
LEARN MORE ABOUT NISAR
SEE THE SATELLITE IN THE JPL CLEAN ROOM

1
00:00:00,133 --> 00:00:01,267
>> Welcome to NASA's

2
00:00:01,334 --> 00:00:03,203
Jet Propulsion Laboratory

3
00:00:03,269 --> 00:00:04,904
here in Southern California.

4
00:00:04,971 --> 00:00:06,406
I'm Marina Jurica,

5
00:00:06,473 --> 00:00:07,574
and we're coming to you live

6
00:00:07,640 --> 00:00:09,509
from a very special place today.

7
00:00:09,576 --> 00:00:12,645
This is a spacecraft assembly

8
00:00:12,712 --> 00:00:14,481
facility clean room

9
00:00:14,547 --> 00:00:15,815
here at JPL.

10
00:00:15,882 --> 00:00:16,950
And we're gonna talk to you

11
00:00:17,016 --> 00:00:18,051
today a little bit

12
00:00:18,118 --> 00:00:19,319
about an upcoming

13
00:00:19,386 --> 00:00:20,487

earth science mission.

14
00:00:20,553 --> 00:00:21,521
But we're in a clean room,

15
00:00:21,588 --> 00:00:23,757
so that's why we are all wearing

16
00:00:23,823 --> 00:00:26,126
protective gear in here today.

17
00:00:26,192 --> 00:00:27,627
Now in this clean room,

18
00:00:27,694 --> 00:00:28,661
spacecraft have been

19
00:00:28,728 --> 00:00:30,463
put together for decades.

20
00:00:30,530 --> 00:00:31,598
And as I mentioned today,

21
00:00:31,664 --> 00:00:32,432
we're talking to you

22
00:00:32,499 --> 00:00:33,733
about an upcoming

23
00:00:33,800 --> 00:00:34,901
earth science mission

24
00:00:34,968 --> 00:00:36,469
called NISAR.

25
00:00:36,536 --> 00:00:38,171
Now, NISAR is going to be

26
00:00:38,238 --> 00:00:40,206
able to measure changes

27
00:00:40,273 --> 00:00:42,142
in the land and on ice

28
00:00:42,208 --> 00:00:44,277
all across the earth's surface

29
00:00:44,344 --> 00:00:46,813
with unprecedented precision.

30
00:00:46,880 --> 00:00:47,747
So we're going to be able

31
00:00:47,814 --> 00:00:49,082
to observe things like

32
00:00:49,149 --> 00:00:51,384
volcanoes and earthquakes

33
00:00:51,451 --> 00:00:52,919
as well as glaciers.

34
00:00:52,986 --> 00:00:54,087
Now it's set to launch

35
00:00:54,154 --> 00:00:56,222
in 2024, so next year.

36
00:00:56,289 --> 00:00:57,424
So you might be wondering,

37
00:00:57,490 --> 00:00:58,625
why are we talking about

38
00:00:58,691 --> 00:00:59,692

NISAR now when it's

39
00:00:59,759 --> 00:01:01,127
launching next year?

40
00:01:01,194 --> 00:01:02,128
Well, this is

41
00:01:02,195 --> 00:01:04,964
the scientific heart of NISAR

42
00:01:05,031 --> 00:01:06,599
here behind me.

43
00:01:06,666 --> 00:01:08,468
And shortly, it is going to be

44
00:01:08,535 --> 00:01:11,171
leaving JPL and heading to India

45
00:01:11,237 --> 00:01:12,872
where it is gonna go through

46
00:01:12,939 --> 00:01:15,175
further testing and integration.

47
00:01:15,241 --> 00:01:16,242
You heard me right.

48
00:01:16,309 --> 00:01:17,243
India.

49
00:01:17,310 --> 00:01:19,312
NISAR is a joint collaboration

50
00:01:19,379 --> 00:01:21,915
with the Indian Space Research

51
00:01:21,981 --> 00:01:25,151
Organization, ISRO, and NASA.

52
00:01:25,218 --> 00:01:25,919
And it's actually

53
00:01:25,985 --> 00:01:26,853
going to be launching

54
00:01:26,920 --> 00:01:28,421
from Southern India as well

55
00:01:28,488 --> 00:01:29,389
next year.

56
00:01:29,456 --> 00:01:30,623
So a lot of great things

57
00:01:30,690 --> 00:01:31,858
to look fro ward to.

58
00:01:31,925 --> 00:01:33,159
Now today, we're going to

59
00:01:33,226 --> 00:01:35,061
educate and learn

60
00:01:35,128 --> 00:01:36,663
so much about NISAR

61
00:01:36,729 --> 00:01:38,231
with two mission members.

62
00:01:38,298 --> 00:01:40,433
Our first mission member will be

63
00:01:40,500 --> 00:01:43,036

the deputy project scientist,

64
00:01:43,102 --> 00:01:44,637
Sue Owen, and then next,

65
00:01:44,704 --> 00:01:45,572
we'll be talking to

66
00:01:45,638 --> 00:01:47,240
the deputy project manager,

67
00:01:47,307 --> 00:01:48,875
Wendy Edelstein.

68
00:01:48,942 --> 00:01:49,576
And we're going to be

69
00:01:49,642 --> 00:01:50,743
answering your questions.

70
00:01:50,810 --> 00:01:52,078
So if you have any questions

71
00:01:52,145 --> 00:01:53,480
at all, make sure you put them

72
00:01:53,546 --> 00:01:54,514
in the comment box.

73
00:01:54,581 --> 00:01:55,748
And also, we're using

74
00:01:55,815 --> 00:01:57,650
the hashtag, #asknasa,

75
00:01:57,717 --> 00:01:58,485
on Twitter,

76
00:01:58,551 --> 00:01:59,419
and we'll get to all of

77
00:01:59,486 --> 00:02:00,787
your questions later on

78
00:02:00,854 --> 00:02:01,988
in the program.

79
00:02:02,055 --> 00:02:03,022
So first up, we're gonna

80
00:02:03,089 --> 00:02:03,990
talk to Sue.

81
00:02:04,057 --> 00:02:04,891
Thank you so much for

82
00:02:04,958 --> 00:02:06,125
being here today, Sue.

83
00:02:06,192 --> 00:02:07,427
>> Thank you for inviting me.

84
00:02:07,494 --> 00:02:08,328
And thanks, everybody,

85
00:02:08,394 --> 00:02:09,362
for showing up.

86
00:02:09,429 --> 00:02:10,430
>> So, like I said, this is

87
00:02:10,497 --> 00:02:11,831
a really cool place to be in.

88
00:02:11,898 --> 00:02:13,099

So tell the folks at home

89
00:02:13,166 --> 00:02:14,501
a little bit about where we are,

90
00:02:14,567 --> 00:02:15,635
why today is important,

91
00:02:15,702 --> 00:02:16,703
and looking at

92
00:02:16,769 --> 00:02:18,771
the scientific heart of NISAR.

93
00:02:18,838 --> 00:02:19,572
>> Oh, thank you.

94
00:02:19,639 --> 00:02:20,573
So-so we're here in

95
00:02:20,640 --> 00:02:22,041
the spacecraft assembly facility

96
00:02:22,108 --> 00:02:22,842
as you mentioned.

97
00:02:22,909 --> 00:02:23,977
It's a clean room where

98
00:02:24,043 --> 00:02:25,912
the spacecraft instruments are

99
00:02:25,979 --> 00:02:27,413
put together and integrated.

100
00:02:27,480 --> 00:02:28,848
So you can see behind you,

101
00:02:28,915 --> 00:02:31,217
the radar instruments for NISAR.

102
00:02:31,284 --> 00:02:32,519
So we're here today,

103
00:02:32,585 --> 00:02:34,153
as you mentioned, because it is

104
00:02:34,220 --> 00:02:36,489
about to get sent to India.

105
00:02:36,556 --> 00:02:38,591
And there are many people who

106
00:02:38,658 --> 00:02:39,926
have been involved with India--

107
00:02:39,993 --> 00:02:41,361
or involved with NISAR,

108
00:02:41,427 --> 00:02:43,229
uh, who are here today

109
00:02:43,296 --> 00:02:44,130
to commemorate

110
00:02:44,197 --> 00:02:45,565
this really important NI--

111
00:02:45,632 --> 00:02:47,200
milestone for NISAR.

112
00:02:47,267 --> 00:02:48,935
So the engineers have been

113
00:02:49,002 --> 00:02:50,136

hard at work integrating

114
00:02:50,203 --> 00:02:51,771
the two radars.

115
00:02:51,838 --> 00:02:53,606
So NISAR stands for

116
00:02:53,673 --> 00:02:55,708
the NASA-Israel Synthetic

117
00:02:55,775 --> 00:02:57,877
Aperture Radar mission.

118
00:02:57,944 --> 00:02:59,279
And so it's a radar mission

119
00:02:59,345 --> 00:03:00,346
that's gonna be observing

120
00:03:00,413 --> 00:03:01,915
the earth and making the--

121
00:03:01,981 --> 00:03:03,116
uh, very high precision

122
00:03:03,182 --> 00:03:04,183
measurements.

123
00:03:04,250 --> 00:03:06,586
Uh, but right now, they're

124
00:03:06,653 --> 00:03:08,054
finished with integrating

125
00:03:08,121 --> 00:03:09,422
the two different radars,

126
00:03:09,489 --> 00:03:11,224
the L band is a slightly

127
00:03:11,291 --> 00:03:12,191
longer wavelength,

128
00:03:12,258 --> 00:03:13,526
and the S band, which is

129
00:03:13,593 --> 00:03:15,028
a slightly shorter wavelength.

130
00:03:15,094 --> 00:03:16,462
Um, and it is about

131
00:03:16,529 --> 00:03:17,897
to get sent off to India.

132
00:03:17,964 --> 00:03:18,865
And as a result, we've had

133
00:03:18,932 --> 00:03:20,300
people from Israel.

134
00:03:20,366 --> 00:03:21,467
The Israel chairman is here.

135
00:03:21,534 --> 00:03:22,969
People from NASA headquarters.

136
00:03:23,036 --> 00:03:25,004
The head of earth science, uh,

137
00:03:25,071 --> 00:03:26,873
for NASA has been here today.

138
00:03:26,940 --> 00:03:29,242

And you here all get to be part

139
00:03:29,309 --> 00:03:30,543
of that through this social--

140
00:03:30,610 --> 00:03:32,145
this social media activity.

141
00:03:32,211 --> 00:03:33,580
>> Yes, uh, we're bringing them

142
00:03:33,646 --> 00:03:35,648
here to send off NISAR

143
00:03:35,715 --> 00:03:36,449
with all the fanfare

144
00:03:36,516 --> 00:03:37,717
it deserves for sure.

145
00:03:37,784 --> 00:03:38,551
So there's some key

146
00:03:38,618 --> 00:03:40,053
science instruments that are

147
00:03:40,119 --> 00:03:40,887
involved with this.

148
00:03:40,954 --> 00:03:41,754
Tell me a little bit about that.

149
00:03:41,821 --> 00:03:43,089
>> Okay, so-so the science

150
00:03:43,156 --> 00:03:44,324
instruments that-that are

151
00:03:44,390 --> 00:03:45,124
here that are getting

152
00:03:45,191 --> 00:03:46,059
built and integrated,

153
00:03:46,125 --> 00:03:47,961
it's synthetic aperture radar.

154
00:03:48,027 --> 00:03:49,362
So what does that mean?

155
00:03:49,429 --> 00:03:51,431
So the synthetic aperture part

156
00:03:51,497 --> 00:03:53,099
is that we're using the movement

157
00:03:53,166 --> 00:03:55,234
of the satellite through space

158
00:03:55,301 --> 00:03:57,403
to simulate a very large

159
00:03:57,470 --> 00:03:59,005
aperture for that radar.

160
00:03:59,072 --> 00:04:00,306
And so what does that mean?

161
00:04:00,373 --> 00:04:01,374
That means that we get

162
00:04:01,441 --> 00:04:03,876
very good spatial coverage,

163
00:04:03,943 --> 00:04:05,945

so we can cover more of the land

164
00:04:06,012 --> 00:04:07,614
and cover a greater part

165
00:04:07,680 --> 00:04:09,882
of the globe, uh, as well as

166
00:04:09,949 --> 00:04:11,584
getting very, what we say,

167
00:04:11,651 --> 00:04:13,019
high spatial resolution.

168
00:04:13,086 --> 00:04:14,420
So that means we can measure

169
00:04:14,487 --> 00:04:16,022
things that occur over

170
00:04:16,089 --> 00:04:18,024
smaller parts of the earth.

171
00:04:18,091 --> 00:04:20,326
So we'll be able to see changes

172
00:04:20,393 --> 00:04:22,061
that happen over areas

173
00:04:22,128 --> 00:04:24,697
that are as small as 10 meters,

174
00:04:24,764 --> 00:04:26,065
or if we're looking, say,

175
00:04:26,132 --> 00:04:27,567
at how change is occurring,

176
00:04:27,634 --> 00:04:29,769
um, in urban areas,

177
00:04:29,836 --> 00:04:30,703
we'll be able to measure

178
00:04:30,770 --> 00:04:31,738
changes that occur

179
00:04:31,804 --> 00:04:34,173
over less than a city block.

180
00:04:34,240 --> 00:04:36,109
Or if we're looking at changes

181
00:04:36,175 --> 00:04:37,877
in-in agricultural fields.

182
00:04:37,944 --> 00:04:39,245
We'll be able to see changes

183
00:04:39,312 --> 00:04:40,913
that occur over the scale

184
00:04:40,980 --> 00:04:42,515
of about 200 meters,

185
00:04:42,582 --> 00:04:43,549
which is about the scale

186
00:04:43,616 --> 00:04:45,018
of some agricultural fields,

187
00:04:45,084 --> 00:04:45,918
crop fields.

188
00:04:45,985 --> 00:04:49,155

So, uh, a lot of really

189
00:04:49,222 --> 00:04:50,323
exciting data that we're going

190
00:04:50,390 --> 00:04:51,691
to be getting from this radar.

191
00:04:51,758 --> 00:04:53,526
The radar is going to be, uh,

192
00:04:53,593 --> 00:04:55,995
basically transmitted from

193
00:04:56,062 --> 00:04:58,231
the satellite, uh, bounced off

194
00:04:58,297 --> 00:04:59,766
the earth, and then, um,

195
00:04:59,832 --> 00:05:01,701
received by the satellite,

196
00:05:01,768 --> 00:05:03,636
and then we'll use that signal

197
00:05:03,703 --> 00:05:06,506
to, as you mentioned, look at

198
00:05:06,572 --> 00:05:08,207
how the earth is changing.

199
00:05:08,274 --> 00:05:09,409
So what does that mean?

200
00:05:09,475 --> 00:05:11,511
Uh, one key measurement is

201
00:05:11,577 --> 00:05:13,746
using those signals to measure

202
00:05:13,813 --> 00:05:16,783
how fast the ground is moving.

203
00:05:16,849 --> 00:05:18,851
So, uh, when we're looking at

204
00:05:18,918 --> 00:05:20,453
volcanoes, for example,

205
00:05:20,520 --> 00:05:22,288
we can see if the volcano

206
00:05:22,355 --> 00:05:23,489
is moving upwards

207
00:05:23,556 --> 00:05:24,691
because there's magma

208
00:05:24,757 --> 00:05:25,725
coming underneath it.

209
00:05:25,792 --> 00:05:27,326
We're looking at landslides.

210
00:05:27,393 --> 00:05:28,795
We can look to see

211
00:05:28,861 --> 00:05:30,463
if landslides are starting

212
00:05:30,530 --> 00:05:32,498
to slip as a precursor

213
00:05:32,565 --> 00:05:34,300

to more catastrophic motion.

214
00:05:34,367 --> 00:05:35,735
If we're looking at areas

215
00:05:35,802 --> 00:05:37,870
where people have been pulling

216
00:05:37,937 --> 00:05:39,739
groundwater from underneath

217
00:05:39,806 --> 00:05:41,340
the surface of the earth,

218
00:05:41,407 --> 00:05:42,909
we can see that that causes

219
00:05:42,975 --> 00:05:44,610
the ground to sink.

220
00:05:44,677 --> 00:05:46,245
And so that gives us an idea

221
00:05:46,312 --> 00:05:47,747
of how much groundwater

222
00:05:47,814 --> 00:05:49,482
is being pulled from the ground

223
00:05:49,549 --> 00:05:51,417
as well as whether or not

224
00:05:51,484 --> 00:05:53,286
that sinking is affecting

225
00:05:53,352 --> 00:05:55,254
any of the bridge, roads,

226
00:05:55,321 --> 00:05:57,223
train tracks, buildings that are

227
00:05:57,290 --> 00:05:58,825
built on top of the surface.

228
00:05:58,891 --> 00:05:59,826
So lots of really

229
00:05:59,892 --> 00:06:00,927
exciting measurements

230
00:06:00,993 --> 00:06:02,462
of how the earth's surface

231
00:06:02,528 --> 00:06:03,496
is going to change.

232
00:06:03,563 --> 00:06:05,098
That's just-that's just a few.

233
00:06:05,164 --> 00:06:05,932
>> Right, and that's what

234
00:06:05,998 --> 00:06:06,999
we've always talked about, Sue.

235
00:06:07,066 --> 00:06:08,601
For folks at home, what I love

236
00:06:08,668 --> 00:06:10,036
about NISAR is it affects

237
00:06:10,103 --> 00:06:11,003
each and every one of you,

238
00:06:11,070 --> 00:06:11,804

and so that's what's

239
00:06:11,871 --> 00:06:12,572
amazing about it.

240
00:06:12,638 --> 00:06:13,840
Its applications are

241
00:06:13,906 --> 00:06:16,042
hundreds and hundreds of things.

242
00:06:16,109 --> 00:06:17,310
So tell folks at home

243
00:06:17,376 --> 00:06:18,177
a little bit about maybe

244
00:06:18,244 --> 00:06:19,645
a few of them that are--

245
00:06:19,712 --> 00:06:21,514
you're really interested in.

246
00:06:21,581 --> 00:06:21,948
>> Okay.

247
00:06:22,014 --> 00:06:22,682
>> Or that they would be

248
00:06:22,749 --> 00:06:23,382
really affected by.

249
00:06:23,449 --> 00:06:24,217
Because that's what's

250
00:06:24,283 --> 00:06:25,051
so great about this

251
00:06:25,118 --> 00:06:26,252
is it really groundbreaking.

252
00:06:26,319 --> 00:06:27,653
>> Yeah, good point.

253
00:06:27,720 --> 00:06:29,288
[laughter]

254
00:06:29,355 --> 00:06:31,224
Uh, so-so, I'm gonna

255
00:06:31,290 --> 00:06:32,225
talk about two.

256
00:06:32,291 --> 00:06:33,092
And one, I've already

257
00:06:33,159 --> 00:06:34,127
mentioned a little bit before,

258
00:06:34,193 --> 00:06:35,928
and that is volcanoes,

259
00:06:35,995 --> 00:06:36,929
because that's kind of

260
00:06:36,996 --> 00:06:37,864
near and dear to my heart.

261
00:06:37,930 --> 00:06:38,731
I started out as

262
00:06:38,798 --> 00:06:40,133
a volcano scientist.

263
00:06:40,199 --> 00:06:41,667

And so what we're really

264
00:06:41,734 --> 00:06:43,169
excited about with NISAR is

265
00:06:43,236 --> 00:06:46,939
by using the L band radar.

266
00:06:47,006 --> 00:06:49,675
So, L band, um, it's a radar

267
00:06:49,742 --> 00:06:51,944
that can see through vegetation

268
00:06:52,011 --> 00:06:54,680
more than the, um, global

269
00:06:54,747 --> 00:06:55,948
radar measurements that are

270
00:06:56,015 --> 00:06:56,916
currently out there.

271
00:06:56,983 --> 00:06:58,384
So there's volcanoes that

272
00:06:58,451 --> 00:07:00,253
we can't measure very accurately

273
00:07:00,319 --> 00:07:01,621
right now or as accurately

274
00:07:01,687 --> 00:07:04,157
as we would like to, um, because

275
00:07:04,223 --> 00:07:05,758
we don't have the continuous

276
00:07:05,825 --> 00:07:07,260
repeated observations

277
00:07:07,326 --> 00:07:09,195
from the L band radar.

278
00:07:09,262 --> 00:07:10,630
And so, people will be able

279
00:07:10,696 --> 00:07:13,566
to monitor volcanoes, see when

280
00:07:13,633 --> 00:07:14,967
they are starting to be active,

281
00:07:15,034 --> 00:07:16,936
see, um, once they start

282
00:07:17,003 --> 00:07:17,904
to be active if they are

283
00:07:17,970 --> 00:07:19,472
getting closer to eruptions, uh,

284
00:07:19,539 --> 00:07:21,407
and-and that's really important.

285
00:07:21,474 --> 00:07:22,308
Even if you don't live

286
00:07:22,375 --> 00:07:23,509
next to a volcano,

287
00:07:23,576 --> 00:07:26,045
a lot of the, uh, global flights

288
00:07:26,112 --> 00:07:28,347

go over areas that-that

289
00:07:28,414 --> 00:07:29,782
have volcanic activity,

290
00:07:29,849 --> 00:07:31,150
and so it's really important

291
00:07:31,217 --> 00:07:32,552
for airline traffic

292
00:07:32,618 --> 00:07:34,320
to also be aware of

293
00:07:34,387 --> 00:07:36,155
when volcanoes are erupting,

294
00:07:36,222 --> 00:07:37,790
even if they're far away from

295
00:07:37,857 --> 00:07:38,958
where people live.

296
00:07:39,025 --> 00:07:40,760
Uh, another application

297
00:07:40,827 --> 00:07:41,994
that's really important is

298
00:07:42,061 --> 00:07:44,063
how NISAR's gonna be used

299
00:07:44,130 --> 00:07:45,498
to measure soil moisture.

300
00:07:45,565 --> 00:07:46,899
So we're going to be able

301
00:07:46,966 --> 00:07:48,701
to measure how wet

302
00:07:48,768 --> 00:07:50,136
the top layer of the earth

303
00:07:50,203 --> 00:07:53,072
is globally at field scales,

304
00:07:53,139 --> 00:07:54,106
as I mentioned before.

305
00:07:54,173 --> 00:07:55,675
And so that's gonna be helpful

306
00:07:55,741 --> 00:07:57,677
not only for agricultural

307
00:07:57,743 --> 00:07:59,846
management, but also for seeing

308
00:07:59,912 --> 00:08:02,081
where areas are wet or dry

309
00:08:02,148 --> 00:08:04,150
as we're looking at, um,

310
00:08:04,217 --> 00:08:05,651
where wildfires might happen.

311
00:08:05,718 --> 00:08:07,220
So it will help with,

312
00:08:07,286 --> 00:08:08,821
uh, wildfire management,

313
00:08:08,888 --> 00:08:11,991

and it was also, um, be

314
00:08:12,058 --> 00:08:13,659
helpful in kind of understand

315
00:08:13,726 --> 00:08:15,328
how ecosystems are changing

316
00:08:15,394 --> 00:08:17,230
in response to changing

317
00:08:17,296 --> 00:08:18,431
soil moisture.

318
00:08:18,497 --> 00:08:19,298
So those are just

319
00:08:19,365 --> 00:08:20,867
two of many applications

320
00:08:20,933 --> 00:08:21,934
that NISAR has.

321
00:08:22,001 --> 00:08:23,002
>> Yes, just two.

322
00:08:23,069 --> 00:08:24,270
And, uh, you can always

323
00:08:24,337 --> 00:08:26,539
go onto NISAR's website and see

324
00:08:26,606 --> 00:08:28,541
the many applications, and also

325
00:08:28,608 --> 00:08:29,909
the many early adopters--

326
00:08:29,976 --> 00:08:30,643
>> Yes!

327
00:08:30,710 --> 00:08:31,510
>> ...that are adopting

328
00:08:31,577 --> 00:08:32,411
NISAR's program.

329
00:08:32,478 --> 00:08:33,846
And so you touched on this

330
00:08:33,913 --> 00:08:34,547
just a little bit, Sue,

331
00:08:34,614 --> 00:08:35,581
but I think that folks at home

332
00:08:35,648 --> 00:08:36,883
will be so fascinated by this,

333
00:08:36,949 --> 00:08:38,517
but it sees through all weather.

334
00:08:38,584 --> 00:08:39,285
>> Yeah!

335
00:08:39,352 --> 00:08:39,952
>> And we've never been able

336
00:08:40,019 --> 00:08:40,620
to do that before.

337
00:08:40,686 --> 00:08:41,354
So like, clouds,

338
00:08:41,420 --> 00:08:42,321

raining, thunderstorms,

339
00:08:42,388 --> 00:08:43,189
it sees through all that.

340
00:08:43,256 --> 00:08:43,956
>> Yes, no, that's

341
00:08:44,023 --> 00:08:44,891
a really good point.

342
00:08:44,957 --> 00:08:46,125
So one of the other exciting

343
00:08:46,192 --> 00:08:48,027
things about, uh, radar data is

344
00:08:48,094 --> 00:08:50,096
that it can see through clouds.

345
00:08:50,162 --> 00:08:52,031
And so there are types--

346
00:08:52,098 --> 00:08:53,366
there are areas on the globe

347
00:08:53,432 --> 00:08:54,734
where we haven't been able to

348
00:08:54,800 --> 00:08:56,836
study as well, as consistently

349
00:08:56,903 --> 00:08:57,770
as we would like,

350
00:08:57,837 --> 00:08:58,905
because they're mostly

351
00:08:58,971 --> 00:09:00,406
covered in-in cloud cover.

352
00:09:00,473 --> 00:09:03,442
Or, say, if we're trying to see

353
00:09:03,509 --> 00:09:04,877
where there is flooding

354
00:09:04,944 --> 00:09:06,579
after a major hurricane

355
00:09:06,646 --> 00:09:07,947
or a major storm,

356
00:09:08,014 --> 00:09:10,283
radar can be used to map

357
00:09:10,349 --> 00:09:11,751
the extent of the floods

358
00:09:11,817 --> 00:09:13,352
and it can see through

359
00:09:13,419 --> 00:09:14,186
the clouds that are

360
00:09:14,253 --> 00:09:15,121
often still there.

361
00:09:15,187 --> 00:09:17,023
So, you know, it complements

362
00:09:17,089 --> 00:09:18,925
the-the type of data that

363
00:09:18,991 --> 00:09:20,626

we get from optical satellites

364
00:09:20,693 --> 00:09:22,595
really nicely because it is

365
00:09:22,662 --> 00:09:24,430
able to see through clouds.

366
00:09:24,497 --> 00:09:25,264
>> That's great, so tell

367
00:09:25,331 --> 00:09:26,332
folks at home a little bit

368
00:09:26,399 --> 00:09:27,767
about what it is that you do

369
00:09:27,833 --> 00:09:28,501
on the mission

370
00:09:28,567 --> 00:09:30,536
as a deputy project scientist.

371
00:09:30,603 --> 00:09:31,370
>> Great, yeah, no,

372
00:09:31,437 --> 00:09:32,605
deputy project scientist

373
00:09:32,672 --> 00:09:33,773
is a really great job.

374
00:09:33,839 --> 00:09:34,974
Uh, I've been in it

375
00:09:35,041 --> 00:09:36,275
for about three years now.

376
00:09:36,342 --> 00:09:38,611
And what we do is what I--

377
00:09:38,678 --> 00:09:39,612
you know, I-I work closely

378
00:09:39,679 --> 00:09:40,713
with a project scientist

379
00:09:40,780 --> 00:09:42,848
and my job is primarily

380
00:09:42,915 --> 00:09:44,617
to interact with,

381
00:09:44,684 --> 00:09:46,419
and interface with the engineers

382
00:09:46,485 --> 00:09:47,653
to make sure that as they're

383
00:09:47,720 --> 00:09:49,355
building the instrument,

384
00:09:49,422 --> 00:09:50,289
as we're building

385
00:09:50,356 --> 00:09:51,457
the science data systems,

386
00:09:51,524 --> 00:09:53,292
you know, we're keeping in mind

387
00:09:53,359 --> 00:09:54,694
the science that's

388
00:09:54,760 --> 00:09:55,928

going to be done at the end

389
00:09:55,995 --> 00:09:57,697
and making sure that it's--

390
00:09:57,763 --> 00:09:59,765
uh, you know, any decisions

391
00:09:59,832 --> 00:10:01,600
that are made are going

392
00:10:01,667 --> 00:10:03,102
to maximize the science

393
00:10:03,169 --> 00:10:04,570
that we get at the end.

394
00:10:04,637 --> 00:10:05,638
And then, the other part

395
00:10:05,705 --> 00:10:06,739
is talking to the science

396
00:10:06,806 --> 00:10:08,507
community, including

397
00:10:08,574 --> 00:10:11,210
the science community in India.

398
00:10:11,277 --> 00:10:12,011
They are part of this--

399
00:10:12,078 --> 00:10:13,079
this project as well.

400
00:10:13,145 --> 00:10:14,981
We have Israel counterparts

401
00:10:15,047 --> 00:10:16,449
on the science team,

402
00:10:16,515 --> 00:10:18,617
uh, and there, we're telling

403
00:10:18,684 --> 00:10:20,519
them about the type of data

404
00:10:20,586 --> 00:10:22,288
that NISAR is gonna provide.

405
00:10:22,355 --> 00:10:23,489
It's a new type of measurement,

406
00:10:23,556 --> 00:10:24,690
so we're doing a lot

407
00:10:24,757 --> 00:10:25,992
of communicating with

408
00:10:26,058 --> 00:10:26,726
the science community

409
00:10:26,792 --> 00:10:28,160
to get them ready,

410
00:10:28,227 --> 00:10:29,628
so that once NISAR launches

411
00:10:29,695 --> 00:10:30,830
and once the data starts

412
00:10:30,896 --> 00:10:32,264
flowing, they're ready

413
00:10:32,331 --> 00:10:33,833

to start doing their science.

414
00:10:33,899 --> 00:10:34,800
>> That's so amazing.

415
00:10:34,867 --> 00:10:35,735
It's just putting the tools

416
00:10:35,801 --> 00:10:36,702
in their hands so they are

417
00:10:36,769 --> 00:10:37,603
just ready to go.

418
00:10:37,670 --> 00:10:38,137
>> Yeah.

419
00:10:38,204 --> 00:10:38,704
>> All right, well,

420
00:10:38,771 --> 00:10:39,405
we're getting tons of questions

421
00:10:39,472 --> 00:10:40,506
from you, so thank you so much

422
00:10:40,573 --> 00:10:41,841
for interacting with us.

423
00:10:41,907 --> 00:10:43,309
So, are you ready for a couple

424
00:10:43,376 --> 00:10:44,543
of questions from the public?

425
00:10:44,610 --> 00:10:45,144
>> Sure.

426
00:10:45,211 --> 00:10:45,978
>> All right, Sue.

427
00:10:46,045 --> 00:10:48,180
First comes from Maddie Doser

428
00:10:48,247 --> 00:10:49,815
on Instagram asking,

429
00:10:49,882 --> 00:10:51,117
"Can the satellite be used

430
00:10:51,183 --> 00:10:54,153
to document weather patterns?"

431
00:10:54,220 --> 00:10:56,322
>> So, the radar is really

432
00:10:56,389 --> 00:10:58,324
seeing through the weather.

433
00:10:58,391 --> 00:11:00,159
Uh, so what we can do

434
00:11:00,226 --> 00:11:02,194
is-is document the influence

435
00:11:02,261 --> 00:11:03,763
of the weather patterns

436
00:11:03,829 --> 00:11:04,830
on the ground.

437
00:11:04,897 --> 00:11:06,032
So, when I was talking

438
00:11:06,098 --> 00:11:06,932

about flooding--

439
00:11:06,999 --> 00:11:09,335
so if you have storms

440
00:11:09,402 --> 00:11:10,536
that are causing flooded areas,

441
00:11:10,603 --> 00:11:11,971
that's what the radar

442
00:11:12,038 --> 00:11:13,039
is going to be really good

443
00:11:13,105 --> 00:11:14,106
at-at documenting,

444
00:11:14,173 --> 00:11:15,841
not so much seeing

445
00:11:15,908 --> 00:11:16,575
where the clouds are,

446
00:11:16,642 --> 00:11:18,010
because we're actually--

447
00:11:18,077 --> 00:11:19,412
you know, the radar just shoots

448
00:11:19,478 --> 00:11:21,347
right through the clouds.

449
00:11:21,414 --> 00:11:22,448
>> All right, next comes

450
00:11:22,515 --> 00:11:24,350
from Ally Bron on Instagram,

451
00:11:24,417 --> 00:11:26,752
asking, "How is NISAR different

452
00:11:26,819 --> 00:11:28,654
from missions like SWAT,

453
00:11:28,721 --> 00:11:29,321
which just launched

454
00:11:29,388 --> 00:11:30,322
in December?"

455
00:11:30,389 --> 00:11:31,023
>> Yeah, that's a really

456
00:11:31,090 --> 00:11:32,124
great question.

457
00:11:32,191 --> 00:11:33,692
So, NASA has a lot

458
00:11:33,759 --> 00:11:34,994
of earth science satellites,

459
00:11:35,061 --> 00:11:35,895
and sometimes,

460
00:11:35,961 --> 00:11:37,029
at the very high level,

461
00:11:37,096 --> 00:11:38,564
they can sound kind of similar.

462
00:11:38,631 --> 00:11:41,667
So, SWAT has a radar as well,

463
00:11:41,734 --> 00:11:42,868

but it is a different--

464
00:11:42,935 --> 00:11:44,303
it's specialized to be looking

465
00:11:44,370 --> 00:11:46,439
at how the oceans are changing,

466
00:11:46,505 --> 00:11:48,441
so it is going to be one

467
00:11:48,507 --> 00:11:49,675
focused on measuring

468
00:11:49,742 --> 00:11:51,077
in the oceans, and NISAR

469
00:11:51,143 --> 00:11:52,278
is not going to be making

470
00:11:52,344 --> 00:11:53,746
very much observations

471
00:11:53,813 --> 00:11:54,947
over the ocean.

472
00:11:55,014 --> 00:11:56,348
SWAT is also gonna be

473
00:11:56,415 --> 00:11:58,617
measuring the water on land,

474
00:11:58,684 --> 00:11:59,518
but it's gonna be looking

475
00:11:59,585 --> 00:12:01,253
at the elevation and the change

476
00:12:01,320 --> 00:12:03,122
in the elevation of the water,

477
00:12:03,189 --> 00:12:05,224
whereas what NISAR is gonna

478
00:12:05,291 --> 00:12:06,659
be focused more on what--

479
00:12:06,725 --> 00:12:08,227
how the land is changing,

480
00:12:08,294 --> 00:12:09,695
how the ice is changing,

481
00:12:09,762 --> 00:12:10,463
and it will be able

482
00:12:10,529 --> 00:12:13,232
to detect where the boundary

483
00:12:13,299 --> 00:12:13,966
between the land

484
00:12:14,033 --> 00:12:15,201
and the water is,

485
00:12:15,267 --> 00:12:16,068
and so we call that

486
00:12:16,135 --> 00:12:17,436
the water extent.

487
00:12:17,503 --> 00:12:18,671
So, that's what we use

488
00:12:18,737 --> 00:12:20,272

to, say, map floods

489
00:12:20,339 --> 00:12:22,174
and to map changes in wetlands.

490
00:12:22,241 --> 00:12:24,343
So, it's a very complimentary

491
00:12:24,410 --> 00:12:25,811
set of observations

492
00:12:25,878 --> 00:12:26,979
that SWAT is making.

493
00:12:27,046 --> 00:12:27,746
>> And like you said,

494
00:12:27,813 --> 00:12:28,647
it's so complimentary.

495
00:12:28,714 --> 00:12:29,582
A lot of our Earth

496
00:12:29,648 --> 00:12:30,316
satellite missions,

497
00:12:30,382 --> 00:12:33,185
when they are grouped together,

498
00:12:33,252 --> 00:12:33,919
the data becomes

499
00:12:33,986 --> 00:12:34,753
even more amazing

500
00:12:34,820 --> 00:12:35,855
than it is by itself.

501
00:12:35,921 --> 00:12:37,256
>> Yes. Yeah, and I like

502
00:12:37,323 --> 00:12:38,257
to think of it kind of like

503
00:12:38,324 --> 00:12:40,159
if you're going to the doctor,

504
00:12:40,226 --> 00:12:41,527
you don't just--

505
00:12:41,594 --> 00:12:42,761
the doctor doesn't just take

506
00:12:42,828 --> 00:12:43,596
one measurement.

507
00:12:43,662 --> 00:12:44,597
They don't just, you know,

508
00:12:44,663 --> 00:12:45,831
take a blood test

509
00:12:45,898 --> 00:12:46,799
and then they're able

510
00:12:46,866 --> 00:12:48,834
to solve all of the things

511
00:12:48,901 --> 00:12:49,435
that, you know,

512
00:12:49,502 --> 00:12:50,436
might be wrong with you

513
00:12:50,503 --> 00:12:51,270

or might-- you might

514
00:12:51,337 --> 00:12:52,605
be having problems with.

515
00:12:52,671 --> 00:12:53,506
We always-- when we go

516
00:12:53,572 --> 00:12:54,306
to the doctor, we're used

517
00:12:54,373 --> 00:12:56,008
to getting multiple tests

518
00:12:56,075 --> 00:12:56,709
so that the doctor

519
00:12:56,775 --> 00:12:57,676
can really figure out

520
00:12:57,743 --> 00:12:59,745
what's going on within you,

521
00:12:59,812 --> 00:13:01,280
and so the same is true

522
00:13:01,347 --> 00:13:02,548
for how we're making

523
00:13:02,615 --> 00:13:04,049
observations of the Earth.

524
00:13:04,116 --> 00:13:06,418
We need multiple sets of data

525
00:13:06,485 --> 00:13:08,053
to really diagnose

526
00:13:08,120 --> 00:13:09,722
how the Earth is changing,

527
00:13:09,788 --> 00:13:10,656
and to help make sure

528
00:13:10,723 --> 00:13:12,424
that, you know, we can manage

529
00:13:12,491 --> 00:13:13,592
the Earth's response

530
00:13:13,659 --> 00:13:15,060
to-to what we're doing.

531
00:13:15,127 --> 00:13:15,761
>> That's right. For the future.

532
00:13:15,828 --> 00:13:16,295
>> Yes.

533
00:13:16,362 --> 00:13:17,263
>> Yes, all right.

534
00:13:17,329 --> 00:13:18,564
Next is The Lord Plord

535
00:13:18,631 --> 00:13:20,299
on Instagram, asks--

536
00:13:20,366 --> 00:13:20,866
that's a great name.

537
00:13:20,933 --> 00:13:21,400
>> Yeah.

538
00:13:21,467 --> 00:13:22,868

>> "Is the data received

539
00:13:22,935 --> 00:13:23,836
from the satellite

540
00:13:23,903 --> 00:13:25,371
open to the public?"

541
00:13:25,437 --> 00:13:26,839
>> Yes, so all NASA data

542
00:13:26,906 --> 00:13:28,240
is free and open.

543
00:13:28,307 --> 00:13:30,009
Uh, the data from NISAR

544
00:13:30,075 --> 00:13:32,178
will be distributed through a--

545
00:13:32,244 --> 00:13:33,479
we call it a DAAC,

546
00:13:33,546 --> 00:13:34,914
a distributed active

547
00:13:34,980 --> 00:13:36,182
archive center.

548
00:13:36,248 --> 00:13:37,716
Uh, it's the Alaska

549
00:13:37,783 --> 00:13:39,018
Satellite Facility,

550
00:13:39,084 --> 00:13:40,619
uh, up in Fairbanks, Alaska

551
00:13:40,686 --> 00:13:42,688
is the DAAC-- the official DAAC

552
00:13:42,755 --> 00:13:44,023
for NISAR data,

553
00:13:44,089 --> 00:13:46,258
and so 90 days after launch

554
00:13:46,325 --> 00:13:47,226
after we go through

555
00:13:47,293 --> 00:13:48,294
our commissioning phase,

556
00:13:48,360 --> 00:13:49,828
the data will be available

557
00:13:49,895 --> 00:13:52,264
through the ASF DAAC.

558
00:13:52,331 --> 00:13:54,500
>> That's awesome. All right.

559
00:13:54,567 --> 00:13:55,334
Okay, well that's

560
00:13:55,401 --> 00:13:55,968
all the questions

561
00:13:56,035 --> 00:13:56,835
that we have for you, Sue,

562
00:13:56,902 --> 00:13:57,636
but we're gonna bring you back

563
00:13:57,703 --> 00:13:58,737

a little bit later

564
00:13:58,804 --> 00:14:00,039
to talk with Wendy as well,

565
00:14:00,105 --> 00:14:00,973
but before you go,

566
00:14:01,040 --> 00:14:01,674
I know you've been

567
00:14:01,740 --> 00:14:02,875
on the mission for a while,

568
00:14:02,942 --> 00:14:03,943
so tell us how long

569
00:14:04,009 --> 00:14:04,810
you've been on the mission

570
00:14:04,877 --> 00:14:06,378
and maybe a really memorable

571
00:14:06,445 --> 00:14:07,346
memory that you have.

572
00:14:07,413 --> 00:14:07,947
>> Oh, wow.

573
00:14:08,013 --> 00:14:09,181
Okay, so-so I've been

574
00:14:09,248 --> 00:14:10,216
deputy project scientist

575
00:14:10,282 --> 00:14:11,483
for about three years,

576
00:14:11,550 --> 00:14:12,084
and then I've been working

577
00:14:12,151 --> 00:14:13,185
with the team,

578
00:14:13,252 --> 00:14:14,353
um, on applications

579
00:14:14,420 --> 00:14:16,522
for about ten years or so.

580
00:14:16,589 --> 00:14:17,990
And you know, for me,

581
00:14:18,057 --> 00:14:19,725
uh, most recently,

582
00:14:19,792 --> 00:14:21,727
a really memorable memory

583
00:14:21,794 --> 00:14:23,195
is we had our NISAR

584
00:14:23,262 --> 00:14:25,064
science community workshop

585
00:14:25,130 --> 00:14:26,398
just this past summer

586
00:14:26,465 --> 00:14:27,900
in Pasadena,

587
00:14:27,967 --> 00:14:28,601
and this was something

588
00:14:28,667 --> 00:14:29,635

that we had planned to do

589
00:14:29,702 --> 00:14:31,070
in 2020.

590
00:14:31,136 --> 00:14:32,204
[laughs]

591
00:14:32,271 --> 00:14:33,606
And then it got postponed,

592
00:14:33,672 --> 00:14:35,407
and then it got postponed again,

593
00:14:35,474 --> 00:14:36,575
uh, and so-- and then,

594
00:14:36,642 --> 00:14:37,543
when we did meet,

595
00:14:37,610 --> 00:14:38,978
there was so much excitement

596
00:14:39,044 --> 00:14:40,512
from the science community

597
00:14:40,579 --> 00:14:42,648
about NISAR, and so, you know,

598
00:14:42,715 --> 00:14:43,816
people were just so excited

599
00:14:43,882 --> 00:14:44,883
to get this data.

600
00:14:44,950 --> 00:14:45,784
So, that was just

601
00:14:45,851 --> 00:14:46,852
an amazing event for me,

602
00:14:46,919 --> 00:14:48,687
and lots of fun memories.

603
00:14:48,754 --> 00:14:49,388
>> Well, I am so glad

604
00:14:49,455 --> 00:14:50,489
that things are calming down

605
00:14:50,556 --> 00:14:51,824
and we're finally getting

606
00:14:51,890 --> 00:14:52,791
a little bit back to normal,

607
00:14:52,858 --> 00:14:53,626
but thank you so much

608
00:14:53,692 --> 00:14:54,593
for being here with us, Sue.

609
00:14:54,660 --> 00:14:55,060
We'll see you

610
00:14:55,127 --> 00:14:55,828
in just a little bit.

611
00:14:55,894 --> 00:14:56,362
>> Great.

612
00:14:56,428 --> 00:14:56,929
>> And if you're just

613
00:14:56,996 --> 00:14:58,430

joining us, we are here

614
00:14:58,497 --> 00:15:00,099
at Jet Propulsion Laboratory

615
00:15:00,165 --> 00:15:01,166
in Southern California

616
00:15:01,233 --> 00:15:02,468
in a clean room.

617
00:15:02,534 --> 00:15:03,102
That's why we're wearing

618
00:15:03,168 --> 00:15:04,303
protective gear,

619
00:15:04,370 --> 00:15:05,137
and we're talking about

620
00:15:05,204 --> 00:15:06,672
an upcoming Earth mission

621
00:15:06,739 --> 00:15:08,407
called NISAR, and now

622
00:15:08,474 --> 00:15:09,875
we're switching over here--

623
00:15:09,942 --> 00:15:10,743
gears to Wendy,

624
00:15:10,809 --> 00:15:12,211
who is the deputy

625
00:15:12,278 --> 00:15:13,579
project manager.

626
00:15:13,646 --> 00:15:14,146
Thanks so much

627
00:15:14,213 --> 00:15:15,080
for joining us, Wendy.

628
00:15:15,147 --> 00:15:15,914
>> Oh, glad to be here.

629
00:15:15,981 --> 00:15:16,582
Hello, everybody.

630
00:15:16,649 --> 00:15:17,650
>> So, tell us a little bit

631
00:15:17,716 --> 00:15:18,917
about what it is that you do.

632
00:15:18,984 --> 00:15:19,551
What is a deputy

633
00:15:19,618 --> 00:15:20,452
project manager?

634
00:15:20,519 --> 00:15:21,220
>> So, I would say

635
00:15:21,287 --> 00:15:22,388
a deputy project manager--

636
00:15:22,454 --> 00:15:23,489
I wear a lot of hats.

637
00:15:23,555 --> 00:15:25,424
I'm responsible for basically

638
00:15:25,491 --> 00:15:26,792

making sure this beautiful

639
00:15:26,859 --> 00:15:28,427
instrument is designed,

640
00:15:28,494 --> 00:15:30,195
built, tested properly.

641
00:15:30,262 --> 00:15:31,163
I need to work carefully

642
00:15:31,230 --> 00:15:32,097
with our scientists,

643
00:15:32,164 --> 00:15:33,065
like Sue and others,

644
00:15:33,132 --> 00:15:33,999
to make sure that we're meeting

645
00:15:34,066 --> 00:15:34,867
the mission objectives

646
00:15:34,933 --> 00:15:35,634
and we're building

647
00:15:35,701 --> 00:15:36,802
the right instrument.

648
00:15:36,869 --> 00:15:37,670
That takes, you know,

649
00:15:37,736 --> 00:15:38,637
a fair amount of effort

650
00:15:38,704 --> 00:15:39,938
to make sure we can

651
00:15:40,005 --> 00:15:41,240
do that properly.

652
00:15:41,307 --> 00:15:42,508
I work with those problems.

653
00:15:42,574 --> 00:15:43,942
I help deal with issues

654
00:15:44,009 --> 00:15:44,610
that they come up.

655
00:15:44,677 --> 00:15:46,045
I help remove roadblocks

656
00:15:46,111 --> 00:15:47,279
when there's a problem.

657
00:15:47,346 --> 00:15:47,980
So all those things

658
00:15:48,047 --> 00:15:49,181
I have to do.

659
00:15:49,248 --> 00:15:50,115
Another important part

660
00:15:50,182 --> 00:15:51,950
of my job, of course, is to work

661
00:15:52,017 --> 00:15:53,218
with our Israel colleagues,

662
00:15:53,285 --> 00:15:54,186
because we work across

663
00:15:54,253 --> 00:15:55,421

the world from them,

664
00:15:55,487 --> 00:15:56,121
and so it takes a lot

665
00:15:56,188 --> 00:15:56,955
of collaboration

666
00:15:57,022 --> 00:15:58,123
and coordination,

667
00:15:58,190 --> 00:15:59,725
and a lot of late night telecons

668
00:15:59,792 --> 00:16:01,093
to work with them

669
00:16:01,160 --> 00:16:02,227
and to-to make sure

670
00:16:02,294 --> 00:16:03,362
that we understand

671
00:16:03,429 --> 00:16:04,396
what we're doing,

672
00:16:04,463 --> 00:16:05,331
we have built the right--

673
00:16:05,397 --> 00:16:06,298
the interfaces

674
00:16:06,365 --> 00:16:07,232
with our designs,

675
00:16:07,299 --> 00:16:08,033
and that ultimately,

676
00:16:08,100 --> 00:16:08,600
the two systems

677
00:16:08,667 --> 00:16:09,635
will come together,

678
00:16:09,702 --> 00:16:10,769
so that takes-- that's really

679
00:16:10,836 --> 00:16:12,638
the third component of my job.

680
00:16:12,705 --> 00:16:14,073
>> Yes, and time changes,

681
00:16:14,139 --> 00:16:15,374
global pandemics-- you guys

682
00:16:15,441 --> 00:16:16,175
have been through it all,

683
00:16:16,241 --> 00:16:17,343
which has been so amazing

684
00:16:17,409 --> 00:16:19,078
because you have overcome.

685
00:16:19,144 --> 00:16:20,746
>> Yeah, it has been--

686
00:16:20,813 --> 00:16:21,680
it's interesting because

687
00:16:21,747 --> 00:16:22,648
we started testing

688
00:16:22,715 --> 00:16:23,982

the two systems--

689
00:16:24,049 --> 00:16:24,616
we started testing

690
00:16:24,683 --> 00:16:25,417
the L-band radar,

691
00:16:25,484 --> 00:16:26,618
which is right behind me,

692
00:16:26,685 --> 00:16:28,287
in 2019 and 2020

693
00:16:28,354 --> 00:16:29,355
through the pandemic,

694
00:16:29,421 --> 00:16:30,155
and then also through

695
00:16:30,222 --> 00:16:32,191
the pandemic, the S-band radar

696
00:16:32,257 --> 00:16:33,292
from India joined us

697
00:16:33,359 --> 00:16:34,460
here at JPL.

698
00:16:34,526 --> 00:16:35,394
That got integrated.

699
00:16:35,461 --> 00:16:36,829
We had many people from India

700
00:16:36,895 --> 00:16:38,297
who joined us from there.

701
00:16:38,364 --> 00:16:39,298
We worked together,

702
00:16:39,365 --> 00:16:40,232
side by side,

703
00:16:40,299 --> 00:16:41,400
through the pandemic,

704
00:16:41,467 --> 00:16:42,368
which was challenging,

705
00:16:42,434 --> 00:16:43,836
and now for the last year or so,

706
00:16:43,902 --> 00:16:45,170
we've been actually finalizing

707
00:16:45,237 --> 00:16:46,672
the testing of this system

708
00:16:46,739 --> 00:16:48,841
and putting it all together,

709
00:16:48,907 --> 00:16:49,675
finishing the testing,

710
00:16:49,742 --> 00:16:50,743
and preparing to take it

711
00:16:50,809 --> 00:16:51,977
to India for the final phase

712
00:16:52,044 --> 00:16:53,645
of the journey.

713
00:16:53,712 --> 00:16:54,780

>> So, I know people at home

714
00:16:54,847 --> 00:16:56,315
are like, "Okay, let's talk

715
00:16:56,382 --> 00:16:57,583
about the instrument," right?

716
00:16:57,649 --> 00:16:59,284
I mean, this is really cool,

717
00:16:59,351 --> 00:17:00,119
so can you point out

718
00:17:00,185 --> 00:17:01,420
what exactly it is

719
00:17:01,487 --> 00:17:02,388
that we're looking at here?

720
00:17:02,454 --> 00:17:03,188
It's considered

721
00:17:03,255 --> 00:17:04,289
the scientific car

722
00:17:04,356 --> 00:17:06,191
which Sue talked about

723
00:17:06,258 --> 00:17:07,259
a little bit, but just point out

724
00:17:07,326 --> 00:17:08,227
some really cool things

725
00:17:08,293 --> 00:17:09,061
to folks at home.

726
00:17:09,128 --> 00:17:10,262
>> Right, so this whole thing--

727
00:17:10,329 --> 00:17:10,729
you know, this--

728
00:17:10,796 --> 00:17:11,430
some people might think

729
00:17:11,497 --> 00:17:12,331
it's the actual spacecraft.

730
00:17:12,398 --> 00:17:13,999
This is just the instrument.

731
00:17:14,066 --> 00:17:14,533
The spacecraft

732
00:17:14,600 --> 00:17:15,634
is not even here yet.

733
00:17:15,701 --> 00:17:16,902
That's gonna get attached

734
00:17:16,969 --> 00:17:17,736
to the instrument

735
00:17:17,803 --> 00:17:19,438
when we move to India,

736
00:17:19,505 --> 00:17:20,706
but right here is what's called

737
00:17:20,773 --> 00:17:22,408
the radar instrument structure.

738
00:17:22,474 --> 00:17:23,809

What you see is--

739
00:17:23,876 --> 00:17:25,611
all this gold is covering

740
00:17:25,677 --> 00:17:26,779
a lot of electronics,

741
00:17:26,845 --> 00:17:28,013
but the electronics

742
00:17:28,080 --> 00:17:29,381
are broken up into two pieces.

743
00:17:29,448 --> 00:17:30,783
We have the S-band system

744
00:17:30,849 --> 00:17:32,284
that Sue talked about.

745
00:17:32,351 --> 00:17:33,085
That's the part that was

746
00:17:33,152 --> 00:17:34,653
contributed by Israel.

747
00:17:34,720 --> 00:17:36,422
That's buried inside the system.

748
00:17:36,488 --> 00:17:37,589
You can't see that anymore

749
00:17:37,656 --> 00:17:39,858
because we integrated it,

750
00:17:39,925 --> 00:17:40,759
installed it,

751
00:17:40,826 --> 00:17:41,693
closed everything in.

752
00:17:41,760 --> 00:17:42,694
That's buttoned up,

753
00:17:42,761 --> 00:17:43,929
but what you still can see

754
00:17:43,996 --> 00:17:44,830
if you look carefully

755
00:17:44,897 --> 00:17:46,665
is a lot of the L-band radar

756
00:17:46,732 --> 00:17:47,900
electronics on the outside

757
00:17:47,966 --> 00:17:49,201
of the system, and you can see,

758
00:17:49,268 --> 00:17:50,436
if you look carefully,

759
00:17:50,502 --> 00:17:51,870
there's some silver patches.

760
00:17:51,937 --> 00:17:53,105
Those are all what we call

761
00:17:53,172 --> 00:17:54,540
transmit receive modules.

762
00:17:54,606 --> 00:17:56,108
Those are the-the primary

763
00:17:56,175 --> 00:17:57,843

interface to our antenna feed,

764
00:17:57,910 --> 00:17:59,178
and there's 24 of them,

765
00:17:59,244 --> 00:18:00,379
12 H-polarization

766
00:18:00,446 --> 00:18:01,947
and 12 V-polarization,

767
00:18:02,014 --> 00:18:02,815
and together, they make

768
00:18:02,881 --> 00:18:05,150
basically 24 separate radars,

769
00:18:05,217 --> 00:18:06,351
so it's like testing

770
00:18:06,418 --> 00:18:08,654
24 different systems,

771
00:18:08,720 --> 00:18:10,122
but those all work together,

772
00:18:10,189 --> 00:18:11,390
and those white panels

773
00:18:11,457 --> 00:18:12,357
across the top--

774
00:18:12,424 --> 00:18:13,192
there's six panels.

775
00:18:13,258 --> 00:18:14,593
Those are our antenna feeds.

776
00:18:14,660 --> 00:18:15,794
Those are the L-band feeds,

777
00:18:15,861 --> 00:18:16,562
and right below it

778
00:18:16,628 --> 00:18:18,197
is the S-band antenna feeds.

779
00:18:18,263 --> 00:18:19,631
So, those two radiate

780
00:18:19,698 --> 00:18:20,499
into the antenna,

781
00:18:20,566 --> 00:18:21,433
the big, large reflector

782
00:18:21,500 --> 00:18:22,968
that is not here right now,

783
00:18:23,035 --> 00:18:23,936
as you can see,

784
00:18:24,002 --> 00:18:24,970
because we box that up,

785
00:18:25,037 --> 00:18:25,737
but that's how we would

786
00:18:25,804 --> 00:18:27,105
normally operate this

787
00:18:27,172 --> 00:18:28,540
with that large antenna

788
00:18:28,607 --> 00:18:30,008

out, uh, in this region

789
00:18:30,075 --> 00:18:31,743
where we basically use that

790
00:18:31,810 --> 00:18:33,979
to reflect the RF frequencies

791
00:18:34,046 --> 00:18:35,080
down to Earth.

792
00:18:35,147 --> 00:18:36,248
So, right now, what you see

793
00:18:36,315 --> 00:18:37,783
is the radar instrument

794
00:18:37,850 --> 00:18:40,052
by itself without the antenna.

795
00:18:40,118 --> 00:18:40,919
>> And it's undergone

796
00:18:40,986 --> 00:18:42,221
a lot of testing here.

797
00:18:42,287 --> 00:18:43,655
It will continue in India

798
00:18:43,722 --> 00:18:44,790
as well, but it's already been

799
00:18:44,857 --> 00:18:46,391
tested a lot at JPL as well.

800
00:18:46,458 --> 00:18:47,292
>> Right. We've been testing

801
00:18:47,359 --> 00:18:48,227
since 2019,

802
00:18:48,293 --> 00:18:49,328
so with different phases,

803
00:18:49,394 --> 00:18:50,496
system level testing,

804
00:18:50,562 --> 00:18:51,897
and then we moved on

805
00:18:51,964 --> 00:18:53,265
to integrating it

806
00:18:53,332 --> 00:18:54,233
with the L-band and S-band,

807
00:18:54,299 --> 00:18:55,868
so making sure the two systems

808
00:18:55,934 --> 00:18:57,469
work well together,

809
00:18:57,536 --> 00:18:58,804
and then in the last six months,

810
00:18:58,871 --> 00:18:59,671
we've been doing what we call

811
00:18:59,738 --> 00:19:00,639
environmental testing.

812
00:19:00,706 --> 00:19:01,340
What that means

813
00:19:01,406 --> 00:19:02,274

is we have to simulate

814
00:19:02,341 --> 00:19:03,675
the launch environments.

815
00:19:03,742 --> 00:19:04,776
Vibration, right?

816
00:19:04,843 --> 00:19:05,811
The launch vehicle--

817
00:19:05,878 --> 00:19:07,479
the rocket is a very--

818
00:19:07,546 --> 00:19:08,347
a lot of vibration,

819
00:19:08,413 --> 00:19:09,748
so we have to simulate that.

820
00:19:09,815 --> 00:19:10,749
So, we do a thermal,

821
00:19:10,816 --> 00:19:12,284
uh, vibration test.

822
00:19:12,351 --> 00:19:13,619
We also do several thermal

823
00:19:13,685 --> 00:19:14,920
vacuum tests to simulate

824
00:19:14,987 --> 00:19:16,388
the space environment,

825
00:19:16,455 --> 00:19:17,689
and we have done two of those,

826
00:19:17,756 --> 00:19:19,358
because one of our thermal

827
00:19:19,424 --> 00:19:20,692
vacuum tests was with

828
00:19:20,759 --> 00:19:22,060
the antenna and the boom

829
00:19:22,127 --> 00:19:23,095
wrapped around here.

830
00:19:23,161 --> 00:19:23,729
It's not shown now,

831
00:19:23,795 --> 00:19:24,596
so that's what we call

832
00:19:24,663 --> 00:19:26,231
our launch environment.

833
00:19:26,298 --> 00:19:27,799
So, we tested it there,

834
00:19:27,866 --> 00:19:28,600
and then in December,

835
00:19:28,667 --> 00:19:29,468
it was our last test,

836
00:19:29,535 --> 00:19:30,435
and we had taken off

837
00:19:30,502 --> 00:19:31,837
the boom and reflector,

838
00:19:31,904 --> 00:19:32,871

and we do a science

839
00:19:32,938 --> 00:19:34,006
thermal vacuum test

840
00:19:34,072 --> 00:19:34,940
to really simulate

841
00:19:35,007 --> 00:19:36,341
what the operations in--

842
00:19:36,408 --> 00:19:37,309
on orbit will be like.

843
00:19:37,376 --> 00:19:38,243
So, we've just finished

844
00:19:38,310 --> 00:19:39,211
the last of our testing

845
00:19:39,278 --> 00:19:40,345
in December.

846
00:19:40,412 --> 00:19:41,313
We're doing a sequence

847
00:19:41,380 --> 00:19:42,781
right now-- a last test

848
00:19:42,848 --> 00:19:45,050
to operate more flight life.

849
00:19:45,117 --> 00:19:46,018
We call them mission

850
00:19:46,084 --> 00:19:47,819
scenario tests, and we're doing

851
00:19:47,886 --> 00:19:48,887
our last radar test,

852
00:19:48,954 --> 00:19:49,688
and, you know, we're--

853
00:19:49,755 --> 00:19:50,322
basically, we're ready

854
00:19:50,389 --> 00:19:51,757
to tear it down starting Monday

855
00:19:51,823 --> 00:19:52,858
and start getting ready

856
00:19:52,925 --> 00:19:55,193
to ship it to India next week.

857
00:19:55,260 --> 00:19:56,161
>> Oh, it's gonna be

858
00:19:56,228 --> 00:19:57,229
a bittersweet moment, I'm sure.

859
00:19:57,296 --> 00:19:57,729
>> It will be.

860
00:19:57,796 --> 00:19:58,797
>> For everybody, yes.

861
00:19:58,864 --> 00:19:59,665
And we're gonna get to

862
00:19:59,731 --> 00:20:01,033
your questions again with Wendy

863
00:20:01,099 --> 00:20:01,700

and with Sue here

864
00:20:01,767 --> 00:20:02,434
in just a moment,

865
00:20:02,501 --> 00:20:03,669
but before we get to that,

866
00:20:03,735 --> 00:20:04,970
Wendy, tell me a little bit

867
00:20:05,037 --> 00:20:07,005
about what sets NISAR apart

868
00:20:07,072 --> 00:20:08,307
from other Earth missions,

869
00:20:08,373 --> 00:20:09,541
and why is the data

870
00:20:09,608 --> 00:20:11,143
so unprecedented?

871
00:20:11,209 --> 00:20:13,579
>> Well, so, um,

872
00:20:13,645 --> 00:20:15,480
most science missions

873
00:20:15,547 --> 00:20:17,716
are, you know, focused on

874
00:20:17,783 --> 00:20:18,650
science objectives, right?

875
00:20:18,717 --> 00:20:19,318
They're looking at

876
00:20:19,384 --> 00:20:20,252
the soil moisture,

877
00:20:20,319 --> 00:20:22,421
ocean salinity is one objective.

878
00:20:22,487 --> 00:20:23,789
But NISAR is unique,

879
00:20:23,855 --> 00:20:24,690
because it really,

880
00:20:24,756 --> 00:20:25,857
I think Sue talked about this,

881
00:20:25,924 --> 00:20:26,992
it covers a wide range

882
00:20:27,059 --> 00:20:28,327
of science objectives.

883
00:20:28,393 --> 00:20:29,695
We call it something like

884
00:20:29,761 --> 00:20:30,562
the Swiss Army Knife

885
00:20:30,629 --> 00:20:31,296
of science--

886
00:20:31,363 --> 00:20:32,230
of Earth science missions,

887
00:20:32,297 --> 00:20:33,198
'cause it does a lot.

888
00:20:33,265 --> 00:20:34,666

To do something like that

889
00:20:34,733 --> 00:20:35,867
requires a really

890
00:20:35,934 --> 00:20:37,536
complicated system.

891
00:20:37,603 --> 00:20:38,437
It has to have

892
00:20:38,503 --> 00:20:39,705
a lot of flexibility

893
00:20:39,771 --> 00:20:41,607
in terms of how much power

894
00:20:41,673 --> 00:20:43,175
it generates, the resolution,

895
00:20:43,241 --> 00:20:45,544
how stable it is to make these

896
00:20:45,611 --> 00:20:47,312
surface change measurements.

897
00:20:47,379 --> 00:20:48,180
That's probably one of our

898
00:20:48,246 --> 00:20:49,247
most challenging requirements

899
00:20:49,314 --> 00:20:50,048
is to make sure that

900
00:20:50,115 --> 00:20:50,782
we can do these

901
00:20:50,849 --> 00:20:51,950
change requirements

902
00:20:52,017 --> 00:20:53,485
at the centimeter level.

903
00:20:53,552 --> 00:20:54,353
That requires

904
00:20:54,419 --> 00:20:55,988
a super stable system.

905
00:20:56,054 --> 00:20:57,255
So we spend a lot of time

906
00:20:57,322 --> 00:20:58,757
making sure this system

907
00:20:58,824 --> 00:21:00,092
is very stable

908
00:21:00,158 --> 00:21:02,227
over time, over temperature,

909
00:21:02,294 --> 00:21:03,495
over all environments.

910
00:21:03,562 --> 00:21:04,529
So that's another key thing.

911
00:21:04,596 --> 00:21:05,864
And then the last thing is

912
00:21:05,931 --> 00:21:08,467
that we have a really high--

913
00:21:08,533 --> 00:21:09,434

a lot of data.

914
00:21:09,501 --> 00:21:10,402
You heard that we are generating

915
00:21:10,469 --> 00:21:12,070
a lot of data for this.

916
00:21:12,137 --> 00:21:12,971
>> Enormous.

917
00:21:13,038 --> 00:21:13,939
>> Enormous amounts of data.

918
00:21:14,006 --> 00:21:16,308
40-something terabits

919
00:21:16,375 --> 00:21:17,309
of data a day.

920
00:21:17,376 --> 00:21:18,610
After processing,

921
00:21:18,677 --> 00:21:19,544
it's like, um,

922
00:21:19,611 --> 00:21:23,215
380 terabytes a day,

923
00:21:23,281 --> 00:21:25,417
so it's a huge volume of data

924
00:21:25,484 --> 00:21:26,752
that's completely unprecedented.

925
00:21:26,818 --> 00:21:28,153
And so it's just different

926
00:21:28,220 --> 00:21:28,987
than any other mission.

927
00:21:29,054 --> 00:21:29,821
We've never generated

928
00:21:29,888 --> 00:21:30,822
this much science.

929
00:21:30,889 --> 00:21:31,590
And then the other

930
00:21:31,657 --> 00:21:32,357
interesting feature

931
00:21:32,424 --> 00:21:33,025
of this system

932
00:21:33,091 --> 00:21:33,925
is the big antenna.

933
00:21:33,992 --> 00:21:34,893
You don't see it now,

934
00:21:34,960 --> 00:21:35,761
but if you see it--

935
00:21:35,827 --> 00:21:36,528
>> It's so beautiful.

936
00:21:36,595 --> 00:21:37,295
>> If you've ever seen

937
00:21:37,362 --> 00:21:38,897
any images of NISAR, you say,

938
00:21:38,964 --> 00:21:39,931

well, where's the antenna?

939
00:21:39,998 --> 00:21:41,400
Well, it's too big to have it

940
00:21:41,466 --> 00:21:42,334
right here deployed

941
00:21:42,401 --> 00:21:43,001
in this system,

942
00:21:43,068 --> 00:21:43,969
because we have to deploy it

943
00:21:44,036 --> 00:21:45,103
in a special facility.

944
00:21:45,170 --> 00:21:45,971
But it's getting

945
00:21:46,038 --> 00:21:47,139
ready to launch.

946
00:21:47,205 --> 00:21:47,873
But that's the other

947
00:21:47,939 --> 00:21:48,740
unique feature.

948
00:21:48,807 --> 00:21:49,675
This antenna

949
00:21:49,741 --> 00:21:50,709
is the largest antenna

950
00:21:50,776 --> 00:21:52,144
that NASA has flown

951
00:21:52,210 --> 00:21:53,078
for a science mission.

952
00:21:53,145 --> 00:21:54,579
It's a lot of firsts

953
00:21:54,646 --> 00:21:55,814
for the NISAR mission.

954
00:21:55,881 --> 00:21:56,715
>> That's great.

955
00:21:56,782 --> 00:21:57,949
And if you want to see

956
00:21:58,016 --> 00:21:59,184
what NISAR looks like,

957
00:21:59,251 --> 00:22:00,285
we have animations,

958
00:22:00,352 --> 00:22:01,153
and we'll drop those

959
00:22:01,219 --> 00:22:02,254
in the chat for you, too,

960
00:22:02,320 --> 00:22:02,988
as well, so that

961
00:22:03,055 --> 00:22:03,689
you can look them up

962
00:22:03,755 --> 00:22:04,523
so that you can actually

963
00:22:04,589 --> 00:22:05,957

see it in its full capacity

964
00:22:06,024 --> 00:22:06,758
or what it'll look like

965
00:22:06,825 --> 00:22:08,126
once it is up and launched.

966
00:22:08,193 --> 00:22:08,727
>> Right.

967
00:22:08,794 --> 00:22:09,494
>> All right, so let's get

968
00:22:09,561 --> 00:22:10,395
to some of your questions

969
00:22:10,462 --> 00:22:11,329
here for Wendy.

970
00:22:11,396 --> 00:22:12,497
All right, first question

971
00:22:12,564 --> 00:22:14,266
comes from Ethan M. Webber

972
00:22:14,332 --> 00:22:15,600
on Instagram asking,

973
00:22:15,667 --> 00:22:17,602
are there any plans in place

974
00:22:17,669 --> 00:22:18,870
to mitigate damage

975
00:22:18,937 --> 00:22:19,738
to the antenna

976
00:22:19,805 --> 00:22:22,040
from space debris impacts?

977
00:22:22,107 --> 00:22:22,741
>> Great question.

978
00:22:22,808 --> 00:22:24,876
So, yes, what we have is--

979
00:22:24,943 --> 00:22:27,412
we deal with, orbital debris

980
00:22:27,479 --> 00:22:28,880
is what we call it, two ways.

981
00:22:28,947 --> 00:22:30,148
One is by design.

982
00:22:30,215 --> 00:22:31,483
We've designed our systems

983
00:22:31,550 --> 00:22:32,951
to be able to withstand and--

984
00:22:33,018 --> 00:22:34,486
withstand any impact

985
00:22:34,553 --> 00:22:35,420
from debris.

986
00:22:35,487 --> 00:22:36,688
We put extra layers

987
00:22:36,755 --> 00:22:38,256
of materials on.

988
00:22:38,323 --> 00:22:39,424

Actually, some of these blankets

989
00:22:39,491 --> 00:22:40,459
that you see here on it

990
00:22:40,525 --> 00:22:41,226
actually have--

991
00:22:41,293 --> 00:22:42,494
part of their purpose

992
00:22:42,561 --> 00:22:43,929
is to protect the electronics

993
00:22:43,995 --> 00:22:45,430
from orbital debris.

994
00:22:45,497 --> 00:22:47,399
The antenna is protected.

995
00:22:47,466 --> 00:22:48,633
We did a lot of designs

996
00:22:48,700 --> 00:22:49,935
and studies and analysis

997
00:22:50,001 --> 00:22:50,602
to prove that

998
00:22:50,669 --> 00:22:51,603
that very fragile

999
00:22:51,670 --> 00:22:52,504
looking antenna

1000
00:22:52,571 --> 00:22:53,705
that looks like it'll

1001
00:22:53,772 --> 00:22:54,573
just fall apart,

1002
00:22:54,639 --> 00:22:56,374
it actually can withstand debris

1003
00:22:56,441 --> 00:22:57,676
that can fly right through it.

1004
00:22:57,743 --> 00:22:59,111
So it's all built to the design.

1005
00:22:59,177 --> 00:23:00,412
And then of course--

1006
00:23:00,479 --> 00:23:01,379
so that's the design piece,

1007
00:23:01,446 --> 00:23:02,414
and then also in terms

1008
00:23:02,481 --> 00:23:03,381
of operations.

1009
00:23:03,448 --> 00:23:04,249
We have ways

1010
00:23:04,316 --> 00:23:05,383
to move the spacecraft

1011
00:23:05,450 --> 00:23:06,485
and maneuver away,

1012
00:23:06,551 --> 00:23:07,419
because we keep track

1013
00:23:07,486 --> 00:23:08,386

of orbital debris.

1014
00:23:08,453 --> 00:23:09,588
And we can move the spacecraft

1015
00:23:09,654 --> 00:23:11,690
if we recognize that there's

1016
00:23:11,757 --> 00:23:13,291
some debris coming our way.

1017
00:23:13,358 --> 00:23:14,793
>> And thermal blanketing, too,

1018
00:23:14,860 --> 00:23:15,627
a lot of people always ask

1019
00:23:15,694 --> 00:23:16,528
what the gold is,

1020
00:23:16,595 --> 00:23:17,863
so tell us a little bit

1021
00:23:17,929 --> 00:23:18,697
about what all the gold is

1022
00:23:18,764 --> 00:23:19,331
that's surrounding it.

1023
00:23:19,397 --> 00:23:20,499
>> So the gold is interesting.

1024
00:23:20,565 --> 00:23:23,101
Thermal design is a big part

1025
00:23:23,168 --> 00:23:24,035
of a spacecraft.

1026
00:23:24,102 --> 00:23:25,737
It's a very extreme environment.

1027
00:23:25,804 --> 00:23:27,072
It can be very cold.

1028
00:23:27,139 --> 00:23:28,140
It can be very hot.

1029
00:23:28,206 --> 00:23:29,341
And as you can see,

1030
00:23:29,407 --> 00:23:30,542
we have actually electronics

1031
00:23:30,609 --> 00:23:32,277
that just are on the outside

1032
00:23:32,344 --> 00:23:33,078
of the system.

1033
00:23:33,145 --> 00:23:33,912
They're not protected

1034
00:23:33,979 --> 00:23:34,780
by anything.

1035
00:23:34,846 --> 00:23:36,615
So we have used thermal blankets

1036
00:23:36,681 --> 00:23:38,316
and other thermal materials

1037
00:23:38,383 --> 00:23:40,152
to protect the spacecraft

1038
00:23:40,218 --> 00:23:41,019

and keep it,

1039
00:23:41,086 --> 00:23:42,587
kind of like a cooler, right,

1040
00:23:42,654 --> 00:23:43,622
it keeps it warm

1041
00:23:43,688 --> 00:23:44,856
if it's cold outside,

1042
00:23:44,923 --> 00:23:45,690
and it keeps it cool

1043
00:23:45,757 --> 00:23:46,925
if it's hot outside.

1044
00:23:46,992 --> 00:23:48,860
So we have some aspects of it

1045
00:23:48,927 --> 00:23:50,295
that are-- that we want

1046
00:23:50,362 --> 00:23:51,396
to keep our boxes cold.

1047
00:23:51,463 --> 00:23:52,731
So you can see all that

1048
00:23:52,798 --> 00:23:53,799
silver stuff on that,

1049
00:23:53,865 --> 00:23:55,066
that's very reflective.

1050
00:23:55,133 --> 00:23:56,835
So that keeps it nice and cold.

1051
00:23:56,902 --> 00:23:58,203
Our boom that

1052
00:23:58,270 --> 00:23:59,070
you can't see right now,

1053
00:23:59,137 --> 00:24:00,038
it's black because we want

1054
00:24:00,105 --> 00:24:01,006
to keep it warm.

1055
00:24:01,072 --> 00:24:01,940
So we actually use

1056
00:24:02,007 --> 00:24:03,141
different materials, too,

1057
00:24:03,208 --> 00:24:04,042
depending on what part

1058
00:24:04,109 --> 00:24:05,210
of the spacecraft it's on

1059
00:24:05,277 --> 00:24:06,845
and what environment

1060
00:24:06,912 --> 00:24:07,746
it's exposed to.

1061
00:24:07,813 --> 00:24:09,414
So it's a big art

1062
00:24:09,481 --> 00:24:10,982
to deal with a thermal design.

1063
00:24:11,049 --> 00:24:11,683

>> That's great.

1064
00:24:11,750 --> 00:24:12,484
Thank you, Wendy.

1065
00:24:12,551 --> 00:24:13,285
Next question comes

1066
00:24:13,351 --> 00:24:15,921
from TOG.SCGL on Instagram

1067
00:24:15,987 --> 00:24:17,055
asking, do you have cameras

1068
00:24:17,122 --> 00:24:18,990
to check the antenna deployment

1069
00:24:19,057 --> 00:24:19,825
like SWOT?

1070
00:24:19,891 --> 00:24:21,326
>> Yes. Yes, we do.

1071
00:24:21,393 --> 00:24:22,294
Actually, it's being

1072
00:24:22,360 --> 00:24:23,028
contributed by

1073
00:24:23,094 --> 00:24:24,129
the ISRO partners.

1074
00:24:24,196 --> 00:24:25,397
They have cameras onboard

1075
00:24:25,463 --> 00:24:26,164
to actually watch

1076
00:24:26,231 --> 00:24:26,965
the deployment.

1077
00:24:27,032 --> 00:24:27,532
So that is built

1078
00:24:27,599 --> 00:24:28,266
into our design.

1079
00:24:28,333 --> 00:24:29,734
I worked on this map mission,

1080
00:24:29,801 --> 00:24:30,735
we never had cameras.

1081
00:24:30,802 --> 00:24:31,469
We always said

1082
00:24:31,536 --> 00:24:32,571
that's probably a good thing

1083
00:24:32,637 --> 00:24:33,672
from now on, so, yes,

1084
00:24:33,738 --> 00:24:34,472
there are cameras.

1085
00:24:34,539 --> 00:24:35,307
>> Very cool.

1086
00:24:35,373 --> 00:24:37,409
And last, Gallonzoga4

1087
00:24:37,475 --> 00:24:38,243
on Instagram asks,

1088
00:24:38,310 --> 00:24:38,910

how much does

1089
00:24:38,977 --> 00:24:40,145
the antenna reflector weigh,

1090
00:24:40,212 --> 00:24:41,179
and why does it

1091
00:24:41,246 --> 00:24:42,280
have to be so large?

1092
00:24:42,347 --> 00:24:43,348
>> So it weighs

1093
00:24:43,415 --> 00:24:44,850
about 120 pounds

1094
00:24:44,916 --> 00:24:46,184
for just the reflector,

1095
00:24:46,251 --> 00:24:47,419
which is pretty lightweight.

1096
00:24:47,485 --> 00:24:48,320
And the reason why

1097
00:24:48,386 --> 00:24:49,254
it has to be so large,

1098
00:24:49,321 --> 00:24:50,255
and it's 12 meters,

1099
00:24:50,322 --> 00:24:51,489
so that's like 30-something,

1100
00:24:51,556 --> 00:24:52,891
40 feet across,

1101
00:24:52,958 --> 00:24:53,692
so it's very large.

1102
00:24:53,758 --> 00:24:55,227
And that's driven by

1103
00:24:55,293 --> 00:24:56,928
the resolution requirements

1104
00:24:56,995 --> 00:24:57,796
of the system.

1105
00:24:57,863 --> 00:25:00,031
So we need high resolution,

1106
00:25:00,098 --> 00:25:00,932
and that's driven by

1107
00:25:00,999 --> 00:25:01,933
that antenna size.

1108
00:25:02,000 --> 00:25:03,001
>> Okay, great.

1109
00:25:03,068 --> 00:25:03,602
We're gonna bring

1110
00:25:03,668 --> 00:25:04,903
Sue back in again,

1111
00:25:04,970 --> 00:25:06,404
the deputy project scientist

1112
00:25:06,471 --> 00:25:07,172
and the deputy

1113
00:25:07,239 --> 00:25:08,640

project manager here.

1114
00:25:08,707 --> 00:25:09,908
So for Sue,

1115
00:25:09,975 --> 00:25:12,010
ItsHim on Instagram asks,

1116
00:25:12,077 --> 00:25:13,011
what makes it

1117
00:25:13,078 --> 00:25:13,879
different from other

1118
00:25:13,945 --> 00:25:15,113
Earth observing satellites,

1119
00:25:15,180 --> 00:25:16,214
which Wendy touched on,

1120
00:25:16,281 --> 00:25:17,115
but I'm sure you can

1121
00:25:17,182 --> 00:25:18,283
elaborate a little more.

1122
00:25:18,350 --> 00:25:19,184
>> Yeah, so--

1123
00:25:19,251 --> 00:25:19,951
>> If we want to move down

1124
00:25:20,018 --> 00:25:20,619
a little bit here.

1125
00:25:20,685 --> 00:25:21,386
>> Sure, sure.

1126
00:25:21,453 --> 00:25:22,153
>> So we can give everyone

1127
00:25:22,220 --> 00:25:22,854
a much better view

1128
00:25:22,921 --> 00:25:23,622
of this gorgeous

1129
00:25:23,688 --> 00:25:24,522
satellite behind us.

1130
00:25:24,589 --> 00:25:25,290
There we go.

1131
00:25:25,357 --> 00:25:26,958
>> Yeah, so Wendy mentioned

1132
00:25:27,025 --> 00:25:28,793
that it is the Swiss Army Knife

1133
00:25:28,860 --> 00:25:30,595
of Earth in view--

1134
00:25:30,662 --> 00:25:31,763
Earth observing satellites,

1135
00:25:31,830 --> 00:25:33,398
and that it does have

1136
00:25:33,465 --> 00:25:34,833
a really broad range

1137
00:25:34,900 --> 00:25:36,134
of science applications.

1138
00:25:36,201 --> 00:25:37,969

So there are scientists

1139
00:25:38,036 --> 00:25:38,904
who are studying

1140
00:25:38,970 --> 00:25:40,005
the Earth's ecosystems,

1141
00:25:40,071 --> 00:25:40,705
who are studying

1142
00:25:40,772 --> 00:25:41,740
the Earth's ice sheets,

1143
00:25:41,806 --> 00:25:42,807
who are studying the Earth's,

1144
00:25:42,874 --> 00:25:45,010
you know, solid Earth systems,

1145
00:25:45,076 --> 00:25:46,011
natural hazards,

1146
00:25:46,077 --> 00:25:47,879
that are interested in--

1147
00:25:47,946 --> 00:25:48,747
this NISAR data

1148
00:25:48,813 --> 00:25:50,081
is gonna be useful for.

1149
00:25:50,148 --> 00:25:51,116
So I think it is unique

1150
00:25:51,182 --> 00:25:52,284
in the range

1151
00:25:52,350 --> 00:25:53,652
of science applications

1152
00:25:53,718 --> 00:25:54,686
that it's going to have.

1153
00:25:54,753 --> 00:25:57,222
And it fills in a gap

1154
00:25:57,289 --> 00:25:59,424
in the current Earth observing

1155
00:25:59,491 --> 00:26:00,926
set of satellites

1156
00:26:00,992 --> 00:26:01,893
that we have on there--

1157
00:26:01,960 --> 00:26:03,061
that we have up there.

1158
00:26:03,128 --> 00:26:04,362
We don't have a satellite

1159
00:26:04,429 --> 00:26:06,197
that is making these types

1160
00:26:06,264 --> 00:26:07,532
of radar imagery--

1161
00:26:07,599 --> 00:26:10,068
radar, uh, measurements

1162
00:26:10,135 --> 00:26:11,336
that allow us to see

1163
00:26:11,403 --> 00:26:13,171

the types of change.

1164
00:26:13,238 --> 00:26:13,972
So I mentioned, you know,

1165
00:26:14,039 --> 00:26:14,940
it's gonna be able to measure

1166
00:26:15,006 --> 00:26:16,808
how fast the surface

1167
00:26:16,875 --> 00:26:18,143
of the Earth is moving.

1168
00:26:18,209 --> 00:26:20,078
And so it's going to, you know,

1169
00:26:20,145 --> 00:26:21,880
provide that data in a way

1170
00:26:21,947 --> 00:26:23,481
that we don't-- haven't--

1171
00:26:23,548 --> 00:26:25,183
that we haven't been able

1172
00:26:25,250 --> 00:26:26,384
to measure it so far.

1173
00:26:26,451 --> 00:26:28,353
The other really unique thing

1174
00:26:28,420 --> 00:26:29,821
about NISAR

1175
00:26:29,888 --> 00:26:31,323
is the amount of data.

1176
00:26:31,389 --> 00:26:33,191
So we are going

1177
00:26:33,258 --> 00:26:34,559
to be collecting--

1178
00:26:34,626 --> 00:26:35,860
we're going to be generating

1179
00:26:35,927 --> 00:26:37,362
80 terabytes

1180
00:26:37,429 --> 00:26:40,332
of data products per day,

1181
00:26:40,398 --> 00:26:42,367
which is way more

1182
00:26:42,434 --> 00:26:44,936
than any other NASA

1183
00:26:45,003 --> 00:26:45,904
Earth observing mission

1184
00:26:45,971 --> 00:26:47,539
has collected so far

1185
00:26:47,605 --> 00:26:48,340
and any other

1186
00:26:48,406 --> 00:26:49,507
Earth observing mission

1187
00:26:49,574 --> 00:26:50,909
has collected so far.

1188
00:26:50,976 --> 00:26:52,544

And that just gives you a hint

1189
00:26:52,610 --> 00:26:54,446
of the content--

1190
00:26:54,512 --> 00:26:56,982
the content rich nature

1191
00:26:57,048 --> 00:26:58,416
of the data set that

1192
00:26:58,483 --> 00:27:00,151
NISAR's gonna be providing.

1193
00:27:00,218 --> 00:27:01,753
So hopefully that tells you

1194
00:27:01,820 --> 00:27:02,487
a little bit about

1195
00:27:02,554 --> 00:27:03,888
NISAR's difference.

1196
00:27:03,955 --> 00:27:04,589
>> Scientists aren't gonna

1197
00:27:04,656 --> 00:27:05,290
know what to do.

1198
00:27:05,357 --> 00:27:05,991
>> Yeah, I know.

1199
00:27:06,057 --> 00:27:06,691
>> It's so much.

1200
00:27:06,758 --> 00:27:08,493
It's gonna be a smorgasbord.

1201
00:27:08,560 --> 00:27:09,327
>> Well, and that's why

1202
00:27:09,394 --> 00:27:10,362
we're talking now.

1203
00:27:10,428 --> 00:27:12,230
>> Yes, exactly, all right.

1204
00:27:12,297 --> 00:27:14,032
So now we have a question

1205
00:27:14,099 --> 00:27:16,434
from TheCoolerofId

1206
00:27:16,501 --> 00:27:17,402
on Instagram asking,

1207
00:27:17,469 --> 00:27:19,170
how will the reflector antenna

1208
00:27:19,237 --> 00:27:21,106
be folded, sent up,

1209
00:27:21,172 --> 00:27:22,207
and opened in space?

1210
00:27:22,273 --> 00:27:23,074
So you can address that one.

1211
00:27:23,141 --> 00:27:23,775
>> I'll take that one.

1212
00:27:23,842 --> 00:27:25,410
So it actually has a boom.

1213
00:27:25,477 --> 00:27:26,678

You don't see this here,

1214
00:27:26,745 --> 00:27:27,679
but it has a boom

1215
00:27:27,746 --> 00:27:28,646
that is broken

1216
00:27:28,713 --> 00:27:29,581
into four segments.

1217
00:27:29,647 --> 00:27:30,782
It wraps around

1218
00:27:30,849 --> 00:27:32,183
the whole structure.

1219
00:27:32,250 --> 00:27:33,451
So actually I can point to you

1220
00:27:33,518 --> 00:27:35,053
over here is where

1221
00:27:35,120 --> 00:27:36,287
the boom attaches.

1222
00:27:36,354 --> 00:27:37,922
It wraps around.

1223
00:27:37,989 --> 00:27:39,791
There's a joint, a hinge here,

1224
00:27:39,858 --> 00:27:41,059
that folds over here.

1225
00:27:41,126 --> 00:27:42,027
And then it folds

1226
00:27:42,093 --> 00:27:43,061
and wraps around over here.

1227
00:27:43,128 --> 00:27:44,229
So the reflector,

1228
00:27:44,295 --> 00:27:45,063
when we launch it,

1229
00:27:45,130 --> 00:27:45,864
is actually gonna be

1230
00:27:45,930 --> 00:27:47,565
on the far side

1231
00:27:47,632 --> 00:27:49,501
of the spacecraft,

1232
00:27:49,567 --> 00:27:51,136
tied down with a lot

1233
00:27:51,202 --> 00:27:52,203
of launch restraints,

1234
00:27:52,270 --> 00:27:54,239
very, very cozy and protected

1235
00:27:54,305 --> 00:27:55,140
and can withstand

1236
00:27:55,206 --> 00:27:56,141
all the launch loads.

1237
00:27:56,207 --> 00:27:57,175
And then we have

1238
00:27:57,242 --> 00:27:59,344

to carefully on orbit,

1239
00:27:59,411 --> 00:28:00,512
and it'll take several days

1240
00:28:00,578 --> 00:28:02,614
to actually one hinge at a time

1241
00:28:02,680 --> 00:28:04,082
we open up the antenna,

1242
00:28:04,149 --> 00:28:06,851
and then we open up the boom.

1243
00:28:06,918 --> 00:28:08,119
And then once

1244
00:28:08,186 --> 00:28:08,820
that's all deployed,

1245
00:28:08,887 --> 00:28:10,055
then we release the reflector.

1246
00:28:10,121 --> 00:28:11,022
>> And it takes a while.

1247
00:28:11,089 --> 00:28:11,656
>> Yes.

1248
00:28:11,723 --> 00:28:12,290
>> So folks know at home,

1249
00:28:12,357 --> 00:28:12,924
this isn't something that

1250
00:28:12,991 --> 00:28:13,658
happens in ten minutes.

1251
00:28:13,725 --> 00:28:14,726
It takes a couple of days

1252
00:28:14,793 --> 00:28:15,493
to make sure everything's

1253
00:28:15,560 --> 00:28:16,461
going right and--

1254
00:28:16,528 --> 00:28:17,896
>> We do it very carefully.

1255
00:28:17,962 --> 00:28:18,963
We could do it faster,

1256
00:28:19,030 --> 00:28:19,864
but we choose not to.

1257
00:28:19,931 --> 00:28:20,532
>> Yes.

1258
00:28:20,598 --> 00:28:21,299
>> We want to do it carefully

1259
00:28:21,366 --> 00:28:22,400
so we do one hinge a day

1260
00:28:22,467 --> 00:28:23,601
for-- over several days,

1261
00:28:23,668 --> 00:28:24,269
and then we do

1262
00:28:24,335 --> 00:28:25,437
the boom and reflector.

1263
00:28:25,503 --> 00:28:26,071

So it's about

1264
00:28:26,137 --> 00:28:27,272
a 10-day operation.

1265
00:28:27,338 --> 00:28:29,307
What's interesting is

1266
00:28:29,374 --> 00:28:30,341
I've seen one in proofs,

1267
00:28:30,408 --> 00:28:31,109
and it only takes

1268
00:28:31,176 --> 00:28:32,243
about 30 minutes, actually,

1269
00:28:32,310 --> 00:28:33,178
to deploy the reflector,

1270
00:28:33,244 --> 00:28:33,945
but, again,

1271
00:28:34,012 --> 00:28:34,913
we filled in the margin

1272
00:28:34,979 --> 00:28:36,347
so that we can deal with

1273
00:28:36,414 --> 00:28:37,982
any uncertainty or surprises

1274
00:28:38,049 --> 00:28:38,750
along the way.

1275
00:28:38,817 --> 00:28:39,751
>> So now I think

1276
00:28:39,818 --> 00:28:40,718
Sue can take the next one.

1277
00:28:40,785 --> 00:28:42,387
Daniel Fisher on YouTube asks,

1278
00:28:42,454 --> 00:28:43,354
what will the satellite

1279
00:28:43,421 --> 00:28:44,889
tell us about global warming

1280
00:28:44,956 --> 00:28:45,957
and climate change?

1281
00:28:46,024 --> 00:28:46,724
>> Oh, that's

1282
00:28:46,791 --> 00:28:47,725
a really good question.

1283
00:28:47,792 --> 00:28:49,861
So what the NISAR satellite's

1284
00:28:49,928 --> 00:28:50,829
gonna be able to do

1285
00:28:50,895 --> 00:28:52,330
for climate change,

1286
00:28:52,397 --> 00:28:53,431
there's a couple of things,

1287
00:28:53,498 --> 00:28:54,132
you know,

1288
00:28:54,199 --> 00:28:55,500

just off the top of my head.

1289
00:28:55,567 --> 00:28:56,734
The main thing--

1290
00:28:56,801 --> 00:28:57,569
one of the main things

1291
00:28:57,635 --> 00:29:00,038
is measuring how fast

1292
00:29:00,105 --> 00:29:01,272
the ice sheets are melting.

1293
00:29:01,339 --> 00:29:04,175
So as the climate is warming,

1294
00:29:04,242 --> 00:29:06,311
and as the oceans are warming,

1295
00:29:06,377 --> 00:29:08,046
we're seeing an increased rate

1296
00:29:08,113 --> 00:29:09,814
of the glaciers melting

1297
00:29:09,881 --> 00:29:10,782
up in the mountains

1298
00:29:10,849 --> 00:29:12,350
and in the major areas

1299
00:29:12,417 --> 00:29:13,418
where there's ice sheets.

1300
00:29:13,485 --> 00:29:14,219
We're also seeing

1301
00:29:14,285 --> 00:29:15,820
the sea ice changing.

1302
00:29:15,887 --> 00:29:17,589
And NISAR is going to be

1303
00:29:17,655 --> 00:29:18,790
tracking those changes.

1304
00:29:18,857 --> 00:29:21,559
We're gonna be able to see how--

1305
00:29:21,626 --> 00:29:22,627
not only how fast

1306
00:29:22,694 --> 00:29:23,628
the ice sheets are melting,

1307
00:29:23,695 --> 00:29:26,865
but how fast that rate

1308
00:29:26,931 --> 00:29:29,334
of movement is changing,

1309
00:29:29,400 --> 00:29:30,835
so how it's accelerating

1310
00:29:30,902 --> 00:29:32,137
and decelerating.

1311
00:29:32,203 --> 00:29:33,505
And that's gonna help us

1312
00:29:33,571 --> 00:29:34,706
tell what's really

1313
00:29:34,772 --> 00:29:36,474

driving those changes

1314
00:29:36,541 --> 00:29:38,443
and how that feeds into

1315
00:29:38,510 --> 00:29:41,513
all of the Earth systems'

1316
00:29:41,579 --> 00:29:44,015
response to global warming.

1317
00:29:44,082 --> 00:29:45,216
We're also gonna be able

1318
00:29:45,283 --> 00:29:46,151
to look at how

1319
00:29:46,217 --> 00:29:47,819
the forests are changing,

1320
00:29:47,886 --> 00:29:49,821
so NISAR's gonna be measuring

1321
00:29:49,888 --> 00:29:53,458
the extent of forested areas.

1322
00:29:53,525 --> 00:29:55,426
So we call that biomass,

1323
00:29:55,493 --> 00:29:57,795
which is a term for, you know,

1324
00:29:57,862 --> 00:30:00,465
how much woody carbon,

1325
00:30:00,532 --> 00:30:02,033
so how many trees basically

1326
00:30:02,100 --> 00:30:03,401
are in the forest.

1327
00:30:03,468 --> 00:30:05,603
And that is something that,

1328
00:30:05,670 --> 00:30:06,738
you know, can influence

1329
00:30:06,804 --> 00:30:08,640
the global response

1330
00:30:08,706 --> 00:30:10,208
to climate change.

1331
00:30:10,275 --> 00:30:13,111
So are the trees growing more

1332
00:30:13,178 --> 00:30:15,146
and collecting more carbon?

1333
00:30:15,213 --> 00:30:16,781
Are they decreasing?

1334
00:30:16,848 --> 00:30:17,849
Are they under stress

1335
00:30:17,916 --> 00:30:19,217
from climate change?

1336
00:30:19,284 --> 00:30:21,186
And how is this feeding into

1337
00:30:21,252 --> 00:30:23,087
the carbon cycle on the Earth?

1338
00:30:23,154 --> 00:30:24,322

So those are two main ways

1339
00:30:24,389 --> 00:30:25,423
that we're going

1340
00:30:25,490 --> 00:30:26,658
to be looking at

1341
00:30:26,724 --> 00:30:27,492
that NISAR's gonna

1342
00:30:27,559 --> 00:30:28,493
be able to inform us.

1343
00:30:28,560 --> 00:30:29,494
I didn't even mention

1344
00:30:29,561 --> 00:30:30,762
sea level rise, okay.

1345
00:30:30,828 --> 00:30:31,863
[laughing]

1346
00:30:31,930 --> 00:30:33,731
So when the ice sheets melt,

1347
00:30:33,798 --> 00:30:35,266
it's going to be increasing

1348
00:30:35,333 --> 00:30:37,235
the volume of the ocean,

1349
00:30:37,302 --> 00:30:39,704
you know, influencing

1350
00:30:39,771 --> 00:30:40,672
sea level rise.

1351
00:30:40,738 --> 00:30:41,906
We're also gonna be looking

1352
00:30:41,973 --> 00:30:43,708
at how the coastal areas

1353
00:30:43,775 --> 00:30:45,543
are changing,

1354
00:30:45,610 --> 00:30:49,480
and how that also influences

1355
00:30:49,547 --> 00:30:51,282
the impacts of sea level rise.

1356
00:30:51,349 --> 00:30:53,484
So there is the oceans

1357
00:30:53,551 --> 00:30:55,186
increasing their volume

1358
00:30:55,253 --> 00:30:56,387
as part of sea level rise.

1359
00:30:56,454 --> 00:30:57,655
There's also the fact

1360
00:30:57,722 --> 00:30:58,590
that the coasts--

1361
00:30:58,656 --> 00:31:00,191
the coastal areas themselves

1362
00:31:00,258 --> 00:31:01,993
could be either sinking

1363
00:31:02,060 --> 00:31:04,362

or uplifting.

1364
00:31:04,429 --> 00:31:05,763
And so that's gonna be--

1365
00:31:05,830 --> 00:31:06,598
that's something that

1366
00:31:06,664 --> 00:31:07,398
the people who live

1367
00:31:07,465 --> 00:31:08,399
in those areas

1368
00:31:08,466 --> 00:31:09,400
really need to know

1369
00:31:09,467 --> 00:31:11,302
as they look at projections

1370
00:31:11,369 --> 00:31:12,904
of how much the seas

1371
00:31:12,971 --> 00:31:13,838
are gonna be rising

1372
00:31:13,905 --> 00:31:15,340
in their local area

1373
00:31:15,406 --> 00:31:16,841
over the next 10,

1374
00:31:16,908 --> 00:31:18,142
20, or 30 years.

1375
00:31:18,209 --> 00:31:19,644
And NISAR with

1376
00:31:19,711 --> 00:31:20,712
its global coverage

1377
00:31:20,778 --> 00:31:22,247
and high spatial resolution

1378
00:31:22,313 --> 00:31:23,615
is gonna give people

1379
00:31:23,681 --> 00:31:25,283
the information that they need

1380
00:31:25,350 --> 00:31:26,684
for their local region

1381
00:31:26,751 --> 00:31:28,920
in estimating the impact

1382
00:31:28,987 --> 00:31:30,355
of sea level rise.

1383
00:31:30,421 --> 00:31:31,456
>> So great information

1384
00:31:31,522 --> 00:31:32,323
in the hands of people

1385
00:31:32,390 --> 00:31:33,091
who need it

1386
00:31:33,157 --> 00:31:33,825
to make the future better.

1387
00:31:33,891 --> 00:31:34,525
>> Yes.

1388
00:31:34,592 --> 00:31:35,260

>> Which is really important.

1389
00:31:35,326 --> 00:31:35,994
All right, we've got

1390
00:31:36,060 --> 00:31:36,728
another one on YouTube

1391
00:31:36,794 --> 00:31:37,528
from Ayo.

1392
00:31:37,595 --> 00:31:38,863
Can this satellite recognize

1393
00:31:38,930 --> 00:31:41,165
a snow avalanche or mudslide

1394
00:31:41,232 --> 00:31:42,767
and give warning

1395
00:31:42,834 --> 00:31:43,901
before they happen?

1396
00:31:43,968 --> 00:31:45,236
[laughing]

1397
00:31:45,303 --> 00:31:47,105
>> Yeah.

1398
00:31:47,171 --> 00:31:50,241
So, um,

1399
00:31:50,308 --> 00:31:51,743
that's a really good question.

1400
00:31:51,809 --> 00:31:52,410
I think, you know,

1401
00:31:52,477 --> 00:31:53,645
those types of questions

1402
00:31:53,711 --> 00:31:55,446
are the exact types of questions

1403
00:31:55,513 --> 00:31:56,948
that the people

1404
00:31:57,015 --> 00:31:58,249
using NISAR data

1405
00:31:58,316 --> 00:32:00,118
are going to be exploring

1406
00:32:00,184 --> 00:32:01,519
after launch.

1407
00:32:01,586 --> 00:32:03,288
And right now

1408
00:32:03,354 --> 00:32:04,589
the current radar data,

1409
00:32:04,656 --> 00:32:05,690
we might be able to get

1410
00:32:05,757 --> 00:32:07,959
some constraints on the--

1411
00:32:08,026 --> 00:32:09,193
you know, what would be

1412
00:32:09,260 --> 00:32:11,129
causing avalanche--

1413
00:32:11,195 --> 00:32:12,463

avalanches of snow,

1414
00:32:12,530 --> 00:32:13,331
how much snow

1415
00:32:13,398 --> 00:32:14,499
is in the mountains, say.

1416
00:32:14,565 --> 00:32:15,833
Or for mudslides,

1417
00:32:15,900 --> 00:32:17,435
I mentioned soil moisture.

1418
00:32:17,502 --> 00:32:18,269
You know, if the ground

1419
00:32:18,336 --> 00:32:19,137
is really wet,

1420
00:32:19,203 --> 00:32:20,605
we would be able to--

1421
00:32:20,672 --> 00:32:21,439
you know, we want to know

1422
00:32:21,506 --> 00:32:22,740
how wet the ground is.

1423
00:32:22,807 --> 00:32:23,675
And that's gonna influence

1424
00:32:23,741 --> 00:32:25,376
our predictions of mudslides.

1425
00:32:25,443 --> 00:32:26,678
But right now

1426
00:32:26,744 --> 00:32:27,812
a lot of the data that we have

1427
00:32:27,879 --> 00:32:29,347
for that is fairly--

1428
00:32:29,414 --> 00:32:31,049
it's over a fairly large region,

1429
00:32:31,115 --> 00:32:32,617
so it's hard to use that

1430
00:32:32,684 --> 00:32:34,719
for predictions of, like,

1431
00:32:34,786 --> 00:32:36,354
one particular avalanche

1432
00:32:36,421 --> 00:32:37,922
or one particular mudslide.

1433
00:32:37,989 --> 00:32:39,157
With this higher

1434
00:32:39,223 --> 00:32:40,558
spatial resolution data,

1435
00:32:40,625 --> 00:32:42,760
how much better can we do,

1436
00:32:42,827 --> 00:32:44,429
how much better information

1437
00:32:44,495 --> 00:32:45,496
can we provide?

1438
00:32:45,563 --> 00:32:46,331

These are the types of things

1439
00:32:46,397 --> 00:32:47,899
we want to be testing

1440
00:32:47,965 --> 00:32:49,467
once NISAR launches.

1441
00:32:49,534 --> 00:32:50,368
>> Everyone's concerned

1442
00:32:50,435 --> 00:32:51,636
with preemptively striking.

1443
00:32:51,703 --> 00:32:52,437
>> Yeah.

1444
00:32:52,503 --> 00:32:53,237
>> It's gonna be

1445
00:32:53,304 --> 00:32:54,405
a good precursor.

1446
00:32:54,472 --> 00:32:55,306
And I think this one

1447
00:32:55,373 --> 00:32:56,274
is for you, Wendy.

1448
00:32:56,341 --> 00:32:58,109
So we are asking--

1449
00:32:58,176 --> 00:33:00,111
let's see, StunBlade13

1450
00:33:00,178 --> 00:33:01,079
on Instagram asks,

1451
00:33:01,145 --> 00:33:02,647
how long will it be in space,

1452
00:33:02,714 --> 00:33:04,315
and does it have

1453
00:33:04,382 --> 00:33:06,250
the regenerative battery,

1454
00:33:06,317 --> 00:33:07,452
or is it solar?

1455
00:33:07,518 --> 00:33:09,187
>> It's on the solar array,

1456
00:33:09,253 --> 00:33:10,521
but it is designed to oper--

1457
00:33:10,588 --> 00:33:11,989
we designed it to operate

1458
00:33:12,056 --> 00:33:13,257
at least three years on orbit.

1459
00:33:13,324 --> 00:33:15,226
We expect it'll last longer,

1460
00:33:15,293 --> 00:33:16,394
but that's what we're promising

1461
00:33:16,461 --> 00:33:17,995
from a mission perspective.

1462
00:33:18,062 --> 00:33:19,163
But, yes, we have a battery,

1463
00:33:19,230 --> 00:33:20,698

but it's regenerated

1464
00:33:20,765 --> 00:33:21,733
with a solar array.

1465
00:33:21,799 --> 00:33:23,534
>> Oh, wonderful, okay.

1466
00:33:23,601 --> 00:33:24,569
Well, that's all the time

1467
00:33:24,635 --> 00:33:25,536
we have for questions

1468
00:33:25,603 --> 00:33:26,437
here today.

1469
00:33:26,504 --> 00:33:27,438
And thank you so much

1470
00:33:27,505 --> 00:33:28,940
not only to our mission experts,

1471
00:33:29,006 --> 00:33:29,807
but also to each

1472
00:33:29,874 --> 00:33:30,708
and every one of you

1473
00:33:30,775 --> 00:33:31,376
who actually

1474
00:33:31,442 --> 00:33:32,477
joined us here today

1475
00:33:32,543 --> 00:33:33,711
in this very special

1476
00:33:33,778 --> 00:33:34,445
clean room

1477
00:33:34,512 --> 00:33:35,780
on this very special day

1478
00:33:35,847 --> 00:33:37,849
before we send NISAR off.

1479
00:33:37,915 --> 00:33:39,283
So let's take a little bit

1480
00:33:39,350 --> 00:33:40,451
of a closer look here

1481
00:33:40,518 --> 00:33:42,053
at NISAR for you all,

1482
00:33:42,120 --> 00:33:42,787
so you can have

1483
00:33:42,854 --> 00:33:44,422
a nice last look here.

1484
00:33:44,489 --> 00:33:46,057
And NISAR is expected

1485
00:33:46,124 --> 00:33:48,659
to leave JPL next month

1486
00:33:48,726 --> 00:33:49,660
as it continues

1487
00:33:49,727 --> 00:33:51,562
its journey to India

1488
00:33:51,629 --> 00:33:52,930

where it's gonna be tested

1489
00:33:52,997 --> 00:33:54,198
and integrated as well

1490
00:33:54,265 --> 00:33:55,500
in their location.

1491
00:33:55,566 --> 00:33:56,534
And it is going to be

1492
00:33:56,601 --> 00:33:58,636
launching in 2024 from

1493
00:33:58,703 --> 00:34:00,371
the Satish Dhawan Space Center

1494
00:34:00,438 --> 00:34:02,306
in Sriharikota, India,

1495
00:34:02,373 --> 00:34:04,075
as I mentioned in 2024.

1496
00:34:04,142 --> 00:34:04,976
And if you want to learn more

1497
00:34:05,042 --> 00:34:06,043
about the mission,

1498
00:34:06,110 --> 00:34:07,278
make sure you follow us

1499
00:34:07,345 --> 00:34:08,413
@NASAJPL,

1500
00:34:08,479 --> 00:34:09,847
also our sister channels

1501
00:34:09,914 --> 00:34:10,815
@NASAEarth

1502
00:34:10,882 --> 00:34:12,950
and @NASAClimateChange,

1503
00:34:13,017 --> 00:34:13,818
and we've got a lot

1504
00:34:13,885 --> 00:34:15,186
of information on NISAR

1505
00:34:15,253 --> 00:34:15,887
and all of our

1506
00:34:15,953 --> 00:34:16,888
Earth projects there.

1507
00:34:16,954 --> 00:34:17,922
And just remember,

1508
00:34:17,989 --> 00:34:19,323
at NASA Earth Science

1509
00:34:19,390 --> 00:34:21,359
your home is our mission.

1510
00:34:21,426 --> 00:34:22,293
Thank you so much