
Monitoring Earth's Vital Signs with NISAR:
Meet the Mission Engineers
Wednesday, August 3 at 10:15 a.m. PST, 1:15 p.m. EST

1
00:00:08,470 --> 00:00:06,550
welcome to the jet propulsion laboratory

2
00:00:10,709 --> 00:00:08,480
a nasa facility here in southern

3
00:00:14,070 --> 00:00:10,719
california that specializes in the

4
00:00:16,870 --> 00:00:14,080
robotic exploration of space and of the

5
00:00:20,070 --> 00:00:16,880
earth i'm marina jurica here with a very

6
00:00:22,550 --> 00:00:20,080
small model of nysar an earth observing

7
00:00:25,269 --> 00:00:22,560
satellite that is being put together

8
00:00:27,509 --> 00:00:25,279
here right on a lab and today we're

9
00:00:30,950 --> 00:00:27,519
going to be breaking down nysar which

10
00:00:33,510 --> 00:00:30,960
stands for nasa isro synthetic aperture

11
00:00:35,670 --> 00:00:33,520
radar and isro is the indian space

12
00:00:38,229 --> 00:00:35,680
research organization that we are

13
00:00:40,630 --> 00:00:38,239

collaborating with on this global

14
00:00:42,790 --> 00:00:40,640
mission now before we get to the science

15
00:00:46,630 --> 00:00:42,800
we're going to talk about the assembly

16
00:00:48,549 --> 00:00:46,640
of this next level spacecraft and we're

17
00:00:51,189 --> 00:00:48,559
going to be talking to two emission

18
00:00:53,510 --> 00:00:51,199
experts as they explain nasa is going to

19
00:00:56,630 --> 00:00:53,520
be launching the largest reflector

20
00:00:59,349 --> 00:00:56,640
antenna ever into space first up will be

21
00:01:00,630 --> 00:00:59,359
payload manager wendy edelstein and then

22
00:01:03,510 --> 00:01:00,640
we're going to be talking about the

23
00:01:06,070 --> 00:01:03,520
communication system on board and why

24
00:01:08,950 --> 00:01:06,080
that is so unique to nysar with systems

25
00:01:10,630 --> 00:01:08,960
engineer richa saroki welcome wendy

26
00:01:13,590 --> 00:01:10,640
thanks so much for being here today for

27
00:01:15,749 --> 00:01:13,600
having me so what is nicer and how will

28
00:01:18,230 --> 00:01:15,759
it see the environmental problems

29
00:01:20,149 --> 00:01:18,240
differently so nysar is one of nasa's i

30
00:01:23,030 --> 00:01:20,159
would call a flagship earth science

31
00:01:24,550 --> 00:01:23,040
mission while most uh nasa science

32
00:01:26,550 --> 00:01:24,560
missions are very focused on a single

33
00:01:28,789 --> 00:01:26,560
measurement objective nystar is a bit

34
00:01:30,870 --> 00:01:28,799
unique it covers a wide range of science

35
00:01:33,190 --> 00:01:30,880
goals really focused on addressing

36
00:01:35,109 --> 00:01:33,200
climate change and our response to uh

37
00:01:36,310 --> 00:01:35,119
disasters and and managing those

38
00:01:39,030 --> 00:01:36,320

disasters

39
00:01:41,590 --> 00:01:39,040
um so um for instance i would say that

40
00:01:44,149 --> 00:01:41,600
you could look at nysar as like a swiss

41
00:01:46,389 --> 00:01:44,159
army knife of radar missions of science

42
00:01:48,230 --> 00:01:46,399
missions and what i mean by that is that

43
00:01:49,830 --> 00:01:48,240
um you know it's looking at many

44
00:01:51,910 --> 00:01:49,840
different things in a variety of

45
00:01:54,469 --> 00:01:51,920
different ways for instance we have

46
00:01:57,510 --> 00:01:54,479
measurements that can look at

47
00:01:59,270 --> 00:01:57,520
surface change of the of the climate and

48
00:02:01,270 --> 00:01:59,280
surface change of the earth so that's

49
00:02:02,630 --> 00:02:01,280
used for measuring things like

50
00:02:05,590 --> 00:02:02,640
earthquakes

51
00:02:07,190 --> 00:02:05,600
landslides flooding events volcanic

52
00:02:08,790 --> 00:02:07,200
activity these are things that you see

53
00:02:10,949 --> 00:02:08,800
every day in the news we're measuring

54
00:02:12,309 --> 00:02:10,959
those on a daily basis globally day

55
00:02:15,030 --> 00:02:12,319
after day

56
00:02:17,350 --> 00:02:15,040
we also are measuring and monitoring uh

57
00:02:18,869 --> 00:02:17,360
the the melting of our glaciers and our

58
00:02:21,030 --> 00:02:18,879
ice sheets and that's really important

59
00:02:22,869 --> 00:02:21,040
for measuring and monitoring the sea

60
00:02:25,030 --> 00:02:22,879
level rise and that's extremely

61
00:02:26,309 --> 00:02:25,040
important to our coastal communities

62
00:02:28,869 --> 00:02:26,319
we have our farmers are going to be

63
00:02:30,949 --> 00:02:28,879

using the nysar data as a way to manage

64
00:02:32,470 --> 00:02:30,959
their crops and really manage the water

65
00:02:35,509 --> 00:02:32,480
usage because of course water is a

66
00:02:37,270 --> 00:02:35,519
scarce resource so we have a multitude

67
00:02:39,509 --> 00:02:37,280
of scientists all looking for different

68
00:02:41,030 --> 00:02:39,519
measurements of nice uh ways to use the

69
00:02:43,030 --> 00:02:41,040
nicer measurements

70
00:02:45,509 --> 00:02:43,040
to really solve everyday problems i bet

71
00:02:48,070 --> 00:02:45,519
they can hardly wait very excited so

72
00:02:49,990 --> 00:02:48,080
this model is very small compared to

73
00:02:51,670 --> 00:02:50,000
what it actually is give people some

74
00:02:53,750 --> 00:02:51,680
reference and talk a little bit about

75
00:02:55,670 --> 00:02:53,760
the two radars and what sets them apart

76
00:02:57,670 --> 00:02:55,680
on nicer right so let me first explain

77
00:03:00,869 --> 00:02:57,680
what what the the two systems are so

78
00:03:02,790 --> 00:03:00,879
nice r is a dual frequency uh radar

79
00:03:05,030 --> 00:03:02,800
system it's a synthetic aperture radar

80
00:03:07,270 --> 00:03:05,040
which is a fancy way of saying high

81
00:03:09,589 --> 00:03:07,280
resolution mapping radar so that's what

82
00:03:12,550 --> 00:03:09,599
we mean by a synthetic temperature radar

83
00:03:15,509 --> 00:03:12,560
so we call those the lsr and the sr lsr

84
00:03:17,670 --> 00:03:15,519
is provided by nasa jpl and the sr is a

85
00:03:19,270 --> 00:03:17,680
radar so an independent radar provided

86
00:03:22,550 --> 00:03:19,280
by the indian space research

87
00:03:24,550 --> 00:03:22,560
organization uh elsar operates at l-band

88
00:03:26,949 --> 00:03:24,560

so that's what the l is an l-band is a

89
00:03:30,149 --> 00:03:26,959
long-wavelength uh uh microwave

90
00:03:32,710 --> 00:03:30,159
frequency which is used to basically can

91
00:03:34,949 --> 00:03:32,720
can penetrate through the

92
00:03:38,630 --> 00:03:34,959
foliage and trees and get right down to

93
00:03:41,350 --> 00:03:38,640
the the tree trunks and measure carbon

94
00:03:43,190 --> 00:03:41,360
it measures really well with using a

95
00:03:45,589 --> 00:03:43,200
repeat pass interferometry and technique

96
00:03:47,509 --> 00:03:45,599
to measure small centimeter level

97
00:03:49,990 --> 00:03:47,519
surface change on the earth so it's

98
00:03:52,149 --> 00:03:50,000
really used to monitor these um

99
00:03:53,990 --> 00:03:52,159
features of these large scale features

100
00:03:55,670 --> 00:03:54,000
the s-band radar is operated a little

101
00:03:57,830 --> 00:03:55,680
bit higher frequency and so what that

102
00:04:00,710 --> 00:03:57,840
means is it does that it looks at

103
00:04:03,030 --> 00:04:00,720
foliage it looks at vegetation and crops

104
00:04:04,470 --> 00:04:03,040
and that's its primary objective

105
00:04:06,390 --> 00:04:04,480
let me tell you a little bit about what

106
00:04:08,710 --> 00:04:06,400
where they all fit on this structure so

107
00:04:10,630 --> 00:04:08,720
nyser is a somewhat unique because it's

108
00:04:12,390 --> 00:04:10,640
very large and this model doesn't do it

109
00:04:15,030 --> 00:04:12,400
justice so what you see here is the

110
00:04:17,189 --> 00:04:15,040
entire satellite in the back here is the

111
00:04:19,030 --> 00:04:17,199
conventional satellite components you've

112
00:04:20,550 --> 00:04:19,040
got your solar arrays and the spacecraft

113
00:04:22,069 --> 00:04:20,560

bus that does all the commanding and

114
00:04:24,469 --> 00:04:22,079
controlling of the spacecraft in the

115
00:04:27,270 --> 00:04:24,479
mission but out here in front this large

116
00:04:29,590 --> 00:04:27,280
piece that's the actual radar instrument

117
00:04:31,990 --> 00:04:29,600
structure and that houses the l-band

118
00:04:33,350 --> 00:04:32,000
radar and the s-band radar and this is

119
00:04:35,350 --> 00:04:33,360
very large it's about the size of a

120
00:04:37,350 --> 00:04:35,360
school bus so it's very large

121
00:04:39,350 --> 00:04:37,360
you can see some of the electronics are

122
00:04:41,110 --> 00:04:39,360
on the outside and the inside is stuffed

123
00:04:42,390 --> 00:04:41,120
full of more electronics so it's very

124
00:04:44,710 --> 00:04:42,400
complicated

125
00:04:46,790 --> 00:04:44,720
up here you can see the feeds that

126
00:04:49,270 --> 00:04:46,800
really are used to communicate and

127
00:04:51,590 --> 00:04:49,280
illuminate this large reflector antenna

128
00:04:53,830 --> 00:04:51,600
this is the the interface between the

129
00:04:55,510 --> 00:04:53,840
earth and our system and it basically is

130
00:04:57,270 --> 00:04:55,520
used to transmit and receive our radio

131
00:04:58,469 --> 00:04:57,280
frequencies from the ground and get them

132
00:05:00,870 --> 00:04:58,479
into the system where they can do

133
00:05:03,029 --> 00:05:00,880
onboard or data processing so all

134
00:05:06,469 --> 00:05:03,039
together this is a very complex system

135
00:05:08,390 --> 00:05:06,479
the antenna is like 12 meters so that's

136
00:05:10,790 --> 00:05:08,400
40ish feet and that's like the size of

137
00:05:12,790 --> 00:05:10,800
this tall as a three-story building so

138
00:05:14,710 --> 00:05:12,800

everything is very large the the boom is

139
00:05:16,230 --> 00:05:14,720
nine meters so everything here is very

140
00:05:18,950 --> 00:05:16,240
large and we'll show you some deployment

141
00:05:20,870 --> 00:05:18,960
videos uh to see how that comes together

142
00:05:23,270 --> 00:05:20,880
because one of the key challenges here

143
00:05:25,749 --> 00:05:23,280
is that since this is very large it has

144
00:05:27,590 --> 00:05:25,759
to deploy it has to be stowed to fit

145
00:05:29,590 --> 00:05:27,600
into our launch vehicle you cannot

146
00:05:31,990 --> 00:05:29,600
launch it like this it'd be simpler but

147
00:05:33,670 --> 00:05:32,000
it can't be done so we have to package

148
00:05:36,629 --> 00:05:33,680
it down very small and so you can see in

149
00:05:39,029 --> 00:05:36,639
this video that the boom here is made up

150
00:05:41,029 --> 00:05:39,039
of four separate segments it takes um

151
00:05:43,189 --> 00:05:41,039
each segment of the boom is in is

152
00:05:45,270 --> 00:05:43,199
deployed separately it's wrapping around

153
00:05:47,909 --> 00:05:45,280
the structure as you see and then it

154
00:05:49,990 --> 00:05:47,919
deploys the fourth boom right there and

155
00:05:52,629 --> 00:05:50,000
then the last step is that we release

156
00:05:55,189 --> 00:05:52,639
the antenna structure uh the reflector

157
00:05:56,629 --> 00:05:55,199
structure the reflector is a composite

158
00:05:58,870 --> 00:05:56,639
uh there's a

159
00:06:00,790 --> 00:05:58,880
perimeter truss uh that basically opens

160
00:06:03,350 --> 00:06:00,800
like a baby gate and has a very

161
00:06:04,950 --> 00:06:03,360
lightweight mesh material uh fabric

162
00:06:06,710 --> 00:06:04,960
material that makes up this component

163
00:06:08,550 --> 00:06:06,720

this material

164
00:06:10,790 --> 00:06:08,560
makes it very lightweight so the whole

165
00:06:13,510 --> 00:06:10,800
antenna only weighs about 180 pounds so

166
00:06:15,909 --> 00:06:13,520
it's a package very small to wrap around

167
00:06:17,909 --> 00:06:15,919
this system and launch in a smaller

168
00:06:19,749 --> 00:06:17,919
launch vehicle and it takes a few days

169
00:06:21,670 --> 00:06:19,759
for this process to happen you mentioned

170
00:06:23,670 --> 00:06:21,680
right so we it takes like the first nine

171
00:06:25,670 --> 00:06:23,680
days of the mission we're going to be

172
00:06:26,950 --> 00:06:25,680
going one every day we'll deploy a

173
00:06:28,469 --> 00:06:26,960
different hinge and we do it very

174
00:06:30,150 --> 00:06:28,479
systematically but we takes about nine

175
00:06:31,430 --> 00:06:30,160
days to deploy all of the antenna

176
00:06:33,110 --> 00:06:31,440
components in the first week of the

177
00:06:35,110 --> 00:06:33,120
mission well like i said to you before

178
00:06:37,430 --> 00:06:35,120
wendy we've got to use this technology

179
00:06:39,189 --> 00:06:37,440
to make electric pop-up tents i would

180
00:06:40,629 --> 00:06:39,199
really like that camping a little more

181
00:06:42,790 --> 00:06:40,639
enjoyable that's right well you're

182
00:06:44,950 --> 00:06:42,800
joining us for the nicer live st live

183
00:06:46,390 --> 00:06:44,960
stream with uh wendy edelstein and so if

184
00:06:48,309 --> 00:06:46,400
you have any comments or questions

185
00:06:49,589 --> 00:06:48,319
please pop them in the box and we will

186
00:06:52,710 --> 00:06:49,599
get to them a little later in the

187
00:06:55,189 --> 00:06:52,720
program so wendy tell me exactly what a

188
00:06:57,270 --> 00:06:55,199

payload manager is okay so i have been

189
00:06:58,870 --> 00:06:57,280
with the project for about seven years

190
00:07:01,350 --> 00:06:58,880
and the payload manager is pretty much

191
00:07:03,350 --> 00:07:01,360
responsible for everything you see here

192
00:07:05,430 --> 00:07:03,360
the the instrument the components the

193
00:07:07,990 --> 00:07:05,440
antenna i have to make sure it gets

194
00:07:09,749 --> 00:07:08,000
designed built tested integrated with

195
00:07:11,270 --> 00:07:09,759
the other elements and ultimately i'm

196
00:07:12,309 --> 00:07:11,280
responsible to make sure it works on

197
00:07:14,230 --> 00:07:12,319
orbit

198
00:07:16,150 --> 00:07:14,240
part of my job a big part of my job is

199
00:07:18,629 --> 00:07:16,160
working really closely with the indian

200
00:07:20,390 --> 00:07:18,639
uh my our indian counterparts because

201
00:07:23,189 --> 00:07:20,400
you know we have a very integrated

202
00:07:25,110 --> 00:07:23,199
system i mentioned the s-band system is

203
00:07:26,629 --> 00:07:25,120
buried inside here it takes a lot of

204
00:07:28,790 --> 00:07:26,639
engineering to ensure that all these

205
00:07:30,390 --> 00:07:28,800
different systems work together as

206
00:07:33,029 --> 00:07:30,400
designed and that we can do joint

207
00:07:34,390 --> 00:07:33,039
mission operations so it's a it's a

208
00:07:36,790 --> 00:07:34,400
challenging job next year i'll be

209
00:07:38,390 --> 00:07:36,800
spending a lot of my time in india to do

210
00:07:40,550 --> 00:07:38,400
the final phase of testing to integrate

211
00:07:41,990 --> 00:07:40,560
this with the spacecraft very exciting

212
00:07:44,390 --> 00:07:42,000
and we're going to take a look at our

213
00:07:46,309 --> 00:07:44,400

next steps video here showing what's

214
00:07:47,749 --> 00:07:46,319
going on in our clean room over the last

215
00:07:49,189 --> 00:07:47,759
couple of days as it gets ready for

216
00:07:50,869 --> 00:07:49,199
testing so walk us through this one yeah

217
00:07:52,710 --> 00:07:50,879
so it's exciting so where you see it

218
00:07:54,070 --> 00:07:52,720
right here is the the model here is

219
00:07:56,230 --> 00:07:54,080
fully deployed this is what it looks

220
00:07:58,070 --> 00:07:56,240
like in a stowed position this is how

221
00:08:00,309 --> 00:07:58,080
we're going to launch it you can see the

222
00:08:01,749 --> 00:08:00,319
various components you can see people

223
00:08:03,830 --> 00:08:01,759
standing around there to get a real

224
00:08:05,749 --> 00:08:03,840
sense of size of how big this system is

225
00:08:07,270 --> 00:08:05,759
there's their antenna reflectors being

226
00:08:09,749 --> 00:08:07,280
stowed you can see some of the

227
00:08:12,070 --> 00:08:09,759
electronics on the outside of the system

228
00:08:14,070 --> 00:08:12,080
those golden black things are thermal

229
00:08:16,390 --> 00:08:14,080
blankets that keep the temperature nice

230
00:08:18,309 --> 00:08:16,400
and warm and comfortable on orbit so

231
00:08:19,909 --> 00:08:18,319
we've just finished building it up and

232
00:08:23,029 --> 00:08:19,919
you can see us putting it into a

233
00:08:25,510 --> 00:08:23,039
transportation fixture container and our

234
00:08:27,270 --> 00:08:25,520
next step is to basically take that

235
00:08:28,950 --> 00:08:27,280
system as is and take it to our

236
00:08:30,629 --> 00:08:28,960
environmental test facility and start

237
00:08:32,389 --> 00:08:30,639
our next phase of testing and that's

238
00:08:34,389 --> 00:08:32,399

very important tell us a little bit

239
00:08:35,589 --> 00:08:34,399
about this next test phase right so up

240
00:08:37,110 --> 00:08:35,599
until now we've done what we call

241
00:08:38,870 --> 00:08:37,120
ambient testing we do it in the clean

242
00:08:40,709 --> 00:08:38,880
room we make sure things functionally

243
00:08:42,469 --> 00:08:40,719
work but what's really important it has

244
00:08:45,030 --> 00:08:42,479
to withstand the environment so we go up

245
00:08:46,949 --> 00:08:45,040
to our environmental test facilities we

246
00:08:48,949 --> 00:08:46,959
we expose it to a variety of different

247
00:08:50,630 --> 00:08:48,959
environments to simulate the flight of

248
00:08:53,030 --> 00:08:50,640
the space environment so we have to go

249
00:08:54,310 --> 00:08:53,040
through a vibration test to simulate our

250
00:08:56,470 --> 00:08:54,320
launch environment because it's the

251
00:08:58,550 --> 00:08:56,480
launch vehicle is very shaky uh then we

252
00:09:01,269 --> 00:08:58,560
also have a two different thermal vacuum

253
00:09:03,190 --> 00:09:01,279
test that test uh the system in a flight

254
00:09:04,550 --> 00:09:03,200
like configuration to make sure boxes

255
00:09:06,470 --> 00:09:04,560
don't get too hot or too cold and

256
00:09:08,389 --> 00:09:06,480
everything is operating as designed so

257
00:09:10,070 --> 00:09:08,399
it's a really critical step and then

258
00:09:12,630 --> 00:09:10,080
once we're done with that we bring the

259
00:09:14,630 --> 00:09:12,640
part the system back into our clean room

260
00:09:16,310 --> 00:09:14,640
do a couple last functional health

261
00:09:17,750 --> 00:09:16,320
checks to make sure everything is okay

262
00:09:19,430 --> 00:09:17,760
and then next

263
00:09:21,750 --> 00:09:19,440

next spring early next year we're

264
00:09:22,870 --> 00:09:21,760
shipping it to india very exciting well

265
00:09:24,630 --> 00:09:22,880
thanks so much wendy we're going to

266
00:09:26,870 --> 00:09:24,640
bring wendy back a little bit later to

267
00:09:28,630 --> 00:09:26,880
answer some of your questions but now

268
00:09:31,430 --> 00:09:28,640
we're going to be breaking down the vast

269
00:09:33,990 --> 00:09:31,440
communication system that is on nysar

270
00:09:36,230 --> 00:09:34,000
with lead end to end systems engineer

271
00:09:38,070 --> 00:09:36,240
richa sarohi thank you so much for being

272
00:09:40,150 --> 00:09:38,080
here yeah excited to be here thanks for

273
00:09:41,990 --> 00:09:40,160
having me so that's a big title tell us

274
00:09:44,070 --> 00:09:42,000
exactly what it is that you do here yeah

275
00:09:46,470 --> 00:09:44,080
so i'm the end-to-end information system

276
00:09:48,710 --> 00:09:46,480
engineer on nysar and that and basically

277
00:09:50,470 --> 00:09:48,720
the mission plumber um

278
00:09:52,230 --> 00:09:50,480
just like plumbing is a critical part of

279
00:09:54,150 --> 00:09:52,240
the infrastructure for any building so

280
00:09:55,590 --> 00:09:54,160
is the data flow so i think about

281
00:09:57,190 --> 00:09:55,600
everything from when a scientist says

282
00:09:58,949 --> 00:09:57,200
this is the data i want all the way

283
00:10:00,230 --> 00:09:58,959
through when that data is archived so i

284
00:10:02,389 --> 00:10:00,240
have to make sure that we can command

285
00:10:03,990 --> 00:10:02,399
the spacecraft that we can collect data

286
00:10:06,949 --> 00:10:04,000
correctly that we can process it on

287
00:10:08,310 --> 00:10:06,959
board downlink it receive it and archive

288
00:10:10,150 --> 00:10:08,320

it to make it freely available for

289
00:10:12,710 --> 00:10:10,160
scientists without having any clogs or

290
00:10:15,110 --> 00:10:12,720
any leaks i like that so tell us about

291
00:10:16,710 --> 00:10:15,120
your personal connection to isro yeah

292
00:10:18,389 --> 00:10:16,720
that's a great question so my parents

293
00:10:19,910 --> 00:10:18,399
are actually indian immigrants

294
00:10:21,190 --> 00:10:19,920
and they came to this country like many

295
00:10:23,110 --> 00:10:21,200
immigrants to give me better

296
00:10:24,550 --> 00:10:23,120
opportunities than an education and i

297
00:10:26,069 --> 00:10:24,560
feel really proud that i've been able to

298
00:10:27,829 --> 00:10:26,079
take that and work at this incredible

299
00:10:29,430 --> 00:10:27,839
place and now contribute to this great

300
00:10:30,790 --> 00:10:29,440
earth science mission that is also in

301
00:10:32,870 --> 00:10:30,800
partnership with isro and it's going to

302
00:10:34,310 --> 00:10:32,880
help so many people in india due to its

303
00:10:36,230 --> 00:10:34,320
impacts on our understanding of

304
00:10:37,430 --> 00:10:36,240
agriculture as well as coastal regions

305
00:10:39,670 --> 00:10:37,440
of india

306
00:10:41,670 --> 00:10:39,680
and tell us what sets nysa apart is

307
00:10:43,910 --> 00:10:41,680
communication systems very unique yeah

308
00:10:45,750 --> 00:10:43,920
so there's two big things first we

309
00:10:47,829 --> 00:10:45,760
utilize ground stations both both

310
00:10:49,670 --> 00:10:47,839
operated by the near space network which

311
00:10:51,030 --> 00:10:49,680
is operated out of goddard as well as

312
00:10:53,670 --> 00:10:51,040
ground stations

313
00:10:54,949 --> 00:10:53,680

operated by isro in india and so it's

314
00:10:56,630 --> 00:10:54,959
it's very complicated because we're

315
00:10:58,230 --> 00:10:56,640
interfacing both with you know ground

316
00:11:00,389 --> 00:10:58,240
stations that we are familiar with as

317
00:11:03,030 --> 00:11:00,399
being part of jpl but also isro ground

318
00:11:04,790 --> 00:11:03,040
stations on top of that it's generating

319
00:11:06,790 --> 00:11:04,800
a lot of science data it's like a

320
00:11:08,550 --> 00:11:06,800
tsunami of science data compared to

321
00:11:11,350 --> 00:11:08,560
other earth science missions it's almost

322
00:11:13,590 --> 00:11:11,360
40 terabits every single day to give you

323
00:11:15,829 --> 00:11:13,600
some perspective that's like downloading

324
00:11:18,150 --> 00:11:15,839
33 million word document pages and if

325
00:11:19,829 --> 00:11:18,160
you printed that that would be 6 500

326
00:11:21,269 --> 00:11:19,839
filing cabinets it's like if you

327
00:11:23,430 --> 00:11:21,279
streamed netflix for two and a half

328
00:11:25,269 --> 00:11:23,440
months straight um it's it's a lot of

329
00:11:28,150 --> 00:11:25,279
data so we're excited and i'm sure the

330
00:11:29,750 --> 00:11:28,160
scientists are excited oh yes as well

331
00:11:31,990 --> 00:11:29,760
and so you've talked about the massive

332
00:11:34,150 --> 00:11:32,000
data volume capability the scientists

333
00:11:35,750 --> 00:11:34,160
are just waiting for it and with all of

334
00:11:36,710 --> 00:11:35,760
the things we're hearing on the news

335
00:11:38,150 --> 00:11:36,720
about

336
00:11:40,870 --> 00:11:38,160
all the flash flooding here in the

337
00:11:43,430 --> 00:11:40,880
united states the record heat in england

338
00:11:45,350 --> 00:11:43,440

the fires in france how is nicer going

339
00:11:47,509 --> 00:11:45,360
to be able to help take a look at all of

340
00:11:49,990 --> 00:11:47,519
these issues yeah so naisa is actually

341
00:11:52,230 --> 00:11:50,000
doing a polar orbit of earth every 12

342
00:11:54,629 --> 00:11:52,240
days for about three years that's going

343
00:11:57,190 --> 00:11:54,639
to allow us to see on a centimeter level

344
00:11:58,870 --> 00:11:57,200
how earth is changing over a very long

345
00:12:01,030 --> 00:11:58,880
period of time that gives us a really

346
00:12:03,509 --> 00:12:01,040
good perspective on how ice shelves are

347
00:12:05,350 --> 00:12:03,519
moving how sea level is rising how

348
00:12:07,430 --> 00:12:05,360
coastal cities are being impacted how

349
00:12:09,590 --> 00:12:07,440
agriculture is changing it'll inform our

350
00:12:11,350 --> 00:12:09,600
climate models carbon flux models

351
00:12:13,829 --> 00:12:11,360
basically that helps us be prepared in

352
00:12:15,750 --> 00:12:13,839
the event of disaster responses how to

353
00:12:17,910 --> 00:12:15,760
manage our groundwater how to manage our

354
00:12:20,550 --> 00:12:17,920
agricultural crops and supply chain how

355
00:12:22,069 --> 00:12:20,560
to prepare our cities for rising floods

356
00:12:23,590 --> 00:12:22,079
it's going to be very impactful science

357
00:12:25,509 --> 00:12:23,600
and what's great about it is all that

358
00:12:27,430 --> 00:12:25,519
science becomes freely available for

359
00:12:29,670 --> 00:12:27,440
anyone to access and use and will

360
00:12:31,269 --> 00:12:29,680
eventually inform environmental policy

361
00:12:33,509 --> 00:12:31,279
well i can see how everyone is getting

362
00:12:35,590 --> 00:12:33,519
really excited to get this launched and

363
00:12:37,030 --> 00:12:35,600

heading into next year so thank you so

364
00:12:38,550 --> 00:12:37,040
much richa for being with us we're going

365
00:12:40,150 --> 00:12:38,560
to bring wendy back in here and now

366
00:12:42,470 --> 00:12:40,160
we're going to get to your questions and

367
00:12:45,269 --> 00:12:42,480
comments we've got our social media team

368
00:12:47,990 --> 00:12:45,279
that is going to be kicking us off here

369
00:12:49,990 --> 00:12:48,000
with brian on twitter asking this

370
00:12:52,470 --> 00:12:50,000
antenna configuration looks very

371
00:12:54,710 --> 00:12:52,480
different than the large flat rigid

372
00:12:57,110 --> 00:12:54,720
panels of earlier missions can you

373
00:12:59,030 --> 00:12:57,120
describe how this new configuration was

374
00:13:01,750 --> 00:12:59,040
developed and other engineering

375
00:13:03,110 --> 00:13:01,760
advancements that are a part of nysar

376
00:13:04,710 --> 00:13:03,120
right so i think you're referring to

377
00:13:06,389 --> 00:13:04,720
some of our older synthetic aperture

378
00:13:08,790 --> 00:13:06,399
radar missions where we use phased array

379
00:13:11,030 --> 00:13:08,800
technology we have a flat panel with

380
00:13:13,509 --> 00:13:11,040
individual electronics on each panel

381
00:13:15,590 --> 00:13:13,519
where we sear the beam individually

382
00:13:17,670 --> 00:13:15,600
that configuration does not work well

383
00:13:20,230 --> 00:13:17,680
for nysar and that's because we're

384
00:13:22,629 --> 00:13:20,240
sharing this antenna with israel it'd be

385
00:13:25,269 --> 00:13:22,639
very it would be probably prohibitive to

386
00:13:28,389 --> 00:13:25,279
launch two phased arrays uh together so

387
00:13:30,310 --> 00:13:28,399
instead we we have a smaller array on

388
00:13:32,069 --> 00:13:30,320

the feed of the antenna that's where we

389
00:13:34,150 --> 00:13:32,079
talked about the feed we have all the

390
00:13:36,230 --> 00:13:34,160
electronics behind that and then they

391
00:13:38,150 --> 00:13:36,240
illuminate and illuminate the reflector

392
00:13:39,829 --> 00:13:38,160
together so the reason why we have this

393
00:13:41,910 --> 00:13:39,839
reflector configured is really so we can

394
00:13:46,069 --> 00:13:41,920
enable the dual frequency system

395
00:13:49,189 --> 00:13:46,079
great now money mentor on youtube asks

396
00:13:52,310 --> 00:13:49,199
hey what is the exact role of isro in

397
00:13:53,829 --> 00:13:52,320
this nicer mission yeah so there um as

398
00:13:56,790 --> 00:13:53,839
wendy had talked about are contributing

399
00:13:58,870 --> 00:13:56,800
the sr radar um one of the two radars

400
00:14:00,069 --> 00:13:58,880
involved in nysar what makes it unique

401
00:14:03,030 --> 00:14:00,079
is that nicer is the first time we're

402
00:14:04,470 --> 00:14:03,040
having a two radar earth science mission

403
00:14:05,750 --> 00:14:04,480
um and it's a great partnership because

404
00:14:07,430 --> 00:14:05,760
they're also providing the launch

405
00:14:09,269 --> 00:14:07,440
vehicle and the launch operations and

406
00:14:11,189 --> 00:14:09,279
they're also providing the isro ground

407
00:14:12,310 --> 00:14:11,199
stations and the spacecraft yeah you're

408
00:14:14,310 --> 00:14:12,320
right yeah and the spacecraft

409
00:14:15,829 --> 00:14:14,320
contributing a lot to this mission

410
00:14:17,430 --> 00:14:15,839
which is why we have the partnership of

411
00:14:18,949 --> 00:14:17,440
course because it's a it's an expensive

412
00:14:20,949 --> 00:14:18,959
mission and we could not nasa cannot do

413
00:14:23,990 --> 00:14:20,959

it on its own so having this partnership

414
00:14:25,509 --> 00:14:24,000
is critical and being the first earth

415
00:14:27,670 --> 00:14:25,519
satellite that we are in joint

416
00:14:28,710 --> 00:14:27,680
partnership with isro is really special

417
00:14:32,230 --> 00:14:28,720
as well

418
00:14:35,269 --> 00:14:32,240
all right adrero king on youtube asks

419
00:14:37,590 --> 00:14:35,279
how is nicer going to help agricultural

420
00:14:39,670 --> 00:14:37,600
production

421
00:14:42,150 --> 00:14:39,680
sure yeah um so it's really helping us

422
00:14:44,389 --> 00:14:42,160
understand uh what best practices

423
00:14:46,389 --> 00:14:44,399
farmers can utilize what crops to rotate

424
00:14:48,949 --> 00:14:46,399
to make sure their soil is healthy how

425
00:14:50,790 --> 00:14:48,959
to utilize groundwater resources it'll

426
00:14:52,949 --> 00:14:50,800
inform our water management so where

427
00:14:55,829 --> 00:14:52,959
should we be sending water how can we

428
00:14:57,910 --> 00:14:55,839
prevent from you know groundwater loss

429
00:15:00,069 --> 00:14:57,920
it'll inform supply chains so what is

430
00:15:01,590 --> 00:15:00,079
working what areas are a food desert how

431
00:15:03,829 --> 00:15:01,600
can we make our supply chains more

432
00:15:05,750 --> 00:15:03,839
robust so it's everything from you know

433
00:15:08,069 --> 00:15:05,760
water management farmers pesticide

434
00:15:10,550 --> 00:15:08,079
management all the way through societal

435
00:15:12,310 --> 00:15:10,560
infrastructure and supply chains

436
00:15:13,750 --> 00:15:12,320
and like you mentioned earlier and i'm

437
00:15:17,430 --> 00:15:13,760
learning along with everybody else at

438
00:15:19,110 --> 00:15:17,440

home so l long s short they each look at

439
00:15:20,710 --> 00:15:19,120
things differently but together they

440
00:15:23,189 --> 00:15:20,720
really pack a punch

441
00:15:26,629 --> 00:15:23,199
all right now our next question comes

442
00:15:29,670 --> 00:15:26,639
from ayush subcoda on youtube asking

443
00:15:34,470 --> 00:15:29,680
will nysar be able to see the amount of

444
00:15:38,389 --> 00:15:36,470
that's not really what nysar does it

445
00:15:40,069 --> 00:15:38,399
operates at a longer wavelength so it

446
00:15:41,590 --> 00:15:40,079
does not it sees right through clouds it

447
00:15:42,790 --> 00:15:41,600
doesn't see anything like water vapor

448
00:15:45,030 --> 00:15:42,800
that's we'll leave that to another

449
00:15:46,310 --> 00:15:45,040
mission but what's good is it does see

450
00:15:48,150 --> 00:15:46,320
right through clouds and that's

451
00:15:49,590 --> 00:15:48,160
extremely beneficial right so that

452
00:15:51,350 --> 00:15:49,600
allows us instead of looking through

453
00:15:53,189 --> 00:15:51,360
water vapor we have cloud and vapor

454
00:15:54,470 --> 00:15:53,199
emissions uh but this allows us to see

455
00:15:56,629 --> 00:15:54,480
through the clouds so that gives us

456
00:15:58,790 --> 00:15:56,639
actually day and night um ability to

457
00:16:00,790 --> 00:15:58,800
watch and monitor the earth it doesn't

458
00:16:02,230 --> 00:16:00,800
matter it doesn't need cloud cover is

459
00:16:03,910 --> 00:16:02,240
not a problem so we just see right

460
00:16:06,790 --> 00:16:03,920
through all of that which is great and

461
00:16:09,509 --> 00:16:06,800
that's also groundbreaking as well okay

462
00:16:12,629 --> 00:16:09,519
next we've got florian on facebook

463
00:16:14,790 --> 00:16:12,639

asking what height and where is it going

464
00:16:17,990 --> 00:16:14,800
to orbit

465
00:16:20,550 --> 00:16:18,000
oh i'm blanking

466
00:16:25,670 --> 00:16:20,560
it's around a 800 kilometer orbit okay

467
00:16:31,590 --> 00:16:29,110
xavier on youtube asks does only nasa

468
00:16:35,030 --> 00:16:31,600
and isro have access to their country's

469
00:16:37,030 --> 00:16:35,040
data or global data is accessible to all

470
00:16:39,590 --> 00:16:37,040
countries yeah that's a great question

471
00:16:41,269 --> 00:16:39,600
so when we downlink at the isro stations

472
00:16:42,710 --> 00:16:41,279
and at the near space network stations

473
00:16:44,470 --> 00:16:42,720
but all that data has to get processed

474
00:16:46,230 --> 00:16:44,480
so it's understandable and it's shared

475
00:16:47,590 --> 00:16:46,240
with the entire science team whether

476
00:16:50,310 --> 00:16:47,600
they're from nasa whether they're from

477
00:16:51,749 --> 00:16:50,320
isro and it's put on earth data for nasa

478
00:16:53,670 --> 00:16:51,759
so it's you know

479
00:16:55,590 --> 00:16:53,680
accessible for anybody at any academic

480
00:16:57,269 --> 00:16:55,600
institution any personal researcher

481
00:16:59,430 --> 00:16:57,279
there's actually specialists here at jpl

482
00:17:01,030 --> 00:16:59,440
who can help you understand that data um

483
00:17:02,710 --> 00:17:01,040
and help different academic institutions

484
00:17:04,630 --> 00:17:02,720
utilize that for research so it's pretty

485
00:17:06,309 --> 00:17:04,640
fast and very accessible and there's a

486
00:17:08,069 --> 00:17:06,319
lot of early adapter programs that

487
00:17:10,309 --> 00:17:08,079
people can get involved in as well to

488
00:17:12,309 --> 00:17:10,319

learn more about how this science data

489
00:17:13,590 --> 00:17:12,319
can impact whatever research it is that

490
00:17:14,949 --> 00:17:13,600
they're doing and i'm sure there's more

491
00:17:16,470 --> 00:17:14,959
research that will come out of it

492
00:17:18,549 --> 00:17:16,480
because of all these early adopter

493
00:17:20,710 --> 00:17:18,559
adopters and all of these researchers

494
00:17:22,789 --> 00:17:20,720
who get a handle of the data they find

495
00:17:25,750 --> 00:17:22,799
new areas of research as well

496
00:17:28,470 --> 00:17:25,760
great next question comes from sandesh

497
00:17:30,870 --> 00:17:28,480
tadake on youtube asking which

498
00:17:34,230 --> 00:17:30,880
communication technique is used to

499
00:17:36,710 --> 00:17:34,240
access this huge data from the satellite

500
00:17:38,230 --> 00:17:36,720
yeah so we have you know as like we

501
00:17:40,230 --> 00:17:38,240
mentioned multiple ground stations so

502
00:17:42,390 --> 00:17:40,240
every time we do a flyover of a ground

503
00:17:44,789 --> 00:17:42,400
station we'll downlink to that specific

504
00:17:46,310 --> 00:17:44,799
site so we have multiple downlinks a day

505
00:17:47,830 --> 00:17:46,320
especially over this sort of 12-day

506
00:17:49,430 --> 00:17:47,840
period that we're mapping earth that

507
00:17:51,110 --> 00:17:49,440
allows us to collect everything it's

508
00:17:52,710 --> 00:17:51,120
streaming from the internal avionics

509
00:17:54,470 --> 00:17:52,720
system it's our first time usually

510
00:17:56,630 --> 00:17:54,480
utilizing a solid state recorder which

511
00:17:59,350 --> 00:17:56,640
allows us to to manage that volume of

512
00:18:01,590 --> 00:17:59,360
science data afterwards it goes through

513
00:18:02,630 --> 00:18:01,600

our ground data system um where it you

514
00:18:04,549 --> 00:18:02,640
know gets

515
00:18:06,390 --> 00:18:04,559
you know uh accessible when it becomes

516
00:18:07,909 --> 00:18:06,400
readable otherwise it's just coming down

517
00:18:09,510 --> 00:18:07,919
at ones and zeros right so it doesn't

518
00:18:10,950 --> 00:18:09,520
makes any sense until we put it together

519
00:18:12,549 --> 00:18:10,960
on the ground and then make it

520
00:18:14,789 --> 00:18:12,559
accessible in an archive so it's really

521
00:18:16,390 --> 00:18:14,799
a multi-faceted communication system we

522
00:18:17,669 --> 00:18:16,400
actually have an antenna which you can't

523
00:18:19,590 --> 00:18:17,679
see here on this model but it'll be

524
00:18:21,750 --> 00:18:19,600
right here underneath and that's how

525
00:18:23,830 --> 00:18:21,760
we'll transmit data down

526
00:18:25,990 --> 00:18:23,840
and you're watching a nicer live stream

527
00:18:28,710 --> 00:18:26,000
right now so please ask your questions

528
00:18:30,310 --> 00:18:28,720
from our experts here wendy and richa

529
00:18:32,070 --> 00:18:30,320
are going to be with us

530
00:18:33,830 --> 00:18:32,080
for the next five to 10 minutes so make

531
00:18:35,510 --> 00:18:33,840
sure you get your questions and comments

532
00:18:38,150 --> 00:18:35,520
in there our next question comes from

533
00:18:40,310 --> 00:18:38,160
giselle on facebook asking i'm a grad

534
00:18:42,549 --> 00:18:40,320
student and wanted to know how you both

535
00:18:44,390 --> 00:18:42,559
got to be where you are now what classes

536
00:18:46,470 --> 00:18:44,400
did you take and do you have any advice

537
00:18:48,789 --> 00:18:46,480
for students yeah i love that question

538
00:18:50,789 --> 00:18:48,799

so i actually studied mechanical

539
00:18:52,230 --> 00:18:50,799
engineering um but now i do something

540
00:18:53,750 --> 00:18:52,240
very different and that's because you

541
00:18:55,510 --> 00:18:53,760
know i stayed curious and i asked a lot

542
00:18:57,590 --> 00:18:55,520
of questions i actually found this role

543
00:18:59,110 --> 00:18:57,600
at a society women engineers conference

544
00:19:00,470 --> 00:18:59,120
i got really involved in things i was

545
00:19:01,350 --> 00:19:00,480
passionate about and that would shine

546
00:19:02,390 --> 00:19:01,360
through

547
00:19:04,230 --> 00:19:02,400
and that helped me find the

548
00:19:05,510 --> 00:19:04,240
opportunities i have here and then i

549
00:19:06,710 --> 00:19:05,520
found that i got interested in different

550
00:19:08,630 --> 00:19:06,720
things and and got different

551
00:19:10,230 --> 00:19:08,640
opportunities because i i just kept

552
00:19:11,830 --> 00:19:10,240
asking questions showing up in meetings

553
00:19:13,590 --> 00:19:11,840
and asking for more responsibility so

554
00:19:15,110 --> 00:19:13,600
that's a big part of it um it's not just

555
00:19:16,310 --> 00:19:15,120
what class you take but sort of what

556
00:19:18,470 --> 00:19:16,320
peaks your interests and how willing you

557
00:19:20,470 --> 00:19:18,480
are to pursue that

558
00:19:22,710 --> 00:19:20,480
and for me so i've been at jpl like 30

559
00:19:24,390 --> 00:19:22,720
years i've been around a while um but i

560
00:19:26,230 --> 00:19:24,400
think it's a similar thing i started

561
00:19:28,150 --> 00:19:26,240
electrical engineering i love math and

562
00:19:30,710 --> 00:19:28,160
science so that's what i did and i liked

563
00:19:33,029 --> 00:19:30,720

rf and microwave so i worked up as a rf

564
00:19:35,190 --> 00:19:33,039
design engineer worked my way up uh to

565
00:19:36,630 --> 00:19:35,200
be an assistive engineer i spent my

566
00:19:38,310 --> 00:19:36,640
whole career at jpl actually in the

567
00:19:40,710 --> 00:19:38,320
radar section so i've been working on

568
00:19:42,630 --> 00:19:40,720
radars my whole life and someone might

569
00:19:44,950 --> 00:19:42,640
say oh that's boring it's the same thing

570
00:19:47,590 --> 00:19:44,960
but no the interesting thing at jpl is

571
00:19:49,029 --> 00:19:47,600
i've never worked on anything twice so

572
00:19:50,470 --> 00:19:49,039
it's every mission i've worked on is

573
00:19:51,909 --> 00:19:50,480
completely different i've worked on

574
00:19:53,270 --> 00:19:51,919
multiple lvan radar missions so they're

575
00:19:55,510 --> 00:19:53,280
both completely different different

576
00:19:57,590 --> 00:19:55,520
technologies and it's just it's exciting

577
00:20:00,630 --> 00:19:57,600
working with the teams and the people

578
00:20:02,710 --> 00:20:00,640
and as richard said you branch out from

579
00:20:04,230 --> 00:20:02,720
areas of school that you've never even

580
00:20:06,310 --> 00:20:04,240
experienced before so it's actually very

581
00:20:08,950 --> 00:20:06,320
exciting and i'm sure as both of you can

582
00:20:10,470 --> 00:20:08,960
attest to as well there's always a place

583
00:20:13,110 --> 00:20:10,480
for you at nasa whether you're a

584
00:20:15,430 --> 00:20:13,120
scientist an engineer a communicator a

585
00:20:17,430 --> 00:20:15,440
writer social media expert there's

586
00:20:18,390 --> 00:20:17,440
really a home for whatever your passion

587
00:20:21,990 --> 00:20:18,400
may be

588
00:20:24,710 --> 00:20:22,000

you find your home as long as you love

589
00:20:26,630 --> 00:20:24,720
it right that's right yes okay paul on

590
00:20:29,350 --> 00:20:26,640
facebook going back to our questions

591
00:20:31,909 --> 00:20:29,360
asks for planetary missions we often see

592
00:20:34,789 --> 00:20:31,919
duplicate spacecrafts kept on the ground

593
00:20:36,630 --> 00:20:34,799
for troubleshooting issues after launch

594
00:20:37,430 --> 00:20:36,640
is that done for missions like this as

595
00:20:39,029 --> 00:20:37,440
well

596
00:20:40,950 --> 00:20:39,039
so yeah i think what you're referring to

597
00:20:43,110 --> 00:20:40,960
is a test bed so we have mission test

598
00:20:45,190 --> 00:20:43,120
beds and absolutely we have multiple

599
00:20:46,230 --> 00:20:45,200
types of test beds we have a radar only

600
00:20:48,230 --> 00:20:46,240
test bed so if there's any

601
00:20:49,990 --> 00:20:48,240
troubleshooting of the radar itself we

602
00:20:51,510 --> 00:20:50,000
have a mission system testbed to deal

603
00:20:53,350 --> 00:20:51,520
with the communication and commanding

604
00:20:55,909 --> 00:20:53,360
issues and the telemetry issues so we

605
00:20:57,990 --> 00:20:55,919
have a variety of test beds on the

606
00:21:00,630 --> 00:20:58,000
ground that are ready to go

607
00:21:03,350 --> 00:21:00,640
and need needed on orbit

608
00:21:05,350 --> 00:21:03,360
so just like the mars rovers they've got

609
00:21:06,549 --> 00:21:05,360
testing machines you guys have all the

610
00:21:08,310 --> 00:21:06,559
wheels but yes

611
00:21:11,750 --> 00:21:08,320
we have a similar kind of technology as

612
00:21:15,190 --> 00:21:11,760
a test bed yes wonderful ayush subcoda

613
00:21:17,590 --> 00:21:15,200

on youtube asks how will it look into

614
00:21:19,909 --> 00:21:17,600
the ground without getting disturbed by

615
00:21:22,070 --> 00:21:19,919
clouds oh yeah okay so i'll answer that

616
00:21:24,149 --> 00:21:22,080
so as i mentioned earlier it's an l-band

617
00:21:26,230 --> 00:21:24,159
and so l-band is 24 centimeter

618
00:21:28,230 --> 00:21:26,240
wavelength so that actually can see as i

619
00:21:29,990 --> 00:21:28,240
mentioned earlier through the trees

620
00:21:31,830 --> 00:21:30,000
right to the ground and if it's a very

621
00:21:33,510 --> 00:21:31,840
dry ground it can actually penetrate a

622
00:21:35,510 --> 00:21:33,520
couple meters below the surface if it's

623
00:21:37,510 --> 00:21:35,520
wet it probably won't see very far into

624
00:21:39,270 --> 00:21:37,520
it but it is able to tell how much

625
00:21:41,270 --> 00:21:39,280
moisture is in the ground by how far it

626
00:21:43,029 --> 00:21:41,280
penetrates into the into the surface you

627
00:21:44,950 --> 00:21:43,039
know it's been something back on

628
00:21:46,950 --> 00:21:44,960
missions back in the shuttle days with a

629
00:21:50,310 --> 00:21:46,960
cersei mission where they they were able

630
00:21:52,149 --> 00:21:50,320
to show see ancient um rivers in the uh

631
00:21:53,669 --> 00:21:52,159
in the sahara desert that were there

632
00:21:54,789 --> 00:21:53,679
thousands of years ago that aren't there

633
00:21:57,350 --> 00:21:54,799
and they can do that through what's

634
00:21:59,510 --> 00:21:57,360
called ground penetrating radar

635
00:22:01,430 --> 00:21:59,520
and then the difference between l which

636
00:22:02,630 --> 00:22:01,440
is the long wavelengths and s which is

637
00:22:03,750 --> 00:22:02,640
the short wavelengths what kind of

638
00:22:05,270 --> 00:22:03,760

things are you going to be able to see

639
00:22:07,430 --> 00:22:05,280
with the shorter wavelengths

640
00:22:09,270 --> 00:22:07,440
so the s-band if if the surface is very

641
00:22:11,590 --> 00:22:09,280
dry it could also do some level of

642
00:22:14,230 --> 00:22:11,600
penetration but its real benefit is

643
00:22:16,549 --> 00:22:14,240
looking at the vegetation the

644
00:22:17,750 --> 00:22:16,559
at the crops all the things that

645
00:22:19,270 --> 00:22:17,760
especially that's why india is

646
00:22:21,270 --> 00:22:19,280
interested because that's really their

647
00:22:23,110 --> 00:22:21,280
primary mission objective is to really

648
00:22:24,789 --> 00:22:23,120
help their climate and understand all

649
00:22:26,310 --> 00:22:24,799
the coastal regions and the land

650
00:22:27,990 --> 00:22:26,320
surfaces and all of that so they look

651
00:22:29,510 --> 00:22:28,000
more at the land and they don't do as

652
00:22:32,470 --> 00:22:29,520
much penetration

653
00:22:35,990 --> 00:22:32,480
wonderful xavier on youtube asks how

654
00:22:38,310 --> 00:22:36,000
much resolution does nysar provide yeah

655
00:22:40,149 --> 00:22:38,320
so the imaging swaps are about 240

656
00:22:41,990 --> 00:22:40,159
kilometers and they overlap so when

657
00:22:43,909 --> 00:22:42,000
we're bouncing you know we're taking the

658
00:22:45,909 --> 00:22:43,919
radar images or bouncing it back those

659
00:22:47,830 --> 00:22:45,919
images or the swots are overlapping and

660
00:22:49,669 --> 00:22:47,840
so that gives us a resolution of almost

661
00:22:51,110 --> 00:22:49,679
we can see changes at a centimeter level

662
00:22:53,110 --> 00:22:51,120
but we definitely have resolution at

663
00:22:54,710 --> 00:22:53,120

five to ten meters right and so we have

664
00:22:56,630 --> 00:22:54,720
two types of resolutions i want to point

665
00:22:58,630 --> 00:22:56,640
out too so we have the the ten the two

666
00:23:00,630 --> 00:22:58,640
to five meter resolution is our our

667
00:23:01,990 --> 00:23:00,640
spatial resolution but we also use a

668
00:23:03,270 --> 00:23:02,000
technique called this repeat pass

669
00:23:05,350 --> 00:23:03,280
interferometry you might have heard

670
00:23:07,110 --> 00:23:05,360
people mention it's a advanced technique

671
00:23:09,110 --> 00:23:07,120
where they actually repeat the orbit

672
00:23:11,190 --> 00:23:09,120
with 200 meters and from that they

673
00:23:12,549 --> 00:23:11,200
basically kind of do stereo imaging you

674
00:23:14,710 --> 00:23:12,559
could think of it and that's where they

675
00:23:16,630 --> 00:23:14,720
get this sub centimeter level changes on

676
00:23:18,549 --> 00:23:16,640
the earth so when they do a repeat they

677
00:23:19,590 --> 00:23:18,559
can actually see very very minute

678
00:23:21,590 --> 00:23:19,600
changes and that's where they can

679
00:23:23,029 --> 00:23:21,600
actually look at earthquakes and the

680
00:23:25,029 --> 00:23:23,039
motion of the earth

681
00:23:26,710 --> 00:23:25,039
that you would never even see uh uh you

682
00:23:29,190 --> 00:23:26,720
know with the naked eye of course so

683
00:23:30,230 --> 00:23:29,200
it's a it's very uh a lot of resolution

684
00:23:32,070 --> 00:23:30,240
at that point

685
00:23:34,310 --> 00:23:32,080
that's wonderful now sandy on twitter

686
00:23:37,909 --> 00:23:34,320
asks what's the coolest thing you've

687
00:23:40,310 --> 00:23:37,919
ever worked on so far with this mission

688
00:23:41,830 --> 00:23:40,320

i'd definitely say the isro partnership

689
00:23:43,350 --> 00:23:41,840
like just getting to see how another

690
00:23:44,630 --> 00:23:43,360
space agency

691
00:23:47,029 --> 00:23:44,640
you know applies their engineering

692
00:23:48,789 --> 00:23:47,039
principles and thinks about the

693
00:23:50,630 --> 00:23:48,799
engineering interfaces and just getting

694
00:23:52,870 --> 00:23:50,640
exposure to how other people think can

695
00:23:54,390 --> 00:23:52,880
really inform our own creative processes

696
00:23:56,470 --> 00:23:54,400
and and help us reflect on what we're

697
00:23:58,310 --> 00:23:56,480
doing best that's been an incredible

698
00:23:59,990 --> 00:23:58,320
incredible aspect of the job right part

699
00:24:01,590 --> 00:24:00,000
of it is the sort of diplomatic

700
00:24:02,789 --> 00:24:01,600
intellectual exchange and i love to be a

701
00:24:05,269 --> 00:24:02,799
part of it

702
00:24:06,630 --> 00:24:05,279
yeah i agree with that i also

703
00:24:08,230 --> 00:24:06,640
because i'm the instrument manager i'm

704
00:24:09,669 --> 00:24:08,240
fascinated by the instrument it's

705
00:24:11,350 --> 00:24:09,679
probably the most complex instrument

706
00:24:13,750 --> 00:24:11,360
i've ever worked on and i've worked on a

707
00:24:15,669 --> 00:24:13,760
lot of radars i mean it's the antenna is

708
00:24:17,269 --> 00:24:15,679
complex it is a

709
00:24:18,950 --> 00:24:17,279
feat of engineering

710
00:24:21,350 --> 00:24:18,960
the instrument itself and this is both

711
00:24:22,470 --> 00:24:21,360
the l-band and the s-band instrument it

712
00:24:28,950 --> 00:24:22,480
has

713
00:24:31,590 --> 00:24:28,960

know have high resolution wide swath it

714
00:24:34,310 --> 00:24:31,600
um it is it has high power it has very

715
00:24:36,310 --> 00:24:34,320
sensitive so it has it's just a very um

716
00:24:38,870 --> 00:24:36,320
exciting mission that uh and a lot of

717
00:24:41,590 --> 00:24:38,880
technology that makes that happen

718
00:24:44,950 --> 00:24:41,600
um harry prasad on youtube asked does

719
00:24:47,510 --> 00:24:44,960
nysar cover disaster response

720
00:24:49,269 --> 00:24:47,520
so the data can be utilized to help us

721
00:24:52,470 --> 00:24:49,279
understand how to better respond to

722
00:24:54,070 --> 00:24:52,480
things like qualifiers and rising floods

723
00:24:56,710 --> 00:24:54,080
and things like that and we could we

724
00:24:59,269 --> 00:24:56,720
could potentially see how you know

725
00:25:00,630 --> 00:24:59,279
areas impacted by certain disasters are

726
00:25:02,710 --> 00:25:00,640
able to recover over time that'll

727
00:25:04,230 --> 00:25:02,720
certainly be part of the data set um but

728
00:25:06,470 --> 00:25:04,240
it's really more of how we utilize the

729
00:25:08,470 --> 00:25:06,480
data to inform environmental policy

730
00:25:10,310 --> 00:25:08,480
right but there is there is a part of

731
00:25:12,310 --> 00:25:10,320
our design that we actually do have a

732
00:25:14,950 --> 00:25:12,320
way to change our orbit and be able to

733
00:25:16,870 --> 00:25:14,960
respond to disasters quickly so that is

734
00:25:18,789 --> 00:25:16,880
part of our goal but yes the science of

735
00:25:19,990 --> 00:25:18,799
a long-term societal benefit is what

736
00:25:21,430 --> 00:25:20,000
we're working towards but responding to

737
00:25:22,710 --> 00:25:21,440
disasters is definitely something we're

738
00:25:25,029 --> 00:25:22,720

working on yeah

739
00:25:27,510 --> 00:25:25,039
all right and connie on twitter asks

740
00:25:29,590 --> 00:25:27,520
what are you excited for nysar to show

741
00:25:32,630 --> 00:25:29,600
us

742
00:25:35,029 --> 00:25:32,640
what's your favorite thing well i'm

743
00:25:36,549 --> 00:25:35,039
well i'm just excited when we get it on

744
00:25:37,750 --> 00:25:36,559
orbit get that intended deploy to get

745
00:25:39,430 --> 00:25:37,760
that first image you know there's

746
00:25:41,830 --> 00:25:39,440
nothing like the first image where

747
00:25:43,430 --> 00:25:41,840
you're gonna it's kind of amazing how

748
00:25:44,950 --> 00:25:43,440
quickly they can turn around a minute

749
00:25:47,029 --> 00:25:44,960
you're talking about the data volume

750
00:25:49,190 --> 00:25:47,039
they'll be able to within 24 hours start

751
00:25:50,870 --> 00:25:49,200
producing the first images and it's

752
00:25:52,870 --> 00:25:50,880
really exciting i think that once that

753
00:25:54,630 --> 00:25:52,880
happens you can see the full capability

754
00:25:57,190 --> 00:25:54,640
you can see it penetrating you can see

755
00:25:58,870 --> 00:25:57,200
that s band seeing its

756
00:26:00,149 --> 00:25:58,880
surfaces it's just going to come

757
00:26:02,070 --> 00:26:00,159
together and i think it's going to

758
00:26:03,510 --> 00:26:02,080
really be an exciting mission yeah i

759
00:26:04,950 --> 00:26:03,520
think what's exciting is you know we

760
00:26:06,710 --> 00:26:04,960
talk a lot about climate change you talk

761
00:26:08,630 --> 00:26:06,720
about environmental impacts we can't

762
00:26:10,070 --> 00:26:08,640
really solve a problem if we don't

763
00:26:11,909 --> 00:26:10,080

understand it so it's almost like we're

764
00:26:13,510 --> 00:26:11,919
diagnosing the issue and i'm so excited

765
00:26:15,110 --> 00:26:13,520
to see that data come back

766
00:26:17,669 --> 00:26:15,120
i'm so excited for both of you i know

767
00:26:19,669 --> 00:26:17,679
wendy you just got back from india

768
00:26:21,590 --> 00:26:19,679
so thank you for being here jet lagged

769
00:26:23,190 --> 00:26:21,600
and all and you're both going to be

770
00:26:25,110 --> 00:26:23,200
traveling there so it's a really

771
00:26:26,549 --> 00:26:25,120
exciting time as nicer moves forward so

772
00:26:28,070 --> 00:26:26,559
thank you to both of you for joining us

773
00:26:29,830 --> 00:26:28,080
here today thank you thanks for having

774
00:26:31,590 --> 00:26:29,840
us thank you and thank you for all of

775
00:26:33,750 --> 00:26:31,600
you at home or wherever you might be

776
00:26:35,590 --> 00:26:33,760
right now watching us as well nystar

777
00:26:38,230 --> 00:26:35,600
continues its journey as it goes into

778
00:26:40,870 --> 00:26:38,240
its testing phase and then final

779
00:26:44,110 --> 00:26:40,880
integration as it moves to india and

780
00:26:47,029 --> 00:26:44,120
launches in india no later than

781
00:26:49,510 --> 00:26:47,039
2023. if you want to follow this mission

782
00:26:53,190 --> 00:26:49,520
and get more detailed information head

783
00:26:55,669 --> 00:26:53,200
over to at nasa jpl at nasa and at nasa

784
00:26:59,510 --> 00:26:55,679
earth and follow us on both instagram

785
00:27:01,750 --> 00:26:59,520
twitter and facebook at nasa earth your