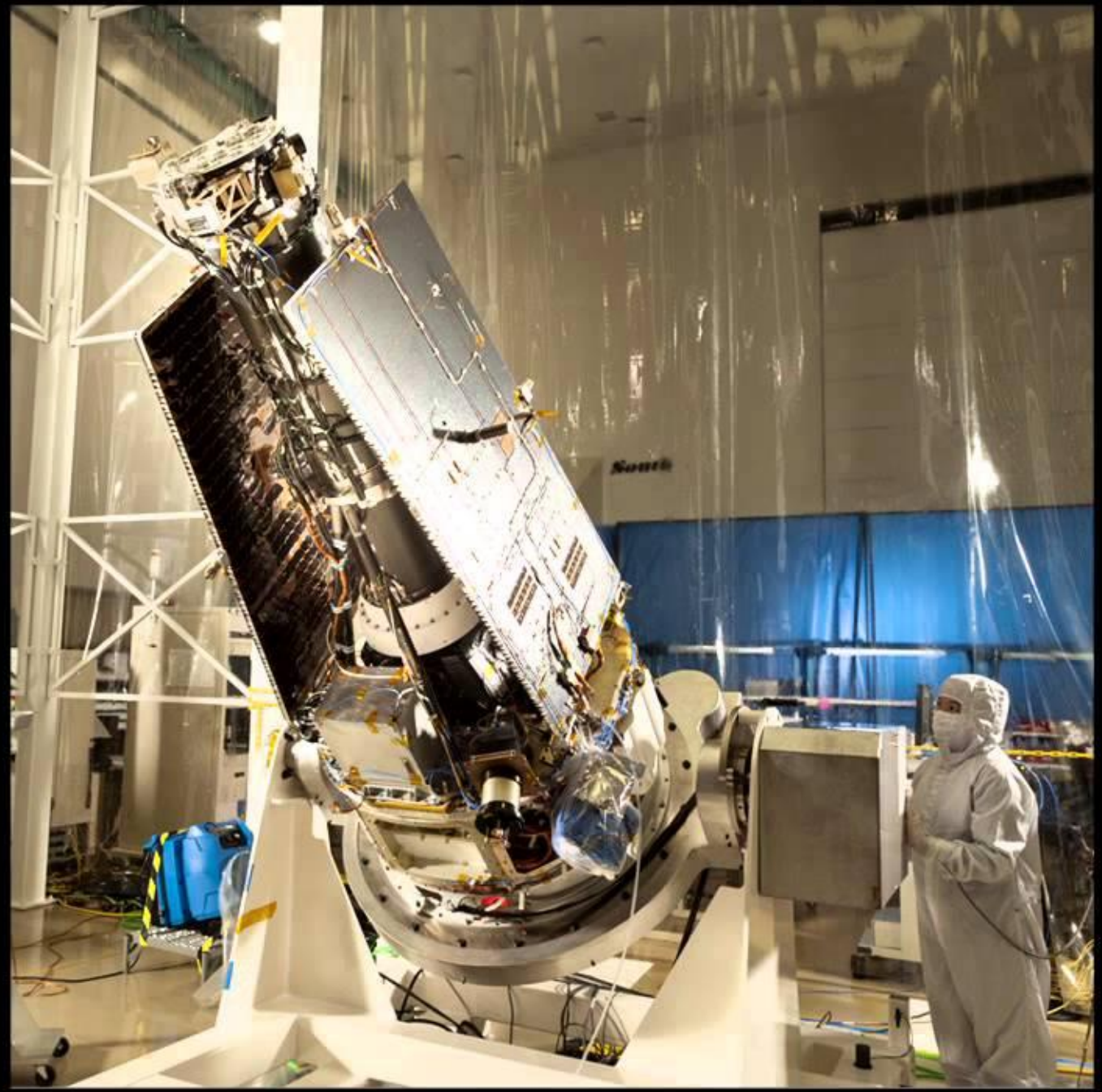
South

1
00:00:08,750 --> 00:00:06,170
good afternoon and welcome to NASA

2
00:00:10,459 --> 00:00:08,760
headquarters in Washington DC i'm steve

3
00:00:12,830 --> 00:00:10,469
cole with the office of communications

4
00:00:15,560 --> 00:00:12,840
we're here today to give you a preview

5
00:00:17,960 --> 00:00:15,570
of NASA's next mission to continue our

6
00:00:21,200 --> 00:00:17,970
exploration of the solar system and

7
00:00:23,150 --> 00:00:21,210
specifically our son the mission is iris

8
00:00:25,970 --> 00:00:23,160
and it will provide the most detailed

9
00:00:28,330 --> 00:00:25,980
look ever of the sun's lower atmosphere

10
00:00:30,679 --> 00:00:28,340
a region called the interface region

11
00:00:33,410 --> 00:00:30,689
iris which stands for the interface

12
00:00:36,020 --> 00:00:33,420
region imaging spectrograph is scheduled

13
00:00:38,540 --> 00:00:36,030

to launch jun 26 from vandenberg air

14
00:00:40,670 --> 00:00:38,550
force base in california we have four

15
00:00:44,030 --> 00:00:40,680
panelists today to tell you about the

16
00:00:46,760 --> 00:00:44,040
mission first will be Jeffrey numark who

17
00:00:50,779 --> 00:00:46,770
is the iris program scientist at NASA

18
00:00:52,610 --> 00:00:50,789
headquarters Allen title iris principal

19
00:00:55,010 --> 00:00:52,620
investigator from Lockheed Martin's

20
00:00:59,510 --> 00:00:55,020
advanced technology center in palo alto

21
00:01:01,849 --> 00:00:59,520
california Gary Kushner iris project

22
00:01:05,840 --> 00:01:01,859
manager at Lockheed Martin's advanced

23
00:01:08,630 --> 00:01:05,850
technology center and john maher me iris

24
00:01:12,320 --> 00:01:08,640
assistant project manager at NASA's Ames

25
00:01:14,000 --> 00:01:12,330
Research Center in California after our

26
00:01:15,679 --> 00:01:14,010
panelists presentations we'll take

27
00:01:18,289 --> 00:01:15,689
questions from reporters on the phone

28
00:01:20,990 --> 00:01:18,299
lines in the audience and also those

29
00:01:23,840 --> 00:01:21,000
watching online if you'd like to ask a

30
00:01:27,830 --> 00:01:23,850
question online on Twitter please use

31
00:01:30,350 --> 00:01:27,840
the hashtag ask NASA we have a lot more

32
00:01:33,789 --> 00:01:30,360
information on them online as well about

33
00:01:38,179 --> 00:01:33,799
the mission and you can see that at ww

34
00:01:40,130 --> 00:01:38,189
NSA gov / iris will continue coverage of

35
00:01:43,969 --> 00:01:40,140
the mission up through launch at that

36
00:01:46,910 --> 00:01:43,979
website so to begin we'll start our

37
00:01:49,219 --> 00:01:46,920
first presentation from Jeffrey numark

38
00:01:52,280 --> 00:01:49,229

well thanks I'm thrilled to be here

39
00:01:54,289 --> 00:01:52,290
today to discuss the iris mission iris

40
00:01:56,899 --> 00:01:54,299
is our newest member of our here physics

41
00:01:59,300 --> 00:01:56,909
fleet of spacecraft I'd like to start by

42
00:02:02,149 --> 00:01:59,310
giving a little background on on what he

43
00:02:04,010 --> 00:02:02,159
of physics is both the oldest known

44
00:02:07,609 --> 00:02:04,020
science people have wondered about the

45
00:02:09,199 --> 00:02:07,619
Sun ever since we existed and and also

46
00:02:11,119 --> 00:02:09,209
we're new science trying to understand

47
00:02:13,610 --> 00:02:11,129
the Sun and its interactions with the

48
00:02:16,009 --> 00:02:13,620
earth and the solar system the

49
00:02:18,289 --> 00:02:16,019
main of heliophysics ranges from the

50
00:02:20,750 --> 00:02:18,299
interior of the Sun through its solar

51
00:02:22,309 --> 00:02:20,760
active atmosphere to the neo space

52
00:02:24,289 --> 00:02:22,319
environment of the earth and to the

53
00:02:28,820 --> 00:02:24,299
edges of our solar system far beyond

54
00:02:30,619 --> 00:02:28,830
Pluto this whole vast extended region is

55
00:02:33,199 --> 00:02:30,629
the extended atmosphere of the Sun we

56
00:02:35,509 --> 00:02:33,209
call it the heliosphere hey physics

57
00:02:38,630 --> 00:02:35,519
seeks to understand basic questions

58
00:02:41,000 --> 00:02:38,640
about this system such as what causes

59
00:02:42,979 --> 00:02:41,010
the Sun to vary how did the earth and

60
00:02:45,199 --> 00:02:42,989
neathia sphere respond what are the

61
00:02:47,449 --> 00:02:45,209
impacts humanity on the earth and to

62
00:02:50,660 --> 00:02:47,459
other worlds as we explore beyond in

63
00:02:52,460 --> 00:02:50,670

order to answer these questions we use a

64
00:02:56,180 --> 00:02:52,470
fleet of spacecraft we call the

65
00:02:57,830 --> 00:02:56,190
heliophysics system observatory our hsl

66
00:03:02,240 --> 00:02:57,840
if you can show graphic number one

67
00:03:06,199 --> 00:03:02,250
please the hso utilizes our entire fleet

68
00:03:08,990 --> 00:03:06,209
of 18 missions over 28 spacecraft as a

69
00:03:11,509 --> 00:03:09,000
distributed observatory to discover the

70
00:03:13,490 --> 00:03:11,519
multiple scales and the couple processes

71
00:03:15,050 --> 00:03:13,500
at work throughout this heliosphere and

72
00:03:17,050 --> 00:03:15,060
then through this complex system that

73
00:03:20,599 --> 00:03:17,060
make up our space environment our

74
00:03:22,580 --> 00:03:20,609
spacecraft orbit the Sun the earth the

75
00:03:26,569 --> 00:03:22,590
regions in between and out to the edge

76
00:03:28,460 --> 00:03:26,579
of the solar system iris joins us fleet

77
00:03:30,440 --> 00:03:28,470
is the newest member of our Explorer

78
00:03:33,379 --> 00:03:30,450
class of missions if you can please show

79
00:03:35,659 --> 00:03:33,389
them graphic number two the Explorer

80
00:03:38,330 --> 00:03:35,669
program is the oldest continuous program

81
00:03:40,580 --> 00:03:38,340
within NASA explorers are one of the

82
00:03:43,490 --> 00:03:40,590
three flight programs we have in here

83
00:03:45,559 --> 00:03:43,500
physics the Explorers offer world-class

84
00:03:48,860 --> 00:03:45,569
science with frequent opportunities

85
00:03:51,110 --> 00:03:48,870
relatively modest cost this brief

86
00:03:53,599 --> 00:03:51,120
montage that you're seeing here is it

87
00:03:55,819 --> 00:03:53,609
shows some examples of hit of Explorer

88
00:03:58,099 --> 00:03:55,829

missions throughout the years starting

89
00:04:00,770 --> 00:03:58,109
with Explorer 011 should in 1858 the

90
00:04:02,780 --> 00:04:00,780
very first NASA mission through some of

91
00:04:05,750 --> 00:04:02,790
the early explorers the Nobel Prize

92
00:04:08,420 --> 00:04:05,760
winning Kobe to our more recent

93
00:04:12,740 --> 00:04:08,430
heliophysics explorers like aim ressie

94
00:04:16,699 --> 00:04:12,750
ibex and of course coming up to iris our

95
00:04:18,770 --> 00:04:16,709
soon-to-be launched Explorer although we

96
00:04:21,770 --> 00:04:18,780
already have some solid servitor ease in

97
00:04:23,870 --> 00:04:21,780
our fleet iris will fool crucial gaps in

98
00:04:26,839 --> 00:04:23,880
our understanding over the role the

99
00:04:27,480 --> 00:04:26,849
interface region plays in powering its

100
00:04:29,879 --> 00:04:27,490
dynamic

101
00:04:32,900 --> 00:04:29,889
degree atmosphere the called the corona

102
00:04:35,129 --> 00:04:32,910
you can please show my next graphic

103
00:04:39,689 --> 00:04:35,139
Irish will join the Solar Dynamics

104
00:04:42,120 --> 00:04:39,699
Observatory or SEO and hinode together

105
00:04:45,540 --> 00:04:42,130
they'll explore how the solar atmosphere

106
00:04:47,670 --> 00:04:45,550
works and how it impacts the earth in OT

107
00:04:49,920 --> 00:04:47,680
and sdl looking at the surface of the

108
00:04:53,129 --> 00:04:49,930
sun and the upper Corona and iris

109
00:04:55,140 --> 00:04:53,139
looking at the region between if you

110
00:04:58,529 --> 00:04:55,150
look in this movie you see the full disk

111
00:05:00,809 --> 00:04:58,539
image as seen by sdl the corona inserted

112
00:05:03,570 --> 00:05:00,819
our images of the photosphere and the

113
00:05:05,370 --> 00:05:03,580

chromosphere from hinode iris will be

114
00:05:08,129 --> 00:05:05,380
the missing link between these two sets

115
00:05:09,960 --> 00:05:08,139
of observations now to tell you the

116
00:05:11,760 --> 00:05:09,970
details about this I'm pleased to

117
00:05:14,540 --> 00:05:11,770
introduce dr. Alan title the principal

118
00:05:19,050 --> 00:05:14,550
investigator of for iris thanks Jeff ah

119
00:05:23,820 --> 00:05:19,060
just by happenstance behind me as a

120
00:05:26,370 --> 00:05:23,830
background is a picture of IRS r and it

121
00:05:28,680 --> 00:05:26,380
happens to be full size so you can get

122
00:05:30,390 --> 00:05:28,690
an idea of the size of this mission it's

123
00:05:35,279 --> 00:05:30,400
not a great big huge thing if we could

124
00:05:37,529 --> 00:05:35,289
have the first slide iris is the

125
00:05:39,990 --> 00:05:37,539
interface region explore what is the

126
00:05:42,510 --> 00:05:40,000
interface the interface is the place

127
00:05:45,089 --> 00:05:42,520
where the visible surface the place

128
00:05:47,510 --> 00:05:45,099
where most of the light are virtually

129
00:05:50,870 --> 00:05:47,520
all the light that leaves the Sun ah

130
00:05:53,659 --> 00:05:50,880
leaves from it's about 6,000 degrees

131
00:05:57,749 --> 00:05:53,669
Kelvin are about a thousand degrees

132
00:06:00,450 --> 00:05:57,759
10,000 degrees Fahrenheit immediately

133
00:06:02,939 --> 00:06:00,460
above that in a ver the temperature

134
00:06:05,969 --> 00:06:02,949
rises to the million degrees of the

135
00:06:08,730 --> 00:06:05,979
corona how that happens is a mystery

136
00:06:11,790 --> 00:06:08,740
what are the processes that occur there

137
00:06:14,909 --> 00:06:11,800
what is iris going to do that's going to

138
00:06:19,050 --> 00:06:14,919

make a step forward first of all iris is

139
00:06:21,120 --> 00:06:19,060
about a factor of 10 higher resolution

140
00:06:23,700 --> 00:06:21,130
than any other instrument that has

141
00:06:25,950 --> 00:06:23,710
explored this region and even more

142
00:06:29,430 --> 00:06:25,960
importantly it's about a factor of 20

143
00:06:32,370 --> 00:06:29,440
faster so it can take images about once

144
00:06:35,100 --> 00:06:32,380
a second this is critical because the

145
00:06:38,490 --> 00:06:35,110
processes that occur in this part of the

146
00:06:40,230 --> 00:06:38,500
atmosphere happened very very fast and i

147
00:06:41,399 --> 00:06:40,240
hope i can show you that in the next few

148
00:06:44,339 --> 00:06:41,409
minutes but

149
00:06:48,029 --> 00:06:44,349
first let's take a trip from the surface

150
00:06:51,419 --> 00:06:48,039
of the Sun which we can see now that's

151
00:06:53,549 --> 00:06:51,429
the photosphere will blend into the

152
00:06:55,109 --> 00:06:53,559
magnetic field where black is magnetic

153
00:06:58,409 --> 00:06:55,119
field that's going out from the Sun

154
00:07:01,559 --> 00:06:58,419
white going back in and the white lines

155
00:07:04,469 --> 00:07:01,569
are a simulation of what we think the

156
00:07:07,769 --> 00:07:04,479
magnetic field is above that upper

157
00:07:09,629 --> 00:07:07,779
photosphere temperature goes up now

158
00:07:12,509 --> 00:07:09,639
we're into the transition region we're

159
00:07:15,449 --> 00:07:12,519
going from photospheric type of light

160
00:07:18,899 --> 00:07:15,459
the coronal type light where we can see

161
00:07:20,819 --> 00:07:18,909
sort of this iron filing picture which

162
00:07:24,059 --> 00:07:20,829
we can compare with what we see in the

163
00:07:25,859 --> 00:07:24,069

magnetic fields now I'll write to show

164
00:07:28,469 --> 00:07:25,869
you what we're going to try and target

165
00:07:31,559 --> 00:07:28,479
with iris so if we can have that movie

166
00:07:34,559 --> 00:07:31,569
on the top is the edge of the Sun and

167
00:07:36,989 --> 00:07:34,569
for context that blue ball is the earth

168
00:07:41,239 --> 00:07:36,999
so you can see these structures are as

169
00:07:44,369 --> 00:07:41,249
as long as the earth the panel below is

170
00:07:47,730 --> 00:07:44,379
enhanced and these very fine lines are

171
00:07:50,459 --> 00:07:47,740
the jets that deliver the energy into

172
00:07:52,859 --> 00:07:50,469
the upper atmosphere they look very

173
00:07:54,540 --> 00:07:52,869
small in this picture but there are

174
00:07:58,230 --> 00:07:54,550
about a hundred and twenty miles across

175
00:08:02,369 --> 00:07:58,240
and there about ten to fifty thousand

176
00:08:05,850 --> 00:08:02,379
miles long and they travel at about a

177
00:08:08,879 --> 00:08:05,860
hundred miles a second so in a couple of

178
00:08:11,129 --> 00:08:08,889
minutes one of those Jets can travel

179
00:08:13,350 --> 00:08:11,139
around the whole earth and they're about

180
00:08:16,799 --> 00:08:13,360
the size of Los Angeles so to get an

181
00:08:19,409 --> 00:08:16,809
idea it's sort of a feeling imagine an

182
00:08:22,169 --> 00:08:19,419
area the size of Los Angeles traveling

183
00:08:24,989 --> 00:08:22,179
around the world in two minutes so if we

184
00:08:27,659 --> 00:08:24,999
have the next slide this is a little bit

185
00:08:30,959 --> 00:08:27,669
more complicated region near a sunspot

186
00:08:32,850 --> 00:08:30,969
and besides these Jets we can see the

187
00:08:36,689 --> 00:08:32,860
large plumes associated with the

188
00:08:41,639 --> 00:08:36,699

sunspots and will show this twice

189
00:08:46,049 --> 00:08:41,649
because it's so pretty remember these

190
00:08:48,389 --> 00:08:46,059
things are going 100 miles a second now

191
00:08:50,910 --> 00:08:48,399
we can also see these Jets not only on

192
00:08:54,570 --> 00:08:50,920
the Sun but on the disk of the Sun so

193
00:08:57,540 --> 00:08:54,580
the next sequence will show

194
00:09:00,180 --> 00:08:57,550
a direct image and then an enhanced

195
00:09:04,350 --> 00:09:00,190
image and you can see in the green

196
00:09:07,560 --> 00:09:04,360
enhanced image these fine spider-like

197
00:09:10,350 --> 00:09:07,570
web structures all over the disk so

198
00:09:14,580 --> 00:09:10,360
these are the targets this is what we

199
00:09:17,520 --> 00:09:14,590
want to understand now the problem that

200
00:09:19,980 --> 00:09:17,530
we have is that we really can't see this

201
00:09:23,160 --> 00:09:19,990
region it's in light it's not visible

202
00:09:26,700 --> 00:09:23,170
and the physics is very complicated so

203
00:09:29,070 --> 00:09:26,710
there's been an international program to

204
00:09:32,760 --> 00:09:29,080
make synthetic images and so the next

205
00:09:40,110 --> 00:09:32,770
sequence will show synthetic images of

206
00:09:42,630 --> 00:09:40,120
the Sun and we'll also pan across the

207
00:09:45,180 --> 00:09:42,640
image and so you can see that these

208
00:09:47,010 --> 00:09:45,190
structures are highly three-dimensional

209
00:09:51,510 --> 00:09:47,020
they're not in a plane it's not a layer

210
00:09:54,450 --> 00:09:51,520
its columns of very rapidly evolving

211
00:09:56,670 --> 00:09:54,460
rapidly move rapidly expanding

212
00:10:05,160 --> 00:09:56,680
structures can we show that again

213
00:10:09,180 --> 00:10:05,170

because it's so much fun okay can we can

214
00:10:14,070 --> 00:10:09,190
we show it again please no you can't yes

215
00:10:19,650 --> 00:10:14,080
you can there he's doing it this this

216
00:10:22,410 --> 00:10:19,660
simulation took about three million CPU

217
00:10:26,370 --> 00:10:22,420
hours on one of the largest computing

218
00:10:28,140 --> 00:10:26,380
systems in the world now ah what I'd

219
00:10:31,020 --> 00:10:28,150
like to show you is not only do we have

220
00:10:34,020 --> 00:10:31,030
this simulation but we can use this

221
00:10:40,460 --> 00:10:34,030
simulation to show what these Jets are

222
00:10:49,050 --> 00:10:44,790
and now you can see models of the Jets

223
00:10:51,390 --> 00:10:49,060
and the colors indicate temperatures you

224
00:10:53,550 --> 00:10:51,400
can see the expanding plumes that we saw

225
00:10:59,700 --> 00:10:53,560
on the models and if we can have the

226
00:11:02,910 --> 00:10:59,710
next sequence this is another use of the

227
00:11:06,510 --> 00:11:02,920
simulation colors go from blue to red as

228
00:11:08,100 --> 00:11:06,520
the material heats so we have models of

229
00:11:10,530 --> 00:11:08,110
how the heating process

230
00:11:12,720 --> 00:11:10,540
works in some detail and these will be

231
00:11:15,000 --> 00:11:12,730
used to be compared with observations

232
00:11:17,069 --> 00:11:15,010
they're not observations and they may

233
00:11:20,790 --> 00:11:17,079
not be correct but they're a starting

234
00:11:24,269 --> 00:11:20,800
point so if we could go to this final

235
00:11:29,220 --> 00:11:24,279
couple of sequences this is what iris

236
00:11:32,069 --> 00:11:29,230
does ah could we have the sequence the

237
00:11:34,769 --> 00:11:32,079
yellow line corresponds to iris's

238
00:11:37,920 --> 00:11:34,779

spectrograph slit and on the right-hand

239
00:11:40,410 --> 00:11:37,930
side of that is what the spectrum will

240
00:11:43,259 --> 00:11:40,420
see from that slit and from those

241
00:11:46,319 --> 00:11:43,269
spectra we can construct images over a

242
00:11:48,810 --> 00:11:46,329
range of high temperatures and densities

243
00:11:51,120 --> 00:11:48,820
in the solar atmosphere so that's what

244
00:11:54,360 --> 00:11:51,130
iris data will look like to the

245
00:11:59,400 --> 00:11:54,370
scientists on the ground and then the

246
00:12:04,139 --> 00:11:59,410
final slide shows the comparison of iris

247
00:12:06,389 --> 00:12:04,149
with previous missions iris is in the

248
00:12:08,970 --> 00:12:06,399
middle and the two other missions are on

249
00:12:11,579 --> 00:12:08,980
the right and left and you can see how

250
00:12:15,210 --> 00:12:11,589
much narrower the spectrographs lid is

251
00:12:17,460 --> 00:12:15,220
and how much faster it moves and because

252
00:12:20,730 --> 00:12:17,470
of that we can actually reconstruct the

253
00:12:23,670 --> 00:12:20,740
motions in these Jets and now I'll turn

254
00:12:27,180 --> 00:12:23,680
this over to Gary Kushner who's had the

255
00:12:29,460 --> 00:12:27,190
enviable job of working with me and some

256
00:12:32,040 --> 00:12:29,470
of our scientists to actually build a

257
00:12:35,430 --> 00:12:32,050
thing that takes this kind of data Thank

258
00:12:37,980 --> 00:12:35,440
You Alan iris is a small lightweight low

259
00:12:40,710 --> 00:12:37,990
power satellite designed to perform

260
00:12:43,019 --> 00:12:40,720
complex solar observations iris is a

261
00:12:45,870 --> 00:12:43,029
NASA small Explorer mission we will fly

262
00:12:47,400 --> 00:12:45,880
in a Sun pointing polar orbit about six

263
00:12:50,040 --> 00:12:47,410

hundred sixty kilometers in low-earth

264
00:12:52,410 --> 00:12:50,050
orbit iris is the culmination of three

265
00:12:54,689 --> 00:12:52,420
years and about nine months of effort by

266
00:12:56,009 --> 00:12:54,699
a team including people from Lockheed

267
00:12:58,370 --> 00:12:56,019
Martin Smithsonian Astrophysical

268
00:13:01,319 --> 00:12:58,380
Observatory Montana State University

269
00:13:04,710 --> 00:13:01,329
University of Oslo and with NASA Ames

270
00:13:07,110 --> 00:13:04,720
Research Center on the first graphic

271
00:13:09,810 --> 00:13:07,120
you'll see is a graphic of the

272
00:13:12,480 --> 00:13:09,820
observatory the left the orange area is

273
00:13:14,310 --> 00:13:12,490
the spacecraft bus the green and light

274
00:13:16,260 --> 00:13:14,320
blue area is the instrument we'll talk a

275
00:13:19,829 --> 00:13:16,270
little bit about that more in a moment

276
00:13:21,540 --> 00:13:19,839
on it is about seven feet in length and

277
00:13:24,240 --> 00:13:21,550
four feet in diameter

278
00:13:27,389 --> 00:13:24,250
spacecraft and 12 feet in width with the

279
00:13:29,910 --> 00:13:27,399
solar arrays deployed on the next

280
00:13:31,530 --> 00:13:29,920
graphic you can see this is an image of

281
00:13:33,180 --> 00:13:31,540
the actual observatory with the solar

282
00:13:35,400 --> 00:13:33,190
arrays deployed this is in the clean

283
00:13:37,650 --> 00:13:35,410
room at Lockheed Martin and in the next

284
00:13:40,380 --> 00:13:37,660
graphic you can see it with the solar

285
00:13:41,850 --> 00:13:40,390
rays stowed this is in preparation for

286
00:13:46,530 --> 00:13:41,860
one of the environmental tests of

287
00:13:50,340 --> 00:13:46,540
vibration testing in the next graphic on

288
00:13:52,500 --> 00:13:50,350

this is the instrument by itself to the

289
00:13:55,139 --> 00:13:52,510
left of the white collar is the

290
00:13:57,690 --> 00:13:55,149
telescope assembly to the right of the

291
00:13:59,699 --> 00:13:57,700
collar is the spectrograph assembly and

292
00:14:02,130 --> 00:13:59,709
the white collar itself is a thermal

293
00:14:05,490 --> 00:14:02,140
radiator for the primary mirror which

294
00:14:08,880 --> 00:14:05,500
sees the Sun this is the optical payload

295
00:14:10,829 --> 00:14:08,890
and in the next series of images they'll

296
00:14:12,750 --> 00:14:10,839
cycle through this is the graphic of the

297
00:14:15,030 --> 00:14:12,760
payload with kind of the sides slowly

298
00:14:17,460 --> 00:14:15,040
cut away and you'll see that if you're

299
00:14:19,380 --> 00:14:17,470
the Sun is to the right you'll see there

300
00:14:22,230 --> 00:14:19,390
that the red Ray's represent the

301
00:14:25,470 --> 00:14:22,240
telescope assembly and that is the light

302
00:14:27,960 --> 00:14:25,480
being focused and projected onto the

303
00:14:29,340 --> 00:14:27,970
spectrograph which is to the left of

304
00:14:32,280 --> 00:14:29,350
what you see as the green collar and

305
00:14:34,829 --> 00:14:32,290
you'll see the blue and green rays

306
00:14:37,139 --> 00:14:34,839
that's the spectrograph and that breaks

307
00:14:39,240 --> 00:14:37,149
the light into its four channels the

308
00:14:42,990 --> 00:14:39,250
faro violet and near ultraviolet and

309
00:14:45,180 --> 00:14:43,000
then that is put on to the sea CDs and

310
00:14:51,150 --> 00:14:45,190
the cameras and then projected down onto

311
00:14:53,069 --> 00:14:51,160
the earth on the next graphic there we

312
00:14:54,930 --> 00:14:53,079
go this is so that was the instrument

313
00:14:57,420 --> 00:14:54,940

and now supporting the instrument is the

314
00:14:59,160 --> 00:14:57,430
spacecraft bus these series of images

315
00:15:01,800 --> 00:14:59,170
shows how you take a large block of

316
00:15:04,319 --> 00:15:01,810
aluminum and quickly in a few steps

317
00:15:06,449 --> 00:15:04,329
convert it into a monolithic spacecraft

318
00:15:07,350 --> 00:15:06,459
bus it actually takes many steps you can

319
00:15:09,600 --> 00:15:07,360
see that they went through rough

320
00:15:11,340 --> 00:15:09,610
machining fine machining and they're

321
00:15:13,170 --> 00:15:11,350
testing the they're assembling the

322
00:15:15,090 --> 00:15:13,180
panel's there and then you end up with a

323
00:15:18,019 --> 00:15:15,100
full spacecraft bus with all of its

324
00:15:21,600 --> 00:15:18,029
components inside the spacecraft bus

325
00:15:25,380 --> 00:15:21,610
includes a pointing system a power

326
00:15:29,100 --> 00:15:25,390
system and all the components of a large

327
00:15:31,230 --> 00:15:29,110
spacecraft bus the next image is the

328
00:15:33,569 --> 00:15:31,240
observatory fully assembled this is

329
00:15:35,010 --> 00:15:33,579
coming out of thermal vacuum testing you

330
00:15:36,570 --> 00:15:35,020
can see the spacecraft is

331
00:15:37,880 --> 00:15:36,580
at the bottom of your screen and the

332
00:15:42,480 --> 00:15:37,890
instrument is at the top of your screen

333
00:15:45,530 --> 00:15:42,490
the next movie we show it will be of the

334
00:15:48,660 --> 00:15:45,540
observatory coming out of vacuum testing

335
00:15:51,120 --> 00:15:48,670
there you go and this is it being

336
00:15:54,390 --> 00:15:51,130
prepared after vacuum testing be

337
00:15:56,550 --> 00:15:54,400
prepared for movement back to its clean

338
00:15:58,440 --> 00:15:56,560

room while you saw before with its

339
00:16:00,720 --> 00:15:58,450
already deployed here it is in the clean

340
00:16:04,290 --> 00:16:00,730
room preparing for a final solar a

341
00:16:06,600 --> 00:16:04,300
deployment that's the solar array facing

342
00:16:08,400 --> 00:16:06,610
you and it will deploy by a flight

343
00:16:10,530 --> 00:16:08,410
command here through the computer

344
00:16:14,640 --> 00:16:10,540
through the spacecraft you'll see that

345
00:16:17,370 --> 00:16:14,650
the arrays deploying right there in this

346
00:16:18,960 --> 00:16:17,380
you can also see that the shiny material

347
00:16:21,150 --> 00:16:18,970
that is the thermal protection system

348
00:16:23,010 --> 00:16:21,160
those are what we call blankets those

349
00:16:24,840 --> 00:16:23,020
protect it while it's on orbit this view

350
00:16:29,190 --> 00:16:24,850
is how it will look on orbit with the

351
00:16:30,810 --> 00:16:29,200
front door opening and the Sun will be

352
00:16:32,190 --> 00:16:30,820
would have been to your right and this

353
00:16:35,850 --> 00:16:32,200
is pretty much how it will look on orbit

354
00:16:38,340 --> 00:16:35,860
and then this is a nice kind of scan

355
00:16:41,130 --> 00:16:38,350
view of it fully deployed this is about

356
00:16:46,530 --> 00:16:41,140
the last testing we do before we ship it

357
00:16:48,540 --> 00:16:46,540
down to Vandenberg on the next series of

358
00:16:51,060 --> 00:16:48,550
videos this we ship to Vandenberg on

359
00:16:53,730 --> 00:16:51,070
April sixteenth this is the observatory

360
00:16:56,700 --> 00:16:53,740
arriving and being off loaded the truck

361
00:16:59,820 --> 00:16:56,710
and being transferred to its handling

362
00:17:01,860 --> 00:16:59,830
fixture it will then be transferred from

363
00:17:03,900 --> 00:17:01,870

its handling fixture into the cleanroom

364
00:17:05,610 --> 00:17:03,910
there if you look quickly you can see to

365
00:17:07,920 --> 00:17:05,620
the left that is the third stage of the

366
00:17:09,990 --> 00:17:07,930
Pegasus rocket and in the cleanroom we

367
00:17:13,770 --> 00:17:10,000
do our final preparations and prepare

368
00:17:16,290 --> 00:17:13,780
for mating to the rocket and we do

369
00:17:18,270 --> 00:17:16,300
several steps to prepare the separation

370
00:17:20,190 --> 00:17:18,280
system and installation on to the rocket

371
00:17:23,670 --> 00:17:20,200
here you can see the crew in various

372
00:17:25,470 --> 00:17:23,680
stages of assembly that is the

373
00:17:27,960 --> 00:17:25,480
separation system means tumble has

374
00:17:30,270 --> 00:17:27,970
installed there and this is the orbital

375
00:17:33,120 --> 00:17:30,280
Pegasus rocket that will take us into

376
00:17:36,090 --> 00:17:33,130
orbit and that's the another view of it

377
00:17:37,590 --> 00:17:36,100
and after we are made it to the rocket

378
00:17:39,360 --> 00:17:37,600
they put on what are called fairings

379
00:17:41,340 --> 00:17:39,370
these are a view of the fairings that

380
00:17:43,770 --> 00:17:41,350
are being prepared for installation now

381
00:17:47,100 --> 00:17:43,780
and they will be installed on the rocket

382
00:17:48,940 --> 00:17:47,110
at the beginning of next week we will be

383
00:17:51,040 --> 00:17:48,950
launching on jun 26

384
00:17:53,680 --> 00:17:51,050
this next graphic will show you how we

385
00:17:55,000 --> 00:17:53,690
get into orbit this is the Pegasus

386
00:17:57,100 --> 00:17:55,010
rocket is actually launched from the

387
00:18:00,630 --> 00:17:57,110
bottom of an airplane is dropped at

388
00:18:03,520 --> 00:18:00,640

39,000 feet the first stage is ignited

389
00:18:06,550 --> 00:18:03,530
and it actually and then the this is now

390
00:18:09,760 --> 00:18:06,560
showing the second stage being propelled

391
00:18:11,410 --> 00:18:09,770
into orbit the second stage about 120

392
00:18:14,130 --> 00:18:11,420
one second hundred thirty-one seconds

393
00:18:16,750 --> 00:18:14,140
into orbit the fairing will separate and

394
00:18:18,400 --> 00:18:16,760
because we're above the atmosphere the

395
00:18:21,070 --> 00:18:18,410
second stage will burn for a few more

396
00:18:25,960 --> 00:18:21,080
seconds and then it will transition to

397
00:18:28,120 --> 00:18:25,970
the third stage the third stage will

398
00:18:32,470 --> 00:18:28,130
then put us into our final orbit of 600

399
00:18:34,900 --> 00:18:32,480
620 by six seventy kilometers when this

400
00:18:37,390 --> 00:18:34,910
third stage finishes it will separate

401
00:18:40,270 --> 00:18:37,400
from the observatory and then actually

402
00:18:42,490 --> 00:18:40,280
walk does maneuvers to get away we will

403
00:18:45,070 --> 00:18:42,500
deploy the solar rays acquire Sun and go

404
00:18:47,200 --> 00:18:45,080
power positive and then 21 days into the

405
00:18:51,100 --> 00:18:47,210
mission we will open the door and start

406
00:18:54,040 --> 00:18:51,110
doing calibrations with a light but to

407
00:18:56,700 --> 00:18:54,050
further discuss how we do it how we get

408
00:18:59,500 --> 00:18:56,710
the data down from orbit and how we

409
00:19:01,930 --> 00:18:59,510
operate the observatory I will hand off

410
00:19:04,000 --> 00:19:01,940
to John Murray thank you Gary I'll

411
00:19:06,310 --> 00:19:04,010
present a look at operations and data

412
00:19:08,560 --> 00:19:06,320
flow for the iris mission but first

413
00:19:10,360 --> 00:19:08,570

though iris is a perfect example of how

414
00:19:12,730 --> 00:19:10,370
collaborative efforts between the

415
00:19:15,040 --> 00:19:12,740
government academia and the private

416
00:19:17,260 --> 00:19:15,050
sector can use the expertise of each

417
00:19:20,740 --> 00:19:17,270
institution to result in cost savings

418
00:19:23,410 --> 00:19:20,750
for the overall mission I enjoy serving

419
00:19:25,240 --> 00:19:23,420
in my role as the system project manager

420
00:19:27,220 --> 00:19:25,250
working directly with Alan and Gary on

421
00:19:28,930 --> 00:19:27,230
this mission and others Lockheed Martin

422
00:19:32,290 --> 00:19:28,940
to help facilitate this productive

423
00:19:34,420 --> 00:19:32,300
relationship alright first clip this

424
00:19:36,580 --> 00:19:34,430
clip shows a few the Irish team members

425
00:19:39,550 --> 00:19:36,590
in the Mission Operations Center at NASA

426
00:19:43,030 --> 00:19:39,560
Ames Ames Mission Operations Center

427
00:19:45,270 --> 00:19:43,040
serves as an example of a small low-cost

428
00:19:47,470 --> 00:19:45,280
flight operations facility for NASA

429
00:19:49,900 --> 00:19:47,480
mission operations center is staffed

430
00:19:52,180 --> 00:19:49,910
twenty-four seven for the first seven

431
00:19:54,340 --> 00:19:52,190
days of light then when all is nominal

432
00:19:57,700 --> 00:19:54,350
they eventually transition down to one

433
00:20:01,270 --> 00:19:57,710
shift per working day each one command

434
00:20:02,680 --> 00:20:01,280
load it occurs / once per week day with

435
00:20:04,900 --> 00:20:02,690
science and spacecraft

436
00:20:08,920 --> 00:20:04,910
health data received daily in a

437
00:20:11,920 --> 00:20:08,930
lights-out mode next clip please iris is

438
00:20:12,960 --> 00:20:11,930

launched into a 620 kilometer by six

439
00:20:15,940 --> 00:20:12,970
hundred and seventy kilometers

440
00:20:17,290 --> 00:20:15,950
sun-synchronous polar orbit at an

441
00:20:19,210 --> 00:20:17,300
inclination of approximately

442
00:20:22,840 --> 00:20:19,220
ninety-eight degrees so what's that mean

443
00:20:25,810 --> 00:20:22,850
iris flies on the dawn dusk line and

444
00:20:29,020 --> 00:20:25,820
always looks towards the Sun each orbit

445
00:20:32,140 --> 00:20:29,030
takes iris on the order of 97 minutes to

446
00:20:35,050 --> 00:20:32,150
complete which allows 14 to 15 passes

447
00:20:38,290 --> 00:20:35,060
per day this orbit was selected to

448
00:20:45,370 --> 00:20:38,300
maximize downlink data volume as well as

449
00:20:47,170 --> 00:20:45,380
sun exposure time explains communicating

450
00:20:50,170 --> 00:20:47,180
with the tracking and data relay

451
00:20:52,090 --> 00:20:50,180
satellite system within 15 minutes the

452
00:20:54,160 --> 00:20:52,100
solar arrays should be deployed and

453
00:20:56,260 --> 00:20:54,170
we're over McMurdo ground station

454
00:20:58,060 --> 00:20:56,270
Antarctica within 60 minutes we

455
00:21:00,310 --> 00:20:58,070
Passover's fall bar ground station

456
00:21:03,880 --> 00:21:00,320
Norway 10 minutes later were over the

457
00:21:05,980 --> 00:21:03,890
Alaska satellite facility each orbit or

458
00:21:10,890 --> 00:21:05,990
ground track that you see here takes on

459
00:21:13,690 --> 00:21:10,900
the order of 97 minutes to complete so

460
00:21:16,270 --> 00:21:13,700
and Wallops ground station actually

461
00:21:21,160 --> 00:21:16,280
comes into view I own the fifth orbit

462
00:21:23,230 --> 00:21:21,170
next clip please the primary facilities

463
00:21:25,240 --> 00:21:23,240

used to support the iris mission are the

464
00:21:28,090 --> 00:21:25,250
instrument operation center at Lockheed

465
00:21:29,440 --> 00:21:28,100
Martin solar in astrophysics lab in Palo

466
00:21:32,440 --> 00:21:29,450
Alto we have the Mission Operations

467
00:21:34,420 --> 00:21:32,450
Center at NASA Ames Research Center we

468
00:21:36,820 --> 00:21:34,430
also have the near Earth network at

469
00:21:39,220 --> 00:21:36,830
Goddard Space Flight Center we have the

470
00:21:41,950 --> 00:21:39,230
small small bar ground facility as fall

471
00:21:43,480 --> 00:21:41,960
bard Norway we collaborate with the

472
00:21:46,390 --> 00:21:43,490
norwegian space that are on this mission

473
00:21:49,390 --> 00:21:46,400
we have the alaska science facility in

474
00:21:51,790 --> 00:21:49,400
fairbanks alaska McMurdo ground station

475
00:21:53,620 --> 00:21:51,800
in Antarctica we have the wall up the

476
00:21:56,080 --> 00:21:53,630
ground station wall up to Island

477
00:21:58,330 --> 00:21:56,090
Virginia data eventually makes its way

478
00:22:00,580 --> 00:21:58,340
to the Mission Operations Center we send

479
00:22:02,830 --> 00:22:00,590
that off to Stanford to the science data

480
00:22:07,360 --> 00:22:02,840
processing facility where it is

481
00:22:09,340 --> 00:22:07,370
available on the web next slide an Irish

482
00:22:11,110 --> 00:22:09,350
stay in the life for the team on the

483
00:22:14,110 --> 00:22:11,120
ground actually begins with the science

484
00:22:16,180 --> 00:22:14,120
team creating a daily plan they'll take

485
00:22:18,279 --> 00:22:16,190
a look at previous images they'll

486
00:22:19,810 --> 00:22:18,289
take a pointing requests they'll take

487
00:22:22,360 --> 00:22:19,820
science requests and they'll also take

488
00:22:24,430 --> 00:22:22,370

into account the spacecraft health they

489
00:22:26,499 --> 00:22:24,440
pass it along to Mission Operations team

490
00:22:29,350 --> 00:22:26,509
where they begin to assemble the command

491
00:22:32,259 --> 00:22:29,360
load they'll take that spacecraft input

492
00:22:33,940 --> 00:22:32,269
they'll Jill take those sequences those

493
00:22:35,560 --> 00:22:33,950
pointing sequences there's science

494
00:22:37,960 --> 00:22:35,570
sequences and generate the command

495
00:22:39,759 --> 00:22:37,970
secrets at that point they then package

496
00:22:41,529 --> 00:22:39,769
that command they'll have worked with

497
00:22:43,869 --> 00:22:41,539
the ground stations beforehand to

498
00:22:46,240 --> 00:22:43,879
schedule time they'll build the scripts

499
00:22:49,330 --> 00:22:46,250
to automate that process o verify the

500
00:22:51,249 --> 00:22:49,340
command sequence approximately 6 p.m.

501
00:22:53,919 --> 00:22:51,259
every day flight controllers then

502
00:22:56,680 --> 00:22:53,929
execute the commands they'll establish

503
00:22:59,590 --> 00:22:56,690
link with the ground station upload the

504
00:23:02,649 --> 00:22:59,600
command and then they release the ground

505
00:23:04,869 --> 00:23:02,659
station link after which telemetry is

506
00:23:07,029 --> 00:23:04,879
received they assess the spacecraft

507
00:23:09,700 --> 00:23:07,039
health they'll send out alerts and

508
00:23:12,039 --> 00:23:09,710
notifications data is then since

509
00:23:14,850 --> 00:23:12,049
Stanford where it's processed stored

510
00:23:18,519 --> 00:23:14,860
science data is and posted to the web

511
00:23:21,009 --> 00:23:18,529
within six hours receipt although quick

512
00:23:24,610 --> 00:23:21,019
looks of the images of the data will be

513
00:23:26,919 --> 00:23:24,620

available within 10 minutes this solar

514
00:23:29,649 --> 00:23:26,929
data is then used in multiple ways to

515
00:23:33,330 --> 00:23:29,659
benefit society here on earth as well as

516
00:23:36,539 --> 00:23:33,340
for space exploration next slide please

517
00:23:39,220 --> 00:23:36,549
so the Irish mission starts with launch

518
00:23:42,369 --> 00:23:39,230
separation occurs 13 minutes after

519
00:23:44,799 --> 00:23:42,379
launch the spacecraft II tumbles opens a

520
00:23:46,539 --> 00:23:44,809
solar arrays begins communicating so for

521
00:23:48,549 --> 00:23:46,549
the next 30 days we check out the

522
00:23:52,119 --> 00:23:48,559
instrument we check out the spacecraft

523
00:23:54,220 --> 00:23:52,129
on day 21 we open the telescope door the

524
00:23:57,940 --> 00:23:54,230
science campaign officially starts on

525
00:24:01,539 --> 00:23:57,950
day 60 as we begin our exploration of

526
00:24:04,629 --> 00:24:01,549
the Sun for the next two years we're in

527
00:24:07,720 --> 00:24:04,639
nominal operations so given there's no

528
00:24:09,669 --> 00:24:07,730
fuel on board if after two years the

529
00:24:13,090 --> 00:24:09,679
observatory is healthy and productive

530
00:24:16,419 --> 00:24:13,100
NASA then has the option to extend

531
00:24:18,700 --> 00:24:16,429
science operations theoretically iris

532
00:24:22,450 --> 00:24:18,710
could be productive for a few decades if

533
00:24:24,340 --> 00:24:22,460
the observatory is healthy and that is a

534
00:24:26,399 --> 00:24:24,350
look at the iris operations for this

535
00:24:28,570 --> 00:24:26,409
exciting mission go back to you Steve

536
00:24:29,830 --> 00:24:28,580
okay thank you John and all our

537
00:24:32,620 --> 00:24:29,840
panelists now we can

538
00:24:34,419 --> 00:24:32,630

go to questions if you're on the phone

539
00:24:37,990 --> 00:24:34,429
bridge or reporters and you'd like to

540
00:24:40,360 --> 00:24:38,000
ask a question please hit star one if

541
00:24:42,210 --> 00:24:40,370
you're watching online and would like to

542
00:24:46,630 --> 00:24:42,220
ask our panelists a question on Twitter

543
00:24:49,000 --> 00:24:46,640
use the hashtag ask NASA that we also

544
00:24:52,299 --> 00:24:49,010
have graphics online everything you've

545
00:24:56,049 --> 00:24:52,309
seen here is available online you just

546
00:25:01,570 --> 00:24:56,059
need to go to a website it's go nasa.gov

547
00:25:05,440 --> 00:25:01,580
slash irish iris graphics there's the

548
00:25:08,260 --> 00:25:05,450
URL right there okay we'll start our

549
00:25:10,269 --> 00:25:08,270
questions from social media I think we

550
00:25:11,919 --> 00:25:10,279
have some from Twitter thank you Steve

551
00:25:14,710 --> 00:25:11,929
the first question that we have for the

552
00:25:20,590 --> 00:25:14,720
panel is what do you hope to discover or

553
00:25:23,200 --> 00:25:20,600
find during the iris mission what we

554
00:25:26,649 --> 00:25:23,210
want to discover is what the basic

555
00:25:30,940 --> 00:25:26,659
physical processes are the transfer

556
00:25:33,730 --> 00:25:30,950
energy and material from the surface of

557
00:25:36,990 --> 00:25:33,740
the sun out to the outer atmosphere to

558
00:25:39,880 --> 00:25:37,000
the corona and remember the corona

559
00:25:46,180 --> 00:25:39,890
extends throughout the heliosphere we

560
00:25:47,560 --> 00:25:46,190
live in the sun's outer atmosphere okay

561
00:25:50,500 --> 00:25:47,570
another question from Twitter please

562
00:25:58,230 --> 00:25:50,510
thank you how many pixels will the

563
00:26:02,710 --> 00:25:58,240

images that iris takes have um we have

564
00:26:07,180 --> 00:26:02,720
three ccd detectors that are roughly

565
00:26:12,730 --> 00:26:07,190
2,000 by 2,000 oh but we won't use all

566
00:26:14,919 --> 00:26:12,740
of them all the time okay and we have

567
00:26:17,710 --> 00:26:14,929
one more question from Twitter before we

568
00:26:19,600 --> 00:26:17,720
go to the phone lines okay thank you how

569
00:26:23,019 --> 00:26:19,610
far away from the Sun will Irish be

570
00:26:27,850 --> 00:26:23,029
while it's taking its measurements iris

571
00:26:32,649 --> 00:26:27,860
flies around the earth so it only gets

572
00:26:35,649 --> 00:26:32,659
about 600 kilometers closer to the Sun

573
00:26:39,250 --> 00:26:35,659
then here we are on earth and that's

574
00:26:42,040 --> 00:26:39,260
about 92 million miles away so it's

575
00:26:45,580 --> 00:26:42,050
really not very much closer to this side

576
00:26:47,470 --> 00:26:45,590
just stares a long time okay and now we

577
00:26:52,650 --> 00:26:47,480
have a question from the phone bridge

578
00:26:58,600 --> 00:26:55,270
hi thanks for taking my question am I

579
00:27:01,210 --> 00:26:58,610
thinking for Alan um what happens in the

580
00:27:03,700 --> 00:27:01,220
interface region during solar storms and

581
00:27:10,090 --> 00:27:03,710
are you expecting our see changes during

582
00:27:15,970 --> 00:27:10,100
solar maximum absolutely ah the second

583
00:27:19,300 --> 00:27:15,980
ah view of the Sun the one that showed

584
00:27:23,290 --> 00:27:19,310
the region around the Sun SPOT showed

585
00:27:28,030 --> 00:27:23,300
the kind of activity that happens in a

586
00:27:32,920 --> 00:27:28,040
rather quiescent active region in so

587
00:27:35,380 --> 00:27:32,930
regardless of exactly where we are ah in

588
00:27:37,690 --> 00:27:35,390

the solar cycle and right now we're

589
00:27:41,190 --> 00:27:37,700
pretty much a solar maximum we're going

590
00:27:44,860 --> 00:27:41,200
to see a lot of activity and we have

591
00:27:47,800 --> 00:27:44,870
pre-planned a large number of herbs or

592
00:27:52,180 --> 00:27:47,810
observing sequences that are targeted to

593
00:27:54,040 --> 00:27:52,190
seeing things like solar flares our next

594
00:27:57,460 --> 00:27:54,050
question is also from the phone line

595
00:28:02,290 --> 00:27:57,470
it's alex we see from nature go ahead

596
00:28:04,750 --> 00:28:02,300
Alex thank you my question is also for

597
00:28:07,660 --> 00:28:04,760
dr. title I wanted to ask about this

598
00:28:10,000 --> 00:28:07,670
Swede balloon experiment that will be

599
00:28:13,150 --> 00:28:10,010
flown over Sweden also this summer

600
00:28:15,610 --> 00:28:13,160
called sunrise how will that compliment

601
00:28:22,390 --> 00:28:15,620
or not complement what you're doing with

602
00:28:26,170 --> 00:28:22,400
iris well unfortunately the sunrise

603
00:28:30,240 --> 00:28:26,180
flight is supposed to be in the next few

604
00:28:33,940 --> 00:28:30,250
days now that's nice for sunrise I wish

605
00:28:36,520 --> 00:28:33,950
that it flown at the same time as IRS

606
00:28:39,940 --> 00:28:36,530
but I guess that's something that just

607
00:28:45,430 --> 00:28:39,950
didn't happen ah but sunrise is a very

608
00:28:47,710 --> 00:28:45,440
important very highly capable experiment

609
00:28:49,660 --> 00:28:47,720
and it will tell us a lot about the

610
00:28:52,240 --> 00:28:49,670
smallest magnetic field structures on

611
00:28:55,240 --> 00:28:52,250
the Sun and the more that we know about

612
00:28:56,040 --> 00:28:55,250
the driving magnetic fields the more

613
00:28:57,870 --> 00:28:56,050

easily will

614
00:29:01,920 --> 00:28:57,880
be able to interpret the results that we

615
00:29:03,570 --> 00:29:01,930
get from iris we have another question

616
00:29:10,650 --> 00:29:03,580
on the phone lines Rebecca Boyle

617
00:29:12,360 --> 00:29:10,660
freelancer hi everybody um no exercise

618
00:29:14,640 --> 00:29:12,370
was just asked but I have a quick

619
00:29:16,560 --> 00:29:14,650
follow-up about it I guess how could

620
00:29:19,100 --> 00:29:16,570
balloon machines like sunrise or

621
00:29:21,240 --> 00:29:19,110
stunning Rockets like the hi-c mission

622
00:29:24,120 --> 00:29:21,250
complement what you're doing with iris

623
00:29:25,470 --> 00:29:24,130
could you sort of have a fast reaction

624
00:29:28,320 --> 00:29:25,480
possibly do something that you've seen

625
00:29:31,880 --> 00:29:28,330
with iris and send us a quick balloon or

626
00:29:34,830 --> 00:29:31,890
signing rocket to take a further look I

627
00:29:40,860 --> 00:29:34,840
guess that's really a question for Jeff

628
00:29:44,640 --> 00:29:40,870
numark ah that I would hope that of the

629
00:29:49,140 --> 00:29:44,650
combination of iris and the Solar

630
00:29:53,100 --> 00:29:49,150
Dynamics Observatory and observations on

631
00:29:56,160 --> 00:29:53,110
stereo would encourage NASA to take

632
00:29:58,770 --> 00:29:56,170
advantage of any relatively low-cost

633
00:30:02,760 --> 00:29:58,780
mission that they could under fly with

634
00:30:05,610 --> 00:30:02,770
iris and certainly balloon flights can

635
00:30:08,610 --> 00:30:05,620
be rescheduled they're not free and

636
00:30:11,100 --> 00:30:08,620
neither or rockets though planning has

637
00:30:14,880 --> 00:30:11,110
to occur and budgets have to be found

638
00:30:18,420 --> 00:30:14,890

but hopefully they will be I would just

639
00:30:21,210 --> 00:30:18,430
like to add that we certainly try and

640
00:30:25,560 --> 00:30:21,220
coordinate whenever we can our various

641
00:30:30,120 --> 00:30:25,570
missions it is difficult some to to

642
00:30:32,610 --> 00:30:30,130
always have a very quick reaction maybe

643
00:30:35,910 --> 00:30:32,620
the processes that you saw in the

644
00:30:38,880 --> 00:30:35,920
wonderful movies and simulations that

645
00:30:40,020 --> 00:30:38,890
Alan showed you were within seconds and

646
00:30:42,900 --> 00:30:40,030
minutes these are very very quick

647
00:30:45,450 --> 00:30:42,910
processes so the two to have that kind

648
00:30:48,000 --> 00:30:45,460
of turnaround on a balloon or sounding

649
00:30:50,070 --> 00:30:48,010
rocket is not always feasible but as a

650
00:30:51,870 --> 00:30:50,080
general rule we do like to try and

651
00:30:54,120 --> 00:30:51,880
coordinate with as many of our assets as

652
00:30:56,100 --> 00:30:54,130
possible and that's one of the reasons

653
00:30:58,560 --> 00:30:56,110
that I tried to show our system

654
00:31:01,260 --> 00:30:58,570
observatory that we have is because it

655
00:31:03,480 --> 00:31:01,270
is through a distributed network a large

656
00:31:06,960 --> 00:31:03,490
number of observations that we will make

657
00:31:09,060 --> 00:31:06,970
real advancement all right we have

658
00:31:10,019 --> 00:31:09,070
another caller on the line but first to

659
00:31:12,389 --> 00:31:10,029
remind the

660
00:31:14,580 --> 00:31:12,399
analyst on the phone lines to hit star

661
00:31:17,459 --> 00:31:14,590
one if you'd like to ask a question our

662
00:31:21,889 --> 00:31:17,469
next question comes from Irene Klotz at

663
00:31:25,019 --> 00:31:21,899

Reuters go ahead Irene thanks Steve

664
00:31:28,349 --> 00:31:25,029
sometimes I miss this which is a design

665
00:31:31,259 --> 00:31:28,359
lifetime of the satellite and someone

666
00:31:34,019 --> 00:31:31,269
else's please give us a raw mission

667
00:31:36,539 --> 00:31:34,029
costs either with without the launch

668
00:31:41,190 --> 00:31:36,549
however you break up separate or

669
00:31:44,789 --> 00:31:41,200
together thanks I'll sort of the cost

670
00:31:47,279 --> 00:31:44,799
the cost is just over 181 million

671
00:31:51,229 --> 00:31:47,289
dollars in really year dollars and that

672
00:31:54,810 --> 00:31:51,239
includes the the development of the

673
00:31:56,609 --> 00:31:54,820
spacecraft the satellite of and the

674
00:31:59,759 --> 00:31:56,619
instrument and and also a launch vehicle

675
00:32:03,119 --> 00:31:59,769
and management of the whole mission is

676
00:32:06,119 --> 00:32:03,129
included and it has a tui just over two

677
00:32:08,639 --> 00:32:06,129
year design life time though as John

678
00:32:11,399 --> 00:32:08,649
mentioned there are no consumables on

679
00:32:13,109 --> 00:32:11,409
board and and and there's a strong

680
00:32:16,950 --> 00:32:13,119
possibility that iris will last much

681
00:32:19,379 --> 00:32:16,960
longer than that iris which is was

682
00:32:23,959 --> 00:32:19,389
designed to the same sort of design

683
00:32:28,619 --> 00:32:23,969
rules operated for 10 years tres tres

684
00:32:33,570 --> 00:32:28,629
I'm sorry I keep doing that but a trace

685
00:32:36,959 --> 00:32:33,580
up iris trace operated for a decade and

686
00:32:39,149 --> 00:32:36,969
it was still working just fine when we

687
00:32:41,669 --> 00:32:39,159
turned it off and we turned it off

688
00:32:46,079 --> 00:32:41,679

because it was replaced by the Solar

689
00:32:49,139 --> 00:32:46,089
Dynamics Observatory our next questions

690
00:32:51,779 --> 00:32:49,149
come from Twitter again how much of the

691
00:32:56,459 --> 00:32:51,789
data obtained by iris will be in the

692
00:32:59,669 --> 00:32:56,469
public domain all of it thank you all of

693
00:33:04,979 --> 00:32:59,679
it at the same time as the science teams

694
00:33:07,379 --> 00:33:04,989
get it and that's true for all sto data

695
00:33:10,169 --> 00:33:07,389
and I think virtually all of

696
00:33:13,649 --> 00:33:10,179
heliophysics data is made available to

697
00:33:15,269 --> 00:33:13,659
the general public at the same time is

698
00:33:18,529 --> 00:33:15,279
made available to this idea the

699
00:33:21,450 --> 00:33:18,539
community next question from online

700
00:33:23,880 --> 00:33:21,460
someone asks are there any advantages

701
00:33:27,620 --> 00:33:23,890
for future missions to put an

702
00:33:32,940 --> 00:33:27,630
an iris type vehicle closer to the Sun

703
00:33:36,510 --> 00:33:32,950
um I'll take that we do actually have a

704
00:33:39,090 --> 00:33:36,520
couple of missions coming up in another

705
00:33:40,800 --> 00:33:39,100
few years one a collaboration with the

706
00:33:43,770 --> 00:33:40,810
european space agency called solar

707
00:33:46,860 --> 00:33:43,780
orbiter and and one nasa mission called

708
00:33:48,720 --> 00:33:46,870
solar probe plus both of these missions

709
00:33:52,110 --> 00:33:48,730
in fact are going closer to the Sun

710
00:33:56,670 --> 00:33:52,120
solar probe plus will actually fly into

711
00:33:59,100 --> 00:33:56,680
the near corona of the Sun and these

712
00:34:01,560 --> 00:33:59,110
missions will complement the Irish type

713
00:34:03,780 --> 00:34:01,570

where Irish is looking at the base of

714
00:34:05,580 --> 00:34:03,790
the solar atmosphere the way the solar

715
00:34:07,380 --> 00:34:05,590
wind originates and these future

716
00:34:10,800 --> 00:34:07,390
missions will actually look a little bit

717
00:34:14,510 --> 00:34:10,810
further up as the solar wind accelerates

718
00:34:18,240 --> 00:34:14,520
and heads out through the heliosphere

719
00:34:20,700 --> 00:34:18,250
yeah our next Twitter question so if

720
00:34:23,360 --> 00:34:20,710
iris doesn't have any fuel can someone

721
00:34:29,790 --> 00:34:23,370
help explain how it moves about in space

722
00:34:35,340 --> 00:34:29,800
yes that's really fun ah iris has

723
00:34:39,419 --> 00:34:35,350
launched slightly tilted with respect to

724
00:34:42,930 --> 00:34:39,429
the rotation axis of the earth and if

725
00:34:47,100 --> 00:34:42,940
you think about it a little bit ah that

726
00:34:53,090 --> 00:34:47,110
if you just launched around the earth as

727
00:34:55,950 --> 00:34:53,100
the earth went around the Sun in only a

728
00:34:58,440 --> 00:34:55,960
quarter of a year you'd be in darkness

729
00:35:01,530 --> 00:34:58,450
all the time but the earth isn't a

730
00:35:04,760 --> 00:35:01,540
perfect sphere it's a little bit fatter

731
00:35:08,760 --> 00:35:04,770
in the middle like some of us ah and

732
00:35:14,700 --> 00:35:08,770
because of that it exists it exerts a

733
00:35:18,060 --> 00:35:14,710
force on the orbit and as a result the

734
00:35:20,250 --> 00:35:18,070
orbit of trace revolves once around the

735
00:35:24,780 --> 00:35:20,260
earth every time the earth resolves

736
00:35:26,640 --> 00:35:24,790
around the Sun and whoever people have

737
00:35:31,440 --> 00:35:26,650
figured out exactly where you put a

738
00:35:33,810 --> 00:35:31,450

satellite to do that okay have a

739
00:35:36,000 --> 00:35:33,820
question we received before we went on

740
00:35:38,310 --> 00:35:36,010
the air will iris conduct a survey of

741
00:35:40,680 --> 00:35:38,320
the entire Sun one small bit

742
00:35:45,570 --> 00:35:40,690
a time or will it target only special

743
00:35:49,530 --> 00:35:45,580
areas of the Sun ah it's a focused

744
00:35:53,810 --> 00:35:49,540
mission it'll target special areas of

745
00:35:59,610 --> 00:35:53,820
the Sun and won't attempt to make maps

746
00:36:05,060 --> 00:35:59,620
of the Sun we have a mission that does

747
00:36:07,860 --> 00:36:05,070
that sto and so we don't need to do that

748
00:36:10,290 --> 00:36:07,870
ok one other question why are you

749
00:36:13,070 --> 00:36:10,300
launching iris on a Pegasus rocket

750
00:36:18,660 --> 00:36:13,080
instead of a conventional vertical Rock

751
00:36:20,340 --> 00:36:18,670
cheaper but also had met the mission

752
00:36:22,350 --> 00:36:20,350
requirements that we I mean we designed

753
00:36:24,450 --> 00:36:22,360
this meets the mission requirements

754
00:36:28,050 --> 00:36:24,460
there are a number of assets that do

755
00:36:33,120 --> 00:36:28,060
launch spacecraft at this size and NASA

756
00:36:35,580 --> 00:36:33,130
has a as a methodology that is set out

757
00:36:38,460 --> 00:36:35,590
for each of our missions to to to

758
00:36:39,810 --> 00:36:38,470
optimize that mission with with their

759
00:36:43,800 --> 00:36:39,820
launch vehicle available at that time

760
00:36:47,610 --> 00:36:43,810
and for iris it was we're very happy to

761
00:36:49,880 --> 00:36:47,620
be launching on an orbital Pegasus okay

762
00:36:52,680 --> 00:36:49,890
we have one last question at this point

763
00:36:54,150 --> 00:36:52,690

those fine structures that was shown in

764
00:36:58,700 --> 00:36:54,160
the previous graphics what are those

765
00:37:05,600 --> 00:36:58,710
made of they're made out of solar stuff

766
00:37:10,740 --> 00:37:05,610
which is which is sort of eighty percent

767
00:37:16,490 --> 00:37:10,750
hydrogen and about eighteen or nineteen

768
00:37:20,490 --> 00:37:16,500
percent helium and one or two percent of

769
00:37:24,120 --> 00:37:20,500
everything else all the elements that we

770
00:37:26,880 --> 00:37:24,130
find on earth in at the level of one or

771
00:37:30,630 --> 00:37:26,890
two percent but it's mostly hydrogen

772
00:37:32,430 --> 00:37:30,640
with a little bit of helium okay thank

773
00:37:33,900 --> 00:37:32,440
you well that's of all the questions we

774
00:37:36,570 --> 00:37:33,910
have for today I wanted to remind

775
00:37:39,750 --> 00:37:36,580
everyone that they can follow along iris

776
00:37:43,710 --> 00:37:39,760
online through social media on NASA's on

777
00:37:45,510 --> 00:37:43,720
quite a few social media channels also

778
00:37:48,830 --> 00:37:45,520
as a reminder the graphics that you've

779
00:37:51,569 --> 00:37:48,840
seen today are all available online at

780
00:37:55,289 --> 00:37:51,579
geo nasa gov

781
00:37:57,239 --> 00:37:55,299
/ iris graphics and please continue to

782
00:37:58,829 --> 00:37:57,249
follow the mission online all the way up

783
00:38:00,329 --> 00:37:58,839
through launch and it's interesting

784
00:38:06,449 --> 00:38:00,339
findings that will be coming up over the

785
00:38:08,670 --> 00:38:06,459
next few years at ww na sa gov / iris