559
like more information about wise by all

751
00:27:40,630 --> 00:27:38,559
means join us on the web at www.nasa.gov