

1
00:00:03,200 --> 00:00:07,200
hello everybody and welcome to this

2
00:00:05,400 --> 00:00:09,150
week's Hubble hang out my name is Tony

3
00:00:07,200 --> 00:00:11,219
Darnell I work at the Space Telescope

4
00:00:09,150 --> 00:00:14,130
Science Institute and this week we are

5
00:00:11,218 --> 00:00:17,070
continuing our celebration of 25 years

6
00:00:14,130 --> 00:00:18,480
of the Hubble Space Telescope by what

7
00:00:17,070 --> 00:00:21,359
we're going to be talking a little bit

8
00:00:18,480 --> 00:00:23,760
with author Caroline Collins Peterson on

9
00:00:21,359 --> 00:00:25,710
the history of Hubble as well as dr.

10
00:00:23,760 --> 00:00:27,390
Antonella nota from the European Space

11
00:00:25,710 --> 00:00:30,359
Agency who will give us insights into

12
00:00:27,390 --> 00:00:32,579
her the european space agency's role in

13
00:00:30,359 --> 00:00:35,309
the history of Hubble but before I do

14
00:00:32,579 --> 00:00:36,989
that I gotta let you guys know how to we

15
00:00:35,308 --> 00:00:38,789
hope that you will send us questions and

16
00:00:36,988 --> 00:00:44,429
comments during the Hangout in the

17
00:00:38,789 --> 00:00:47,308
following ways tweet tweet at us you

18
00:00:44,429 --> 00:00:49,799
can quit in us I the hashtag Hubble hang

19
00:00:47,308 --> 00:00:51,689
out as always we're also also did the

20
00:00:49,799 --> 00:00:54,959
easiest way is to also just use the Q&A

21
00:00:51,689 --> 00:00:56,459
app as well as the comments on the

22
00:00:54,960 --> 00:00:58,799
YouTube channel this is being broadcast

23
00:00:56,460 --> 00:01:00,120
in so please feel free to leave us

24
00:00:58,799 --> 00:01:03,358
questions and comments throughout and we

25
00:01:00,119 --> 00:01:05,459
will get to them as they come up and we

26
00:01:03,359 --> 00:01:07,590
and also if you have not subscribed to

27
00:01:05,459 --> 00:01:09,359
our YouTube channel we hope you'll do

28
00:01:07,590 --> 00:01:11,400
that it's Hubble site channel also

29

00:01:09,359 --> 00:01:13,950
follow us at at hubble telescope on

30
00:01:11,400 --> 00:01:16,560
twitter ok so joining me as always is

31
00:01:13,950 --> 00:01:19,439
dr. carolyn christian carol christian

32
00:01:16,560 --> 00:01:22,950
gonna see this throughout your breaking

33
00:01:19,438 --> 00:01:24,539
and you set of lips over there carol

34
00:01:22,950 --> 00:01:26,280
christian the outreach scientist for

35
00:01:24,540 --> 00:01:29,280
Hubble for the Space Telescope Science

36
00:01:26,280 --> 00:01:31,159
Institute ax and Scott Lewis the our

37
00:01:29,280 --> 00:01:33,509
driver of the Internet extraordinary

38
00:01:31,159 --> 00:01:38,700
welcome back guys it's going to you

39
00:01:33,509 --> 00:01:41,938
again so as I mentioned before we have

40
00:01:38,700 --> 00:01:43,439
we have we have an author and as a

41
00:01:41,938 --> 00:01:45,779
scientist to talk about the history of

42
00:01:43,438 --> 00:01:48,389
Hubble but there is also an opportunity

43
00:01:45,780 --> 00:01:50,909

coming up next week for you to

44

00:01:48,390 --> 00:01:54,269

participate in the 25th anniversary of

45

00:01:50,909 --> 00:01:56,310

Hubble Space Telescope the European

46

00:01:54,269 --> 00:01:59,908

Space Agency next week is launching a

47

00:01:56,310 --> 00:02:02,399

video contest to tell to allow you guys

48

00:01:59,909 --> 00:02:03,960

to express yourselves and to get

49

00:02:02,399 --> 00:02:06,780

involved in the celebration of Hubble

50

00:02:03,959 --> 00:02:09,329

and Scott I believe has a trailer that

51

00:02:06,780 --> 00:02:10,300

he's got cued up oh yeah I'll do that

52

00:02:09,330 --> 00:02:13,800

now I didn't know

53

00:02:10,300 --> 00:02:13,800

doing so soon I just one moment

54

00:02:22,229 --> 00:02:28,889

to celebrate 25 years of a truly

55

00:02:25,500 --> 00:02:31,348

remarkable telescope its staff and its

56

00:02:28,889 --> 00:02:35,789

fans we are pulling out all the stops

57

00:02:31,348 --> 00:02:39,870

for 2015 join us by being part of our

58
00:02:35,789 --> 00:02:43,109
biggest competition yet ode to Hubble

59
00:02:39,870 --> 00:02:45,599
will launch early next year and give you

60
00:02:43,110 --> 00:02:49,140
the chance to get creative and show how

61
00:02:45,598 --> 00:02:51,839
Hubble has inspired you as long as it

62
00:02:49,139 --> 00:02:54,929
can be uploaded as a YouTube video you

63
00:02:51,840 --> 00:02:58,560
can submit anything pan over a drawing

64
00:02:54,930 --> 00:03:02,280
scroll over a poem or text film your own

65
00:02:58,560 --> 00:03:04,939
hubblecast create an animation or record

66
00:03:02,280 --> 00:03:10,289
yourself performing composing music or

67
00:03:04,939 --> 00:03:13,259
broadcasting just make it innovative

68
00:03:10,289 --> 00:03:15,719
creative and most of all inspired by

69
00:03:13,259 --> 00:03:21,239
Hubble one of its great discoveries or

70
00:03:15,719 --> 00:03:23,939
one of its stunning images so there you

71
00:03:21,239 --> 00:03:25,590
go there's the trailer for the for the

72
00:03:23,939 --> 00:03:27,750
contest it's going to be launched next

73
00:03:25,590 --> 00:03:30,299
week you can watch the full video of our

74
00:03:27,750 --> 00:03:33,900
over on Space Telescope org they have a

75
00:03:30,299 --> 00:03:35,370
hubblecast section which comes out every

76
00:03:33,900 --> 00:03:39,030
how often does hubblecast come out

77
00:03:35,370 --> 00:03:42,359
antonella um you know when we have

78
00:03:39,030 --> 00:03:44,609
material to show something around pretty

79
00:03:42,359 --> 00:03:47,310
much every other month we have 81 in the

80
00:03:44,609 --> 00:03:49,079
library so far since the beginning so

81
00:03:47,310 --> 00:03:51,959
these are really nice videos to sort of

82
00:03:49,079 --> 00:03:53,519
keep you up to date on Hubble news and

83
00:03:51,959 --> 00:03:55,200
all kinds of cool things but this one is

84
00:03:53,519 --> 00:03:57,599
the one they made last year it was made

85
00:03:55,199 --> 00:03:59,459
in each summer to sort of get people

86

00:03:57,598 --> 00:04:01,918
ready for this for this for this video

87
00:03:59,459 --> 00:04:03,840
event so we hope you'll participate and

88
00:04:01,919 --> 00:04:05,910
we hope you'll go looking for the

89
00:04:03,840 --> 00:04:07,439
information in fact Anton I'll let me

90
00:04:05,909 --> 00:04:10,109
bring you in on this how can people

91
00:04:07,439 --> 00:04:14,189
learn more about this contest well there

92
00:04:10,109 --> 00:04:18,168
is a website is a Hubble www Space

93
00:04:14,189 --> 00:04:21,478
Telescope dot org that should look and

94
00:04:18,168 --> 00:04:23,149
there will be instructions but basically

95
00:04:21,478 --> 00:04:27,209
the competition is opening on monday

96
00:04:23,149 --> 00:04:32,218
will be out open for a month and a half

97
00:04:27,209 --> 00:04:34,688
and our hope is that people will respond

98
00:04:32,218 --> 00:04:38,139
and will be able to have a great

99
00:04:34,689 --> 00:04:41,379
selection or created videos and music

100
00:04:38,139 --> 00:04:44,319

and paintings because we want to select

101

00:04:41,379 --> 00:04:49,209

the winner and announce it actually two

102

00:04:44,319 --> 00:04:51,610

winners on a hubble birthday and the

103

00:04:49,209 --> 00:04:55,110

winners are you know there is a general

104

00:04:51,610 --> 00:04:58,809

category winner and there is a number 25

105

00:04:55,110 --> 00:05:01,419

because we felt it was really important

106

00:04:58,809 --> 00:05:05,709

to see what the next generation that is

107

00:05:01,418 --> 00:05:09,118

born was born with Hubble already Norway

108

00:05:05,709 --> 00:05:11,439

thinks of this amazing telescope Ryan

109

00:05:09,119 --> 00:05:14,110

calling them the Hubble generation right

110

00:05:11,439 --> 00:05:16,718

the whole generation and we also have

111

00:05:14,110 --> 00:05:19,389

some exciting prizes so I hope that

112

00:05:16,718 --> 00:05:23,918

people will be encouraged to participate

113

00:05:19,389 --> 00:05:27,610

because they can win actually pieces of

114

00:05:23,918 --> 00:05:31,838

the actual solar array is flown on the

115
00:05:27,610 --> 00:05:34,119
telescope between 1990 and 1993 so is

116
00:05:31,838 --> 00:05:36,009
very interesting these are these are

117
00:05:34,119 --> 00:05:37,899
actual Hubble artifacts that have been

118
00:05:36,009 --> 00:05:40,658
brought back from space after a repair

119
00:05:37,899 --> 00:05:42,788
mission yes this because Hubble

120
00:05:40,658 --> 00:05:46,178
contributed a pair of solar arrays

121
00:05:42,788 --> 00:05:48,550
didn't work you know as expected so they

122
00:05:46,178 --> 00:05:50,618
were removed and substituted and they

123
00:05:48,550 --> 00:05:54,639
were tested extensively on the ground

124
00:05:50,619 --> 00:05:57,189
because it's interesting to see how they

125
00:05:54,639 --> 00:06:01,749
were damaged by me through and meteoroid

126
00:05:57,189 --> 00:06:04,239
impacts and so one of the erased was

127
00:06:01,749 --> 00:06:07,239
already you know tested and pretty much

128
00:06:04,238 --> 00:06:09,549
cut in pieces for the testing we decided

129
00:06:07,238 --> 00:06:11,948
to use the remaining to produce some

130
00:06:09,550 --> 00:06:16,059
little interesting mementos that would

131
00:06:11,949 --> 00:06:18,038
be presented for the celebration on you

132
00:06:16,059 --> 00:06:20,889
know on the twenty-third and the winners

133
00:06:18,038 --> 00:06:23,408
of the competition will have will enjoy

134
00:06:20,889 --> 00:06:25,209
some of those so my question is can I

135
00:06:23,408 --> 00:06:28,478
get on in this since I'm technically a

136
00:06:25,209 --> 00:06:32,439
contractor and not an employee home you

137
00:06:28,478 --> 00:06:33,728
can always I like this I like this now

138
00:06:32,439 --> 00:06:36,579
you're up again now you're up against

139
00:06:33,728 --> 00:06:37,349
Scott people on the internet watch out

140
00:06:36,579 --> 00:06:40,110
of that

141
00:06:37,350 --> 00:06:42,180
heartless yeah I'm not going to be

142
00:06:40,110 --> 00:06:44,460
entering but I have also done quite a

143

00:06:42,180 --> 00:06:45,990
few ode to Hubble videos myself in fact

144
00:06:44,459 --> 00:06:48,839
the very first one I ever made the very

145
00:06:45,990 --> 00:06:51,389
first video I ever made 2006 was called

146
00:06:48,839 --> 00:06:52,919
the most important image ever taken it

147
00:06:51,389 --> 00:06:55,709
was a tribute to the Hubble Deep Field

148
00:06:52,920 --> 00:06:58,110
and I'm going to be working I'm working

149
00:06:55,709 --> 00:07:00,389
on one right now with an intern who is

150
00:06:58,110 --> 00:07:04,139
almost finished called the most

151
00:07:00,389 --> 00:07:05,699
important instrument ever built so that

152
00:07:04,139 --> 00:07:07,110
will be coming out on beep astronomy and

153
00:07:05,699 --> 00:07:08,699
I just wanted to like give myself a

154
00:07:07,110 --> 00:07:12,240
shameless plug there because that every

155
00:07:08,699 --> 00:07:13,949
chamber yeah I but I do this all the

156
00:07:12,240 --> 00:07:17,759
time I'm used to it i can't say enough

157
00:07:13,949 --> 00:07:19,649

good things about Hubble and and so so

158

00:07:17,759 --> 00:07:22,680

we this is your chance folks next week

159

00:07:19,649 --> 00:07:25,409

it opens at about eight I think you said

160

00:07:22,680 --> 00:07:27,840

eight a.m. eastern time in the United

161

00:07:25,410 --> 00:07:32,030

States right that's when the webpage

162

00:07:27,839 --> 00:07:35,069

will begin in case or that and you can

163

00:07:32,029 --> 00:07:37,529

how do you submit things do you get our

164

00:07:35,069 --> 00:07:39,540

upload videos to youtube and tell people

165

00:07:37,529 --> 00:07:41,879

about it or how do you yes basically

166

00:07:39,540 --> 00:07:44,120

submit a video and the video can you

167

00:07:41,879 --> 00:07:47,360

know can be everything can be yourself

168

00:07:44,120 --> 00:07:50,009

recording something can be you showing a

169

00:07:47,360 --> 00:07:52,560

piece playing a piece of music or

170

00:07:50,009 --> 00:07:56,399

painting over drawing but it has to be

171

00:07:52,560 --> 00:07:57,780

in a in a video format and the items

172
00:07:56,399 --> 00:08:01,169
that will be submitted will be

173
00:07:57,779 --> 00:08:03,899
crowdsource and then the finalists will

174
00:08:01,170 --> 00:08:05,970
be judged by a panel or four or four

175
00:08:03,899 --> 00:08:09,060
people who will have the tough that you

176
00:08:05,970 --> 00:08:11,580
know task to select among in all the

177
00:08:09,060 --> 00:08:13,589
very top finalists so so how does that

178
00:08:11,579 --> 00:08:16,769
work crowdsourcing you're gonna how will

179
00:08:13,589 --> 00:08:20,549
you how will that be handled basically

180
00:08:16,769 --> 00:08:23,849
we will let a few submission going you

181
00:08:20,550 --> 00:08:25,980
know from four for three weeks and then

182
00:08:23,850 --> 00:08:28,379
we'll open for crowdsourcing so people

183
00:08:25,980 --> 00:08:30,360
will have you know a subset that you

184
00:08:28,379 --> 00:08:34,019
know a basically a large said they will

185
00:08:30,360 --> 00:08:39,229
be able to vote on in pretty much as

186
00:08:34,019 --> 00:08:39,228
they like okay so you just be calculated

187
00:08:40,070 --> 00:08:45,870
not most votes then the panel will

188
00:08:43,229 --> 00:08:47,129
decide and you've got a panel of Hubble

189
00:08:45,870 --> 00:08:49,850
scientists are going to be looking at

190
00:08:47,129 --> 00:08:54,439
the right yes well it will be a

191
00:08:49,850 --> 00:08:56,690
a sort of mixed panel we have I will be

192
00:08:54,440 --> 00:09:01,430
on that panel we also have Lars

193
00:08:56,690 --> 00:09:03,560
Christensen who in the Lisa over sorry

194
00:09:01,429 --> 00:09:06,679
the head of our is a Hubble outreach

195
00:09:03,559 --> 00:09:10,939
effort in Europe who have can sample the

196
00:09:06,679 --> 00:09:14,388
head of stsci as Hubble mission office

197
00:09:10,940 --> 00:09:16,310
and we thought we need to have a

198
00:09:14,389 --> 00:09:19,430
different perspective so we asked

199
00:09:16,309 --> 00:09:22,129
Rebecca Alvin hot burger the director of

200

00:09:19,429 --> 00:09:24,019
founder of the american visionary art

201
00:09:22,129 --> 00:09:29,328
museum involved in order to provide a

202
00:09:24,019 --> 00:09:32,509
you know artistic perspective it will be

203
00:09:29,328 --> 00:09:36,049
an interesting panel and we'll see what

204
00:09:32,509 --> 00:09:37,129
you know we recommend all right and

205
00:09:36,049 --> 00:09:38,659
Carol maybe what we ought to have a

206
00:09:37,129 --> 00:09:41,419
hangout with the winner or something and

207
00:09:38,659 --> 00:09:53,409
see or something winner yeah cuz I'm

208
00:09:41,419 --> 00:09:58,419
gonna win so I'm here boy maybe maybe I

209
00:09:53,409 --> 00:09:58,419
was raised the standard of everyone I

210
00:09:59,350 --> 00:10:05,180
tell you that we tried a similar

211
00:10:02,089 --> 00:10:08,920
competition a few years ago was called

212
00:10:05,179 --> 00:10:11,870
the hidden treasure and for of

213
00:10:08,919 --> 00:10:14,778
experiments we weren't expecting like

214
00:10:11,870 --> 00:10:18,980

500 entries and we were expecting to be

215

00:10:14,778 --> 00:10:23,000

done in a month and we got 2,500 then we

216

00:10:18,980 --> 00:10:26,870

had to even expand the judging time and

217

00:10:23,000 --> 00:10:29,149

we're still using the images today that

218

00:10:26,870 --> 00:10:30,980

people produce at the time it was just

219

00:10:29,149 --> 00:10:32,269

incredible so yeah I thought that was a

220

00:10:30,980 --> 00:10:33,829

really interesting contest because

221

00:10:32,269 --> 00:10:37,850

that's where you had people go and just

222

00:10:33,828 --> 00:10:41,379

cut look for a sort of unknown or not

223

00:10:37,850 --> 00:10:46,790

well known images and banging about yes

224

00:10:41,379 --> 00:10:48,919

yes okay so uh okay so let's let's move

225

00:10:46,789 --> 00:10:50,870

on to so this there's your chance folks

226

00:10:48,919 --> 00:10:52,789

you get here's your opportunity to get

227

00:10:50,870 --> 00:10:54,818

involved in helping us celebrate 25

228

00:10:52,789 --> 00:10:56,809

years of the Hubble Space Telescope

229
00:10:54,818 --> 00:10:58,278
speaking of which it's been up there for

230
00:10:56,809 --> 00:11:00,259
a very long time and we've got people

231
00:10:58,278 --> 00:11:01,909
here who've also been involved with the

232
00:11:00,259 --> 00:11:03,830
project for quite a while I have my good

233
00:11:01,909 --> 00:11:06,319
friend she's an author Carolyn Collins

234
00:11:03,830 --> 00:11:09,970
Peterson she's from Colorado right now

235
00:11:06,320 --> 00:11:15,020
looking very sunny right now sardis

236
00:11:09,970 --> 00:11:16,700
actually yes no I was gonna snow okay so

237
00:11:15,019 --> 00:11:19,879
and she's written several books on

238
00:11:16,700 --> 00:11:21,830
Hubble and so so welcome Carolyn and I

239
00:11:19,879 --> 00:11:23,439
guess I'd like to get your insights into

240
00:11:21,830 --> 00:11:26,650
some of the work that you had done

241
00:11:23,440 --> 00:11:30,320
starting out in your career with Hubble

242
00:11:26,649 --> 00:11:32,480
well I first was on a team right about

243
00:11:30,320 --> 00:11:34,580
the time of launch I was working for on

244
00:11:32,480 --> 00:11:37,100
the Goddard high resolution spectrograph

245
00:11:34,580 --> 00:11:41,840
team and that was headed up by Jack

246
00:11:37,100 --> 00:11:44,090
Brant and Sally he who lead just retired

247
00:11:41,840 --> 00:11:45,649
from Goddard but they were sort of co

248
00:11:44,090 --> 00:11:47,090
heading the team so Jack was at the

249
00:11:45,649 --> 00:11:49,069
University of Colorado and I was working

250
00:11:47,090 --> 00:11:50,930
for him on that and also another

251
00:11:49,070 --> 00:11:52,160
research project having to do with

252
00:11:50,929 --> 00:11:56,029
comets which is another one of his

253
00:11:52,159 --> 00:11:58,069
interests so my original job was going

254
00:11:56,029 --> 00:12:00,889
to be too when the data started coming

255
00:11:58,070 --> 00:12:03,950
in to have some role in analyzing that

256
00:12:00,889 --> 00:12:05,360
data when the Hubble Space Telescope was

257

00:12:03,950 --> 00:12:06,830
found to have spherical aberration

258
00:12:05,360 --> 00:12:09,289
everything kind of ground to a halt

259
00:12:06,830 --> 00:12:12,410
because the sa really affected our

260
00:12:09,289 --> 00:12:13,789
instrument so we kind of had to wait we

261
00:12:12,409 --> 00:12:16,279
had to kind of sit and wait for some

262
00:12:13,789 --> 00:12:17,599
months until we could figure out til

263
00:12:16,279 --> 00:12:18,769
people could figure out how we were

264
00:12:17,600 --> 00:12:20,210
going to handle our data what we're

265
00:12:18,769 --> 00:12:23,149
going to pull out of it the

266
00:12:20,210 --> 00:12:24,980
deconvolution algorithms so for a while

267
00:12:23,149 --> 00:12:27,019
I didn't really do much of anything but

268
00:12:24,980 --> 00:12:29,029
sit there and watch the firestorm break

269
00:12:27,019 --> 00:12:31,009
out and I took a lot of notes about that

270
00:12:29,029 --> 00:12:33,319
and that that's sort of one of the

271
00:12:31,009 --> 00:12:34,700

reasons I've led to my book okay so what

272

00:12:33,320 --> 00:12:37,550

so described as your book this was a

273

00:12:34,700 --> 00:12:39,950

this was a you've written I think to

274

00:12:37,549 --> 00:12:41,809

write you had double vision and then it

275

00:12:39,950 --> 00:12:43,129

was one before that correct now Hubble

276

00:12:41,809 --> 00:12:46,939

vision was the first one there were two

277

00:12:43,129 --> 00:12:49,570

editions of it actually k Sita's sit and

278

00:12:46,940 --> 00:12:54,310

that's the first you lay collectors died

279

00:12:49,570 --> 00:12:56,570

and so what happened with that was about

280

00:12:54,309 --> 00:12:59,479

August of the year that we have

281

00:12:56,570 --> 00:13:02,270

spherical aberration of 1990 so that was

282

00:12:59,480 --> 00:13:04,789

discovered and announced in June I think

283

00:13:02,269 --> 00:13:07,309

is when the fire storm broke out about

284

00:13:04,789 --> 00:13:08,689

August I started seeing really good not

285

00:13:07,309 --> 00:13:09,919

really but good science coming out I

286

00:13:08,690 --> 00:13:12,620

think the first thing was a picture of

287

00:13:09,919 --> 00:13:14,360

Saturn and and Jack and I and everybody

288

00:13:12,620 --> 00:13:16,399

on the team's new well there's science

289

00:13:14,360 --> 00:13:17,690

being done you know the thing wasn't

290

00:13:16,399 --> 00:13:19,819

dead in the water we it was

291

00:13:17,690 --> 00:13:21,140

stumbling around you know with a site

292

00:13:19,820 --> 00:13:24,080

problem but it wasn't dead in the water

293

00:13:21,139 --> 00:13:25,610

so I started taking knows I started

294

00:13:24,080 --> 00:13:26,990

collecting every little bit of data that

295

00:13:25,610 --> 00:13:28,820

I could about the science that was being

296

00:13:26,990 --> 00:13:32,990

done we weren't doing a lot we were

297

00:13:28,820 --> 00:13:35,990

doing some i believe the uh what was

298

00:13:32,990 --> 00:13:37,789

john because instrument carol wife ochem

299

00:13:35,990 --> 00:13:38,840

Bob camera know the way I feel camera

300
00:13:37,789 --> 00:13:41,029
had problems at the other the other

301
00:13:38,840 --> 00:13:45,139
spectrograph was having problems as well

302
00:13:41,029 --> 00:13:47,179
and so at the end this I've never just

303
00:13:45,139 --> 00:13:48,769
problems all the way across and so I

304
00:13:47,179 --> 00:13:50,299
just started collecting it all and in

305
00:13:48,769 --> 00:13:53,360
the meantime I also started watching

306
00:13:50,299 --> 00:13:54,889
that the media how the media was

307
00:13:53,360 --> 00:13:57,169
treating and of course you all remember

308
00:13:54,889 --> 00:13:59,779
if you were there what the horrible

309
00:13:57,169 --> 00:14:01,519
horrible stories were the headlines I

310
00:13:59,779 --> 00:14:03,860
mean it's just you know the Hubble

311
00:14:01,519 --> 00:14:05,899
techno turkey you know Linderman and

312
00:14:03,860 --> 00:14:10,070
something new I mean I did a search on

313
00:14:05,899 --> 00:14:11,740
on the Nexus the news the newsgathering

314

00:14:10,070 --> 00:14:15,620
service and there were something like

315
00:14:11,740 --> 00:14:17,060
11,000 hit of stories that were done on

316
00:14:15,620 --> 00:14:18,500
the Hubble Space Telescope and about

317
00:14:17,059 --> 00:14:20,359
half of those were mentions on David

318
00:14:18,500 --> 00:14:22,580
Letterman you know people just repeating

319
00:14:20,360 --> 00:14:25,759
what he said and so I started watching

320
00:14:22,580 --> 00:14:27,259
that and science I'm collecting and then

321
00:14:25,759 --> 00:14:29,799
I'm sort of collecting this media stuff

322
00:14:27,259 --> 00:14:32,059
and at the time I was working on a

323
00:14:29,799 --> 00:14:33,979
master's degree in science journalism

324
00:14:32,059 --> 00:14:35,509
and telecommunications engineering I was

325
00:14:33,980 --> 00:14:37,490
thinking I was going to go into radio

326
00:14:35,509 --> 00:14:40,039
astronomy or something like that and so

327
00:14:37,490 --> 00:14:42,200
one of my people said one of my people

328
00:14:40,039 --> 00:14:43,789

in the other department said well you

329

00:14:42,200 --> 00:14:45,259

really had to keep track of this and so

330

00:14:43,789 --> 00:14:47,209

we did and that was ultimately what

331

00:14:45,259 --> 00:14:49,189

became my thesis for my master's degree

332

00:14:47,210 --> 00:14:50,290

and that was called the the media

333

00:14:49,190 --> 00:14:53,060

treatment of the Hubble Space Telescope

334

00:14:50,289 --> 00:14:55,069

but that was that was five years of data

335

00:14:53,059 --> 00:14:58,309

that i took what year did that come out

336

00:14:55,070 --> 00:15:00,530

your thesis 1996 so 96 so later there

337

00:14:58,309 --> 00:15:03,679

had been a repair mission done by then

338

00:15:00,529 --> 00:15:07,129

and and so things have gotten had gotten

339

00:15:03,679 --> 00:15:08,179

pretty had gotten fixed so or a lot at

340

00:15:07,129 --> 00:15:09,889

least a lot of things have been

341

00:15:08,179 --> 00:15:12,019

addressed so that you bring up an

342

00:15:09,889 --> 00:15:14,179

interesting I want to kind of go with a

343
00:15:12,019 --> 00:15:17,929
little bit here and that is the cultural

344
00:15:14,179 --> 00:15:19,609
impact of of Hubble and you are in a

345
00:15:17,929 --> 00:15:21,319
position I think to really give us the

346
00:15:19,610 --> 00:15:23,029
good insight on it you were in on the

347
00:15:21,320 --> 00:15:25,700
beginning when they when the public was

348
00:15:23,029 --> 00:15:27,889
maybe the conversation was much more

349
00:15:25,700 --> 00:15:30,140
negative I think we all agree now that

350
00:15:27,889 --> 00:15:31,250
is not the conversation with Hubble and

351
00:15:30,139 --> 00:15:33,439
the media

352
00:15:31,250 --> 00:15:35,360
certainly not with the general public

353
00:15:33,440 --> 00:15:37,930
how have you what do you think has been

354
00:15:35,360 --> 00:15:40,100
mostly responsible for that change I

355
00:15:37,929 --> 00:15:42,949
kind of address that in my thesis a

356
00:15:40,100 --> 00:15:44,389
little bit a lot of it was I mean well

357
00:15:42,950 --> 00:15:45,800
it was hard it's just say at that time

358
00:15:44,389 --> 00:15:47,840
when I was writing a thesis exactly

359
00:15:45,799 --> 00:15:50,569
where all the factors were but but I

360
00:15:47,840 --> 00:15:52,370
dressed the one issue was the continuing

361
00:15:50,570 --> 00:15:54,290
drumbeat of science coming out every

362
00:15:52,370 --> 00:15:56,060
time there was a pretty picture I like

363
00:15:54,289 --> 00:15:57,949
to think that one nasty headline died

364
00:15:56,059 --> 00:15:59,899
and went to heaven you know because it

365
00:15:57,950 --> 00:16:01,250
basically removed a little bit more

366
00:15:59,899 --> 00:16:03,139
negative but in the beginning you know

367
00:16:01,250 --> 00:16:04,879
we had people like like Barbara Mikulski

368
00:16:03,139 --> 00:16:07,129
saying the things that she said in the

369
00:16:04,879 --> 00:16:09,320
background I was talking to mission

370
00:16:07,129 --> 00:16:11,149
scientists sandy Faber and people like

371

00:16:09,320 --> 00:16:12,590
that and were saying okay we know what

372
00:16:11,149 --> 00:16:13,879
the problem is now we know what it is

373
00:16:12,590 --> 00:16:15,889
and so we can get our hands around it

374
00:16:13,879 --> 00:16:17,179
and we can fix it but but even then I

375
00:16:15,889 --> 00:16:18,409
knew that there was a lot of debate

376
00:16:17,179 --> 00:16:19,789
inside the community in those first

377
00:16:18,409 --> 00:16:22,189
couple of months about what was going to

378
00:16:19,789 --> 00:16:23,329
be done but every time a good picture

379
00:16:22,190 --> 00:16:26,120
came out every time that there was a

380
00:16:23,330 --> 00:16:28,070
positive story it would change the

381
00:16:26,120 --> 00:16:30,200
conversation a little bit however for

382
00:16:28,070 --> 00:16:32,000
about four years every single time there

383
00:16:30,200 --> 00:16:33,950
was a story that came out you would see

384
00:16:32,000 --> 00:16:35,929
hubble sees great picture of whatever

385
00:16:33,950 --> 00:16:37,400

and then at the very bottom of the story

386

00:16:35,929 --> 00:16:39,889

or somewhere in the story they wouldn't

387

00:16:37,399 --> 00:16:40,850

that the media would say but you have to

388

00:16:39,889 --> 00:16:42,799

remit they would say something like

389

00:16:40,850 --> 00:16:45,139

remember this was the Hubble you know 15

390

00:16:42,799 --> 00:16:46,549

1.5 billion dollar Hubble that had all

391

00:16:45,139 --> 00:16:48,588

these problems they would remind you of

392

00:16:46,549 --> 00:16:49,939

the problems as soon as you as soon as

393

00:16:48,589 --> 00:16:51,080

you'd say something good they would want

394

00:16:49,940 --> 00:16:53,900

to remind you but remember it had

395

00:16:51,080 --> 00:16:55,759

problems so this happened well after I

396

00:16:53,899 --> 00:16:58,850

started doing some really good work then

397

00:16:55,759 --> 00:17:01,309

oh yeah yeah but it was a slow process I

398

00:16:58,850 --> 00:17:04,189

so I traced I traced stories for about

399

00:17:01,309 --> 00:17:05,389

five years using nexus and and just

400
00:17:04,189 --> 00:17:07,990
looked at all the way you can sort of

401
00:17:05,390 --> 00:17:10,610
almost graph this very smooth curve of

402
00:17:07,990 --> 00:17:11,959
positive stories going up in negative

403
00:17:10,609 --> 00:17:13,818
stories going down but there was this

404
00:17:11,959 --> 00:17:14,930
long period where every time they said

405
00:17:13,818 --> 00:17:17,659
anything they'd have to bring up the bad

406
00:17:14,930 --> 00:17:20,269
stuff yeah so it was always the price

407
00:17:17,660 --> 00:17:22,910
first yeah yeah yeahs always had a prize

408
00:17:20,269 --> 00:17:24,619
first two yeah it's funny how with most

409
00:17:22,910 --> 00:17:28,130
NASA almost anything they always have to

410
00:17:24,619 --> 00:17:31,729
say what the mission yeah I'm if you

411
00:17:28,130 --> 00:17:33,620
don't see that with rosetta yeah so

412
00:17:31,730 --> 00:17:36,860
Jonathan isin hammer hi Jonathan he's a

413
00:17:33,619 --> 00:17:38,869
he's a co-worker he is young the qnap he

414
00:17:36,859 --> 00:17:40,849
said the other spectrograph was thus

415
00:17:38,869 --> 00:17:43,589
paint the faint objects Becca thank you

416
00:17:40,849 --> 00:17:46,528
I was facing it out thank you very much

417
00:17:43,589 --> 00:17:49,288
yeah okay so we all facing out though I

418
00:17:46,528 --> 00:17:50,460
mean really it's true my last yes got

419
00:17:49,288 --> 00:17:52,829
our space on the space let's go over

420
00:17:50,460 --> 00:17:54,360
here for but but carol and i just want

421
00:17:52,829 --> 00:17:57,149
to say i don't think it was limited to

422
00:17:54,359 --> 00:17:58,949
five years even i mean even after sir

423
00:17:57,150 --> 00:18:01,288
this fifth servicing mission people are

424
00:17:58,950 --> 00:18:04,288
saying oh does it work you know it's

425
00:18:01,288 --> 00:18:07,048
like amazing it's a main name yeah they

426
00:18:04,288 --> 00:18:08,640
sure is boring yeah I was tracing it

427
00:18:07,048 --> 00:18:10,288
through the media but you're right I do

428

00:18:08,640 --> 00:18:12,120
a lot of public talks and I will still

429
00:18:10,288 --> 00:18:14,669
get questions from people so how did

430
00:18:12,119 --> 00:18:17,189
they fix it you know Ord is it fixed or

431
00:18:14,669 --> 00:18:23,970
is this some more like who cares its

432
00:18:17,190 --> 00:18:25,470
Morgan that's great actually so I don't

433
00:18:23,970 --> 00:18:27,720
think that working it's doing a

434
00:18:25,470 --> 00:18:29,730
phenomenal job it's doing something it

435
00:18:27,720 --> 00:18:32,548
was never intended to do like frontier

436
00:18:29,730 --> 00:18:35,669
fields to me blows me away what was able

437
00:18:32,548 --> 00:18:37,589
to do well I actually I mean we all sort

438
00:18:35,669 --> 00:18:39,929
of have this perspective I mean I

439
00:18:37,589 --> 00:18:41,490
remember or the American response so and

440
00:18:39,929 --> 00:18:43,409
to know I'm actually interested in what

441
00:18:41,490 --> 00:18:45,450
the European rusalka that was because I

442
00:18:43,409 --> 00:18:47,909

don't have much insight into what was

443

00:18:45,450 --> 00:18:49,860
happening during that time well it was

444

00:18:47,909 --> 00:18:52,559
not only what I dwell on it but it

445

00:18:49,859 --> 00:18:56,459
really interesting because I was

446

00:18:52,558 --> 00:18:59,129
actually here so I had more exposure on

447

00:18:56,460 --> 00:19:02,220
the American side too because i arrived

448

00:18:59,130 --> 00:19:05,549
in actually in 86 working on this

449

00:19:02,220 --> 00:19:07,589
project so as Carolyn said I I lived

450

00:19:05,548 --> 00:19:11,639
exactly i was working on the faint

451

00:19:07,589 --> 00:19:13,470
object camera which was the european

452

00:19:11,640 --> 00:19:16,500
contribution and we were all living

453

00:19:13,470 --> 00:19:18,659
through those horrible times right where

454

00:19:16,500 --> 00:19:21,390
you know the press was negative and

455

00:19:18,659 --> 00:19:23,399
everything was very negative but but the

456

00:19:21,390 --> 00:19:25,649
one the only one thing and yes the press

457
00:19:23,398 --> 00:19:28,079
continue to be negative for a while but

458
00:19:25,648 --> 00:19:31,798
on the other hand i think that what was

459
00:19:28,079 --> 00:19:34,769
remarkable and that in a sense to me

460
00:19:31,798 --> 00:19:37,408
started changing and turning around the

461
00:19:34,769 --> 00:19:40,490
feeling of people is the amazing job

462
00:19:37,409 --> 00:19:43,409
that the astronauts did in orbit horse

463
00:19:40,490 --> 00:19:46,470
hallucination i still remember watching

464
00:19:43,409 --> 00:19:49,289
that and being glued to the screen just

465
00:19:46,470 --> 00:19:52,319
you know watching these people

466
00:19:49,288 --> 00:19:56,799
performing this amazingly complicated

467
00:19:52,319 --> 00:19:58,869
task with the needs and a hand like me

468
00:19:56,799 --> 00:20:01,210
Kingdom seemed so simple like they were

469
00:19:58,869 --> 00:20:03,549
working in their backyard and I think

470
00:20:01,210 --> 00:20:06,279
that that really and end the visibility

471
00:20:03,549 --> 00:20:07,930
that servicing mission had you know with

472
00:20:06,279 --> 00:20:10,269
the public and with the audience they

473
00:20:07,930 --> 00:20:13,060
were all saying well we'll naza be able

474
00:20:10,269 --> 00:20:15,400
to fix this or we're doing with the

475
00:20:13,059 --> 00:20:19,329
techno Turkey I think that that will

476
00:20:15,400 --> 00:20:22,660
change the history of the project and

477
00:20:19,329 --> 00:20:25,949
also the sense we established NASA's

478
00:20:22,660 --> 00:20:28,900
reputation at the level that was

479
00:20:25,950 --> 00:20:33,610
incredible i mean people acquire so much

480
00:20:28,900 --> 00:20:36,610
respect for for me could you know put it

481
00:20:33,609 --> 00:20:40,269
together and deliver you know in such

482
00:20:36,609 --> 00:20:43,089
astonishing fashion and then when the

483
00:20:40,269 --> 00:20:45,879
first image of well 100 came down and

484
00:20:43,089 --> 00:20:49,720
the comparison between the the pre-start

485

00:20:45,880 --> 00:20:52,330
operation and the corrected image I mean

486
00:20:49,720 --> 00:20:56,470
it was just I remembered the WoW in the

487
00:20:52,329 --> 00:21:00,069
room it was just not you incredible so

488
00:20:56,470 --> 00:21:02,529
that is when you know the tide Jay I

489
00:21:00,069 --> 00:21:03,819
mean particularly in the astronomical

490
00:21:02,529 --> 00:21:05,680
community because I think at that point

491
00:21:03,819 --> 00:21:07,839
I had just joined the american

492
00:21:05,680 --> 00:21:10,029
astronomical society is as a student

493
00:21:07,839 --> 00:21:11,799
members a graduate student and at the

494
00:21:10,029 --> 00:21:12,759
meetings you still had people in the

495
00:21:11,799 --> 00:21:14,109
very beginning saying you know we've

496
00:21:12,759 --> 00:21:16,089
wasted this money we could have put it

497
00:21:14,109 --> 00:21:17,709
elsewhere right this one of attitude and

498
00:21:16,089 --> 00:21:19,689
then when that first m100 picture came

499
00:21:17,710 --> 00:21:21,910

out and then later on when the Deep

500

00:21:19,690 --> 00:21:23,769

Field picture I think there was nobody

501

00:21:21,910 --> 00:21:26,830

that believed anything differently after

502

00:21:23,769 --> 00:21:29,680

that right yes so Debbie Smith Judy

503

00:21:26,829 --> 00:21:32,889

Smith has a comment or Schmidt I'm sorry

504

00:21:29,680 --> 00:21:35,019

Judy Schmidt hi Judy by the way I'm over

505

00:21:32,890 --> 00:21:36,880

25 but it feels like Hubble has always

506

00:21:35,019 --> 00:21:38,680

been there for me I was always too young

507

00:21:36,880 --> 00:21:40,750

to watch the news or care about Hubble's

508

00:21:38,680 --> 00:21:42,400

eyesight problems at the start it's

509

00:21:40,750 --> 00:21:44,019

almost like it never happened and I have

510

00:21:42,400 --> 00:21:46,210

to agree I felt like the first real

511

00:21:44,019 --> 00:21:48,460

introduction for me with Hubble was when

512

00:21:46,210 --> 00:21:51,670

I saw the first deep field in the

513

00:21:48,460 --> 00:21:53,500

mid-90s and I saw how what that and I

514
00:21:51,670 --> 00:21:55,720
understood what that image meant and how

515
00:21:53,500 --> 00:21:58,150
it was taken that's when I first got

516
00:21:55,720 --> 00:21:59,589
into Hubble a lot and the other stuff I

517
00:21:58,150 --> 00:22:01,420
had heard about it on the news and i had

518
00:21:59,589 --> 00:22:04,329
heard all the problems with it but it

519
00:22:01,420 --> 00:22:07,779
wouldn't by the way side after after I

520
00:22:04,329 --> 00:22:10,480
saw the Hubble Deep Field so anyway

521
00:22:07,779 --> 00:22:13,629
that's a so the

522
00:22:10,480 --> 00:22:15,160
carolyn the have you well how would you

523
00:22:13,630 --> 00:22:18,549
characterize the news coverage now of

524
00:22:15,160 --> 00:22:20,259
Hubble versus back then well I don't see

525
00:22:18,548 --> 00:22:22,240
too many people writing about what it

526
00:22:20,259 --> 00:22:24,519
costs I mean I'm now part of the media

527
00:22:22,240 --> 00:22:27,099
so I get to write about it I the news

528
00:22:24,519 --> 00:22:28,839
the media now is so strung out I mean

529
00:22:27,099 --> 00:22:31,839
you have the mainstream media you have

530
00:22:28,839 --> 00:22:33,548
online media new media and those of us

531
00:22:31,839 --> 00:22:35,769
who do a lot of the work basically take

532
00:22:33,548 --> 00:22:37,240
Hubble's pictures we put them into our

533
00:22:35,769 --> 00:22:39,668
videos we put them into our stories and

534
00:22:37,240 --> 00:22:42,490
we use them one thing that I've seen is

535
00:22:39,669 --> 00:22:44,110
that you'll see people writing about new

536
00:22:42,490 --> 00:22:45,700
observatories that are coming out that

537
00:22:44,109 --> 00:22:47,619
are going to be just as good as Hubble

538
00:22:45,700 --> 00:22:49,900
or better than Hubble when you would not

539
00:22:47,619 --> 00:22:51,399
have seen that two decades ago you know

540
00:22:49,900 --> 00:22:52,750
nobody would have said that I remember

541
00:22:51,400 --> 00:22:54,610
that from Gemini because I did some

542

00:22:52,750 --> 00:22:55,690
projects with them and they they were

543
00:22:54,609 --> 00:22:57,668
saying we think we can do better than

544
00:22:55,690 --> 00:23:00,130
Hubble and I thought well Hubble's

545
00:22:57,669 --> 00:23:02,559
arrived you know it's now a good

546
00:23:00,130 --> 00:23:04,150
comparator man I think today I think

547
00:23:02,558 --> 00:23:05,759
today it's just it's another great thing

548
00:23:04,150 --> 00:23:08,290
and now it's more focused on the science

549
00:23:05,759 --> 00:23:10,929
I'm going to go back to the comment

550
00:23:08,289 --> 00:23:13,779
about the servicing missions when we

551
00:23:10,929 --> 00:23:16,269
were probably at the darkest moments at

552
00:23:13,779 --> 00:23:18,099
the University some of the astronauts

553
00:23:16,269 --> 00:23:19,660
who were going to be working on the on

554
00:23:18,099 --> 00:23:22,539
the mission came out for some training

555
00:23:19,660 --> 00:23:24,820
at Martin I guess it whistle card Martin

556
00:23:22,539 --> 00:23:26,859

Martin Marietta at that time Claude

557

00:23:24,819 --> 00:23:28,450

Nicoli and some in John and some of

558

00:23:26,859 --> 00:23:30,058

those people and they came out and they

559

00:23:28,450 --> 00:23:32,230

met with all of us and they basically

560

00:23:30,058 --> 00:23:34,269

plighted their troughed us and we're

561

00:23:32,230 --> 00:23:35,950

going to do the darn best we can to make

562

00:23:34,269 --> 00:23:37,690

it happen for you and I think that went

563

00:23:35,950 --> 00:23:39,130

a long ways towards helping us

564

00:23:37,690 --> 00:23:41,140

individually feel it I mean you had to

565

00:23:39,130 --> 00:23:43,510

feel it we on our team it was like grief

566

00:23:41,140 --> 00:23:45,330

and not too long before that we'd lost

567

00:23:43,509 --> 00:23:47,558

Mars Observer we had a team that had

568

00:23:45,329 --> 00:23:48,939

been on Mars Observer I forget when that

569

00:23:47,558 --> 00:23:51,490

was lost but it was a few years before

570

00:23:48,940 --> 00:23:52,509

that but wasn't crushed right well we

571
00:23:51,490 --> 00:23:55,210
don't know we don't know what happened

572
00:23:52,509 --> 00:23:56,470
to it um but but you know basically one

573
00:23:55,210 --> 00:23:58,240
day I'm walking down the hallway one of

574
00:23:56,470 --> 00:24:00,039
my professors walks up and he said we've

575
00:23:58,240 --> 00:24:02,019
just lost Mars Observer and he was in

576
00:24:00,039 --> 00:24:03,399
tears it was like you've lost a family

577
00:24:02,019 --> 00:24:05,500
member and we felt the same way about

578
00:24:03,400 --> 00:24:07,480
Hubble I mean Hubble still feels like my

579
00:24:05,500 --> 00:24:08,950
baby because you know we grew up with it

580
00:24:07,480 --> 00:24:11,019
so there's a lot of us who you know

581
00:24:08,950 --> 00:24:12,308
how'd that Hubble as tight as we can but

582
00:24:11,019 --> 00:24:13,690
when they came out and told us we're

583
00:24:12,308 --> 00:24:15,849
going to do the best we can we really

584
00:24:13,690 --> 00:24:17,320
appreciate you know your faith in us I

585
00:24:15,849 --> 00:24:19,058
mean it went a long ways towards helping

586
00:24:17,319 --> 00:24:20,798
us then when they would actually went

587
00:24:19,058 --> 00:24:23,470
out and did it as as she just said um

588
00:24:20,798 --> 00:24:24,369
it's amazing this is amazing i was at

589
00:24:23,470 --> 00:24:26,350
that the k

590
00:24:24,369 --> 00:24:27,789
watching that after the launch and we

591
00:24:26,349 --> 00:24:30,939
just were glued to the TV for days

592
00:24:27,789 --> 00:24:34,329
watching it that's a great story so

593
00:24:30,940 --> 00:24:37,420
Antonella tell us a little bit about we

594
00:24:34,329 --> 00:24:39,609
always said we hear a lot about NASA and

595
00:24:37,420 --> 00:24:41,710
ISA together when it comes to Hubble can

596
00:24:39,609 --> 00:24:45,159
you give us some idea of what ESA's role

597
00:24:41,710 --> 00:24:48,730
is right well it was was there since the

598
00:24:45,160 --> 00:24:51,070
beginning because in a sense you know if

599

00:24:48,730 --> 00:24:53,319
you remember the very very old history

600
00:24:51,069 --> 00:24:56,109
you know Hubble was born as a 3-meter

601
00:24:53,319 --> 00:24:58,509
telescope was called the large space

602
00:24:56,109 --> 00:25:02,049
telescope you know in the beginning of

603
00:24:58,509 --> 00:25:03,819
the 70s but then as soon as people

604
00:25:02,049 --> 00:25:05,950
started you know now as i started doing

605
00:25:03,819 --> 00:25:09,639
feasibility studies they realize the

606
00:25:05,950 --> 00:25:12,429
mission was very complex and listen

607
00:25:09,640 --> 00:25:16,210
listen that the cost was going up and up

608
00:25:12,429 --> 00:25:20,890
and up and what's new right under the

609
00:25:16,210 --> 00:25:24,569
Sun and so Congress basically instructed

610
00:25:20,890 --> 00:25:27,460
NASA to disco that's why we have a 2.4

611
00:25:24,569 --> 00:25:29,439
Hubble Space Telescope discovering

612
00:25:27,460 --> 00:25:31,058
that's where you you basically roll it

613
00:25:29,440 --> 00:25:32,799

bro back different features that you

614

00:25:31,058 --> 00:25:36,149

thought you were gonna make and you know

615

00:25:32,799 --> 00:25:38,619

make it smaller right and also they were

616

00:25:36,150 --> 00:25:42,519

encouraged to look for international

617

00:25:38,619 --> 00:25:45,428

partners to to share the cost and iza

618

00:25:42,519 --> 00:25:47,740

was actually coming out from a very nice

619

00:25:45,429 --> 00:25:51,059

partnership experience with the

620

00:25:47,740 --> 00:25:53,950

international ultraviolet Explorer iue

621

00:25:51,058 --> 00:25:57,519

bernisa and nasa had partner very

622

00:25:53,950 --> 00:25:59,500

successfully so so and iza was

623

00:25:57,519 --> 00:26:01,629

potentially interested to play a role in

624

00:25:59,500 --> 00:26:06,609

the hubble and so the partnership

625

00:26:01,630 --> 00:26:10,000

basically was started then and you know

626

00:26:06,609 --> 00:26:14,049

there were few years of negotiation but

627

00:26:10,000 --> 00:26:16,779

by 1977 the formal Memorandum of

628
00:26:14,049 --> 00:26:19,178
Understanding was signed and that

629
00:26:16,779 --> 00:26:22,450
basically stated that easy was going to

630
00:26:19,179 --> 00:26:25,000
provide the solar some hardware and this

631
00:26:22,450 --> 00:26:27,549
were solar arrays and the faint object

632
00:26:25,000 --> 00:26:30,609
camera one of the imaging instruments

633
00:26:27,549 --> 00:26:33,039
and a complement of people to support

634
00:26:30,609 --> 00:26:36,029
the mission in what at the time was

635
00:26:33,039 --> 00:26:37,500
expected to be a sort of 100 people

636
00:26:36,029 --> 00:26:41,940
institution

637
00:26:37,500 --> 00:26:46,500
so for the Hubble and so when st SE I

638
00:26:41,940 --> 00:26:49,410
you know started in the 1980s at the

639
00:26:46,500 --> 00:26:51,509
same time when we had you know us

640
00:26:49,410 --> 00:26:53,420
scientists we also had either scientists

641
00:26:51,509 --> 00:26:57,450
already on the premises and we have kept

642
00:26:53,420 --> 00:27:00,990
15 scientists you know here in Baltimore

643
00:26:57,450 --> 00:27:03,690
supporting the HST mission since so I

644
00:27:00,990 --> 00:27:06,390
think that iza you know they're very

645
00:27:03,690 --> 00:27:07,950
happy to be in such you know a reliable

646
00:27:06,390 --> 00:27:11,160
partner for all these years and they

647
00:27:07,950 --> 00:27:13,470
have enjoy the return which is you know

648
00:27:11,160 --> 00:27:16,920
the astronomic European astronomical

649
00:27:13,470 --> 00:27:19,710
community as access to fifteen percent

650
00:27:16,920 --> 00:27:22,259
of the you know of the time which you

651
00:27:19,710 --> 00:27:24,059
know is one competitively anyway so it

652
00:27:22,259 --> 00:27:27,839
has never been enforced but that's what

653
00:27:24,059 --> 00:27:30,569
the MOU says your allocated fifteen

654
00:27:27,839 --> 00:27:33,480
percent of Hubble of all Hubble time

655
00:27:30,569 --> 00:27:35,730
well every year when there is an

656

00:27:33,480 --> 00:27:39,150
allocation you know we make sure that

657
00:27:35,730 --> 00:27:42,029
European astronomers receive you know

658
00:27:39,150 --> 00:27:43,590
fifteen percent you know it's not over

659
00:27:42,029 --> 00:27:46,049
the lifetime of the mission but that's

660
00:27:43,589 --> 00:27:47,639
what the MOU would say you know it's

661
00:27:46,049 --> 00:27:49,440
interesting I did not know that ok so

662
00:27:47,640 --> 00:27:50,730
when the time allocation committee meets

663
00:27:49,440 --> 00:27:53,070
they have to meet certain requirements

664
00:27:50,730 --> 00:27:55,559
and one of them is that me but I can

665
00:27:53,069 --> 00:27:57,990
tell you that we are that's Richard we

666
00:27:55,559 --> 00:28:00,629
never had to enforce it because it is

667
00:27:57,990 --> 00:28:02,759
basically people win competitively on

668
00:28:00,630 --> 00:28:04,620
them you know now you know if you look

669
00:28:02,759 --> 00:28:07,789
at how science has evolved over the

670
00:28:04,619 --> 00:28:10,589

years now oh come all you know

671

00:28:07,789 --> 00:28:12,869

collaborations are international yeah so

672

00:28:10,589 --> 00:28:16,649

you know you cannot even you know go in

673

00:28:12,869 --> 00:28:18,449

distinguish know who belongs to hot I

674

00:28:16,650 --> 00:28:20,190

was gonna I was going to actually say

675

00:28:18,450 --> 00:28:22,289

that we don't talk about that very often

676

00:28:20,190 --> 00:28:24,750

we talk a lot about the benefits and how

677

00:28:22,289 --> 00:28:26,279

Hubble has changed all the way science

678

00:28:24,750 --> 00:28:28,109

is done we talked about that with the

679

00:28:26,279 --> 00:28:30,240

Hubble Deep Field but I think also the

680

00:28:28,109 --> 00:28:32,849

fact that we collaborate and we have

681

00:28:30,240 --> 00:28:35,579

people at the Institute who work you

682

00:28:32,849 --> 00:28:38,759

know hand in hand as that's really i

683

00:28:35,579 --> 00:28:40,589

mean i've been there are 19 years and

684

00:28:38,759 --> 00:28:42,450

it's just part of the culture it's just

685

00:28:40,589 --> 00:28:44,939

the way it is but it's it's really

686

00:28:42,450 --> 00:28:47,370

amazing and it's I think it's really

687

00:28:44,940 --> 00:28:49,350

been beneficial it's really changed

688

00:28:47,369 --> 00:28:50,959

things I think then if it had been just

689

00:28:49,349 --> 00:28:53,759

an American

690

00:28:50,960 --> 00:28:55,470

okay so let me see here we got a

691

00:28:53,759 --> 00:28:56,609

question from Vance McCauley who's going

692

00:28:55,470 --> 00:28:58,558

thanks for putting this great panel

693

00:28:56,609 --> 00:29:01,199

together this afternoon you're welcome

694

00:28:58,558 --> 00:29:03,178

the entire HST design and retrofit

695

00:29:01,200 --> 00:29:07,880

missions are amazing too weak to me I

696

00:29:03,179 --> 00:29:15,470

wave at both HST and ISS when they come

697

00:29:07,880 --> 00:29:21,929

so I yeah exactly okay we lost bro's Tony

698

00:29:15,470 --> 00:29:25,470

frozen oh dear yeah oh let's see if he

699
00:29:21,929 --> 00:29:27,600
comes back there I think it's just

700
00:29:25,470 --> 00:29:33,509
google plus hangout because a plug-in

701
00:29:27,599 --> 00:29:35,519
because i just upgraded it won't let me

702
00:29:33,509 --> 00:29:37,679
do you know how when you switch from one

703
00:29:35,519 --> 00:29:39,869
year to another keeps pop up until you

704
00:29:37,679 --> 00:29:41,220
I'll be right though I did it right

705
00:29:39,869 --> 00:29:42,479
before the Hangout and I'm wondering a

706
00:29:41,220 --> 00:29:45,750
pest on screwing I should have probably

707
00:29:42,480 --> 00:29:47,490
closed my browser did before I started

708
00:29:45,750 --> 00:29:51,210
but anyway my apologies if I see if I

709
00:29:47,490 --> 00:29:53,519
freeze up again so uh ok so the what's

710
00:29:51,210 --> 00:29:55,319
what was your and to the how how did you

711
00:29:53,519 --> 00:29:58,980
get involved in in the Hubble mission

712
00:29:55,319 --> 00:30:02,788
your site itself first experience I was

713

00:29:58,980 --> 00:30:05,849
I was in Europe I just got my PhD and I

714
00:30:02,788 --> 00:30:08,490
was looking a job offer serum there and

715
00:30:05,849 --> 00:30:11,339
and these opportunity to come work on

716
00:30:08,490 --> 00:30:14,250
the Hubble up and I you know for

717
00:30:11,339 --> 00:30:17,908
me it was just living in a living Europe

718
00:30:14,250 --> 00:30:21,808
moving to a different continent and but

719
00:30:17,909 --> 00:30:26,700
I was um an adventure than in a traveler

720
00:30:21,808 --> 00:30:28,950
so I said yeah I'm all hahaha and this

721
00:30:26,700 --> 00:30:31,980
was it and the interesting thing is that

722
00:30:28,950 --> 00:30:35,460
i arrived in january 86 there was a big

723
00:30:31,980 --> 00:30:39,899
rush to get ready for launch because we

724
00:30:35,460 --> 00:30:42,210
were in a one shuttle launch from our in

725
00:30:39,898 --> 00:30:46,979
our lunch mission and then unfortunately

726
00:30:42,210 --> 00:30:50,519
you know in january Challenger blew up

727
00:30:46,980 --> 00:30:53,429

so that was a horrendous moment that we

728

00:30:50,519 --> 00:30:55,200

all live you know especially because we

729

00:30:53,429 --> 00:30:58,259

were just watching like this is the one

730

00:30:55,200 --> 00:31:02,009

last mission before we go and so then

731

00:30:58,259 --> 00:31:04,160

everything was put on a you know slower

732

00:31:02,009 --> 00:31:07,369

pace which was

733

00:31:04,160 --> 00:31:11,300

a good way to get ready for the actual

734

00:31:07,369 --> 00:31:14,000

launch in 1990 and I was a postdoc of

735

00:31:11,299 --> 00:31:17,269

doctoral fellow working on the faint

736

00:31:14,000 --> 00:31:20,390

object cameras that was my role at the

737

00:31:17,269 --> 00:31:25,279

time so exactly like Carolyn was working

738

00:31:20,390 --> 00:31:30,200

for the g hrs i was there worrying about

739

00:31:25,279 --> 00:31:32,990

the FOC and FOC you know being an imager

740

00:31:30,200 --> 00:31:36,730

you know it is further elaboration was

741

00:31:32,990 --> 00:31:40,370

so visible and anything right because

742
00:31:36,730 --> 00:31:44,000
spectral k you lose your sensitivity you

743
00:31:40,369 --> 00:31:46,969
lose your your photons with images the

744
00:31:44,000 --> 00:31:50,410
just you know the brutality of the

745
00:31:46,970 --> 00:31:54,920
Strawbridge of the center to halo

746
00:31:50,410 --> 00:31:57,860
library she was just brutal and I think

747
00:31:54,920 --> 00:32:01,550
that instrument sort of never recovered

748
00:31:57,859 --> 00:32:04,009
from from being hit so hard but then you

749
00:32:01,549 --> 00:32:06,619
know then there was the resurrection

750
00:32:04,009 --> 00:32:10,460
with co-star and the brilliant idea that

751
00:32:06,619 --> 00:32:12,439
some engineers and scientists had

752
00:32:10,460 --> 00:32:14,930
working together to figure out this

753
00:32:12,440 --> 00:32:18,410
complex device that would you know

754
00:32:14,930 --> 00:32:21,200
basically deploy little corrective arms

755
00:32:18,410 --> 00:32:24,320
in front of the apertures of of the

756
00:32:21,200 --> 00:32:26,660
spectrographs and and actually restore

757
00:32:24,319 --> 00:32:29,779
pretty much the caroling in your case I

758
00:32:26,660 --> 00:32:31,550
think you know the hrs were pretty well

759
00:32:29,779 --> 00:32:34,700
off yeah we were throwing away half our

760
00:32:31,549 --> 00:32:37,279
data every time right right so I think

761
00:32:34,700 --> 00:32:39,019
it was a collected again you know

762
00:32:37,279 --> 00:32:42,109
talking about the International nature

763
00:32:39,019 --> 00:32:44,299
of the mission and also of the rescue

764
00:32:42,109 --> 00:32:47,149
mission people really you know worked

765
00:32:44,299 --> 00:32:50,450
really amazingly well together to try to

766
00:32:47,150 --> 00:32:53,180
figure it out and and fix it and then

767
00:32:50,450 --> 00:32:57,080
the astronaut of course you know my you

768
00:32:53,180 --> 00:33:00,049
know did it installing co-star and

769
00:32:57,079 --> 00:33:01,009
making it happen yeah the astronaut did

770

00:33:00,049 --> 00:33:05,990
it but we all know where the real work

771
00:33:01,009 --> 00:33:09,019
was so you mentioned earlier that the

772
00:33:05,990 --> 00:33:11,690
that ISA had built the solar arrays that

773
00:33:09,019 --> 00:33:14,029
were first launched with Hubble did they

774
00:33:11,690 --> 00:33:15,980
build the subsequent replacement arrays

775
00:33:14,029 --> 00:33:17,069
or was that done so there was just a

776
00:33:15,980 --> 00:33:19,380
one-time thing

777
00:33:17,069 --> 00:33:23,178
okay so so the ones that are on there

778
00:33:19,380 --> 00:33:25,830
now I have not been built at ease no no

779
00:33:23,179 --> 00:33:28,500
because the one that were built by Aiza

780
00:33:25,829 --> 00:33:32,278
had a problem they were too peaceful and

781
00:33:28,500 --> 00:33:36,419
so leaving the Terminator during the day

782
00:33:32,278 --> 00:33:39,630
night transition thermal tension would

783
00:33:36,419 --> 00:33:42,840
create some you know how can I say

784
00:33:39,630 --> 00:33:44,940

shakes to the telescope which were which

785

00:33:42,839 --> 00:33:47,398

were really not something you want to

786

00:33:44,940 --> 00:33:49,620

see in your observation of you don't

787

00:33:47,398 --> 00:33:51,658

want a vibrating oh you know you live

788

00:33:49,619 --> 00:33:53,908

and learn you design something and then

789

00:33:51,659 --> 00:33:56,009

you you're faced with a situation in

790

00:33:53,909 --> 00:33:58,470

space it is different for what you're

791

00:33:56,009 --> 00:34:01,399

new and then you have to adapt and

792

00:33:58,470 --> 00:34:05,990

design a new set of solar array which is

793

00:34:01,398 --> 00:34:08,368

which can you know overcome that issue

794

00:34:05,990 --> 00:34:10,409

so we had a hangout a few months ago

795

00:34:08,369 --> 00:34:13,108

with the guys at Goddard who actually

796

00:34:10,409 --> 00:34:17,338

operate the Hubble Space Telescope and

797

00:34:13,108 --> 00:34:19,139

and it does ISA have a role in that at

798

00:34:17,338 --> 00:34:21,239

all or is that is that pretty much done

799

00:34:19,139 --> 00:34:23,280

by NASA ok so what diseases roll these

800

00:34:21,239 --> 00:34:25,138

days what do you guys what do you guys

801

00:34:23,280 --> 00:34:27,750

find yourself doing mostly with with the

802

00:34:25,139 --> 00:34:30,480

mission we basically provide the 15

803

00:34:27,750 --> 00:34:32,039

scientist who are basically allocated

804

00:34:30,480 --> 00:34:35,608

support the mission both of them are

805

00:34:32,039 --> 00:34:38,068

instrument scientists so they work on

806

00:34:35,608 --> 00:34:40,529

you know calibrating and user support

807

00:34:38,068 --> 00:34:43,289

for the various instruments on board of

808

00:34:40,530 --> 00:34:46,050

the telescope you know the interesting

809

00:34:43,289 --> 00:34:48,809

thing about the agreement was stipulated

810

00:34:46,050 --> 00:34:51,510

at the beginning is that our stuff is

811

00:34:48,809 --> 00:34:54,179

fully integrated so they can provided

812

00:34:51,510 --> 00:34:57,390

air staying within the Hubble mission

813
00:34:54,179 --> 00:35:00,539
and large they can you know move

814
00:34:57,389 --> 00:35:02,608
whatever they skillset brings them so I

815
00:35:00,539 --> 00:35:06,210
was head of the science mission office

816
00:35:02,608 --> 00:35:08,489
for a while for example but most of my

817
00:35:06,210 --> 00:35:10,170
colleagues and my team members are all

818
00:35:08,489 --> 00:35:13,169
instruments scientists but we have

819
00:35:10,170 --> 00:35:15,269
archived scientists in the past we never

820
00:35:13,170 --> 00:35:18,720
had anybody now which I think that's

821
00:35:15,269 --> 00:35:20,338
something you alchy they are reach ever

822
00:35:18,719 --> 00:35:22,409
said I've been involved in with ISA have

823
00:35:20,338 --> 00:35:25,500
been with the ones that also do other

824
00:35:22,409 --> 00:35:27,389
emissions as well like ESO and and la

825
00:35:25,500 --> 00:35:28,920
few other things so the people they are

826
00:35:27,389 --> 00:35:30,139
awesome and that's those are they're

827

00:35:28,920 --> 00:35:32,960
also the ones who Morgan

828
00:35:30,139 --> 00:35:35,269
stand down cemented this video contest

829
00:35:32,960 --> 00:35:38,119
that we just talked about yeah yeah of

830
00:35:35,269 --> 00:35:40,909
my team yeah yeah yeah glad girl I have

831
00:35:38,119 --> 00:35:44,239
a question for Carolyn so we've been

832
00:35:40,909 --> 00:35:46,579
talking sort of with uh because many of

833
00:35:44,239 --> 00:35:48,859
us are here at Space Telescope we've

834
00:35:46,579 --> 00:35:51,529
been talking about this sort of

835
00:35:48,860 --> 00:35:54,140
Baltimore Washington centric would it

836
00:35:51,530 --> 00:35:56,480
what it was like you guys are out in

837
00:35:54,139 --> 00:35:59,480
Colorado and you're seeing this disaster

838
00:35:56,480 --> 00:36:02,329
um I'm just wondering like what you know

839
00:35:59,480 --> 00:36:05,090
what what your perspective was then and

840
00:36:02,329 --> 00:36:06,619
then how that's changed and it must have

841
00:36:05,090 --> 00:36:10,760

been pretty frightening to be so a

842

00:36:06,619 --> 00:36:13,099

little bit if people fly to the to NASA

843

00:36:10,760 --> 00:36:15,710

or what what happened oh I think jack

844

00:36:13,099 --> 00:36:18,619

flew out right away in fact look um I

845

00:36:15,710 --> 00:36:20,690

believe he was tasked to be out at NASA

846

00:36:18,619 --> 00:36:22,429

for the first six months anywhere in the

847

00:36:20,690 --> 00:36:26,590

Baltimore area for the first six months

848

00:36:22,429 --> 00:36:30,049

after launch anyway um he came back and

849

00:36:26,590 --> 00:36:31,910

we knew I mean we sort of knew when for

850

00:36:30,050 --> 00:36:33,860

some of the first images were sent down

851

00:36:31,909 --> 00:36:35,359

we all looked at and everybody kind of

852

00:36:33,860 --> 00:36:37,900

knew this was going on but there was a

853

00:36:35,360 --> 00:36:40,400

lot of denial going on at the time about

854

00:36:37,900 --> 00:36:41,869

both sandy Faber basically said they had

855

00:36:40,400 --> 00:36:44,240

to stand up and shattered each other in

856
00:36:41,869 --> 00:36:46,819
meetings and when they when I think it

857
00:36:44,239 --> 00:36:47,899
was Tony angels dr. angel stood up and

858
00:36:46,820 --> 00:36:50,600
said let's looks like spherical

859
00:36:47,900 --> 00:36:52,250
aberration she been saying all along he

860
00:36:50,599 --> 00:36:54,289
said that's that she said that's when we

861
00:36:52,250 --> 00:36:55,880
knew we were well and truly dead she's

862
00:36:54,289 --> 00:36:58,309
telling me this like four years or three

863
00:36:55,880 --> 00:37:00,890
years after the fact at that point which

864
00:36:58,309 --> 00:37:02,570
was second third week in June Jack made

865
00:37:00,889 --> 00:37:05,150
a special trip back out to Colorado

866
00:37:02,570 --> 00:37:07,160
gathered us all and said we know what we

867
00:37:05,150 --> 00:37:08,599
think it is and we'd all been talking

868
00:37:07,159 --> 00:37:11,779
about it you're not to talk to the press

869
00:37:08,599 --> 00:37:13,579
let the Space Telescope Institute handle

870
00:37:11,780 --> 00:37:15,320
it because you guys were sort of at

871
00:37:13,579 --> 00:37:17,059
Ground Zero and then you were having to

872
00:37:15,320 --> 00:37:18,710
formalize it I mean you know basically

873
00:37:17,059 --> 00:37:20,090
come up with a response for all of this

874
00:37:18,710 --> 00:37:21,980
and it would not help for all of us out

875
00:37:20,090 --> 00:37:23,030
the field to say anything that being

876
00:37:21,980 --> 00:37:25,639
said we did get a lot of phone calls

877
00:37:23,030 --> 00:37:27,530
from the press locally and we would say

878
00:37:25,639 --> 00:37:28,940
things like what we knew we were allowed

879
00:37:27,530 --> 00:37:31,940
to say we would say otherwise we have to

880
00:37:28,940 --> 00:37:34,010
defer to so then so then how do you get

881
00:37:31,940 --> 00:37:37,010
how does the team get past that and then

882
00:37:34,010 --> 00:37:41,810
you know the participation now in you

883
00:37:37,010 --> 00:37:43,010
know once it was fixed well um once it

884

00:37:41,809 --> 00:37:44,869
was fixed

885
00:37:43,010 --> 00:37:46,340
we were dancing I mean you know we were

886
00:37:44,869 --> 00:37:48,739
getting data we weren't throwing half of

887
00:37:46,340 --> 00:37:50,120
it away the deconvolution algorithms

888
00:37:48,739 --> 00:37:52,099
we'd been able to pull things out before

889
00:37:50,119 --> 00:37:55,369
that's we we weren't throwing it quite

890
00:37:52,099 --> 00:37:56,690
away but when I first when I got back

891
00:37:55,369 --> 00:37:58,130
rien volved with it quite heavily

892
00:37:56,690 --> 00:38:00,050
because for long it there was something

893
00:37:58,130 --> 00:38:02,300
for you to do I came back in and I was

894
00:38:00,050 --> 00:38:04,640
helping to figure out how we were going

895
00:38:02,300 --> 00:38:06,289
to apply for time and how what we were

896
00:38:04,639 --> 00:38:08,319
going to do to make that day to work for

897
00:38:06,289 --> 00:38:11,150
us and you know with the pipeline

898
00:38:08,320 --> 00:38:12,920

processing and all that sort of stuff we

899

00:38:11,150 --> 00:38:14,240

were very busy working on that so we

900

00:38:12,920 --> 00:38:15,559

were focused on something that we knew

901

00:38:14,239 --> 00:38:17,359

would help make things better and that

902

00:38:15,559 --> 00:38:19,130

really helped a lot that you know this

903

00:38:17,360 --> 00:38:20,900

is a future thing this is not over dead

904

00:38:19,130 --> 00:38:22,369

in the water then when the first

905

00:38:20,900 --> 00:38:24,200

servicing mission results came back

906

00:38:22,369 --> 00:38:26,690

everybody was pretty much dancing and at

907

00:38:24,199 --> 00:38:28,879

that point i remember it was like okay

908

00:38:26,690 --> 00:38:30,409

it's more routine now I mean here they

909

00:38:28,880 --> 00:38:31,519

were still problems obviously I mean

910

00:38:30,409 --> 00:38:33,500

they were you know we have problems with

911

00:38:31,519 --> 00:38:36,980

submitting proposals on all this but but

912

00:38:33,500 --> 00:38:38,329

we got it done and we got people being

913
00:38:36,980 --> 00:38:41,420
able to say oh geez now I can finish my

914
00:38:38,329 --> 00:38:43,279
PhD you know it's a couple one of my one

915
00:38:41,420 --> 00:38:45,139
of my partners in the office was working

916
00:38:43,280 --> 00:38:46,610
on Alpha Ori and it's like oh my god how

917
00:38:45,139 --> 00:38:48,949
am I going to do this you know and then

918
00:38:46,610 --> 00:38:51,019
a couple years later when Dave leckrone

919
00:38:48,949 --> 00:38:52,699
did all the work on KY loopy that was

920
00:38:51,019 --> 00:38:54,619
sort of like the gold standard so to

921
00:38:52,699 --> 00:38:57,799
just explain that one Dave leckrone used

922
00:38:54,619 --> 00:39:00,589
the GHS look at the peculiar of peculiar

923
00:38:57,800 --> 00:39:02,930
Star Chi loopy and saw many many

924
00:39:00,590 --> 00:39:04,610
chemical species in it that normally had

925
00:39:02,929 --> 00:39:06,079
not been seen as stars before could not

926
00:39:04,610 --> 00:39:08,180
have been done without the work that was

927
00:39:06,079 --> 00:39:10,099
done on G hrs and he won an award for

928
00:39:08,179 --> 00:39:12,139
that I think that was a vindication and

929
00:39:10,099 --> 00:39:13,610
we talked a lot about that at the G hrs

930
00:39:12,139 --> 00:39:15,829
results conference we had a few years

931
00:39:13,610 --> 00:39:17,150
later so we actually were able to put

932
00:39:15,829 --> 00:39:19,639
together a book I have it back here it's

933
00:39:17,150 --> 00:39:20,660
a book about about that thick now of all

934
00:39:19,639 --> 00:39:23,659
the results that we did the first

935
00:39:20,659 --> 00:39:25,069
several years of G hrs data so at some

936
00:39:23,659 --> 00:39:27,019
point I think right after the first

937
00:39:25,070 --> 00:39:28,880
servicing mission it was like okay full

938
00:39:27,019 --> 00:39:30,590
speed ahead let's go yeah we know we had

939
00:39:28,880 --> 00:39:32,900
problems you know but we can put the

940
00:39:30,590 --> 00:39:34,340
oars in the water we can go so Carol let

941

00:39:32,900 --> 00:39:35,990
me put that same question back to you

942
00:39:34,340 --> 00:39:41,090
then what were things like at the

943
00:39:35,989 --> 00:39:42,919
Institute me your eyes on me um well

944
00:39:41,090 --> 00:39:45,140
well I was in there I was in the

945
00:39:42,920 --> 00:39:47,450
outreach office and I actually didn't

946
00:39:45,139 --> 00:39:52,099
join the project until the telescope was

947
00:39:47,449 --> 00:39:54,469
fixed okay oh so I see Carol is the

948
00:39:52,099 --> 00:39:57,809
master Crispin

949
00:39:54,469 --> 00:40:00,899
very smart ya know I was always working

950
00:39:57,809 --> 00:40:03,690
on the extreme ultraviolet Explorer okay

951
00:40:00,900 --> 00:40:07,349
i'm at that time in California and I got

952
00:40:03,690 --> 00:40:10,679
teased over to Baltimore you know garden

953
00:40:07,349 --> 00:40:14,699
spot of the mid-atlantic from home or

954
00:40:10,679 --> 00:40:18,389
neah when people tell me is coming hope

955
00:40:14,699 --> 00:40:19,980

you miss me highway um so I joined the

956

00:40:18,389 --> 00:40:22,019

office of public outreach and actually I

957

00:40:19,980 --> 00:40:24,960

joined it just won the first image came

958

00:40:22,019 --> 00:40:26,989

back from the sourcing mission um and it

959

00:40:24,960 --> 00:40:30,449

was it was great because at that point

960

00:40:26,989 --> 00:40:33,329

everybody was it was like oh my god this

961

00:40:30,449 --> 00:40:36,539

worked we have a close ago we were

962

00:40:33,329 --> 00:40:39,090

practically in tears lastic you know was

963

00:40:36,539 --> 00:40:41,329

really fantastic in it and from the

964

00:40:39,090 --> 00:40:45,480

community side i had been because i am a

965

00:40:41,329 --> 00:40:49,980

goal nirav red astronomer my nature but

966

00:40:45,480 --> 00:40:52,050

ground-based it we all were watching

967

00:40:49,980 --> 00:40:53,730

like and participating and how can you

968

00:40:52,050 --> 00:40:56,880

take the imagery and do this image

969

00:40:53,730 --> 00:40:58,710

processing complex image processing as

970
00:40:56,880 --> 00:41:00,269
Antonella talked about the coral you

971
00:40:58,710 --> 00:41:02,190
could get the core of the image but then

972
00:41:00,269 --> 00:41:03,989
there was all this god of light and you

973
00:41:02,190 --> 00:41:05,280
know can you process it and people

974
00:41:03,989 --> 00:41:07,019
tearing your hair out and making

975
00:41:05,280 --> 00:41:08,910
algorithms to see what they could get

976
00:41:07,019 --> 00:41:10,469
out of it and it they could tell that

977
00:41:08,909 --> 00:41:13,019
the telescope had a lot of promise

978
00:41:10,469 --> 00:41:14,789
because those cores were you know there

979
00:41:13,019 --> 00:41:16,949
are pinpoints it was like I mean if we

980
00:41:14,789 --> 00:41:20,940
can have that we get were golden and

981
00:41:16,949 --> 00:41:23,429
then it happened and so um it was just

982
00:41:20,940 --> 00:41:25,740
great and so people were learning how to

983
00:41:23,429 --> 00:41:27,899
then you have the normal situation where

984
00:41:25,739 --> 00:41:29,759
you have a telescope as if it's brand

985
00:41:27,900 --> 00:41:31,920
new and you start learning how to

986
00:41:29,760 --> 00:41:34,170
calibrate it and get the most out of the

987
00:41:31,920 --> 00:41:36,900
telescope of course you want fantastic

988
00:41:34,170 --> 00:41:39,690
early results and then you start combing

989
00:41:36,900 --> 00:41:42,360
through all that data to get every

990
00:41:39,690 --> 00:41:45,659
little bit out of the data because then

991
00:41:42,360 --> 00:41:47,670
the data was exquisite and then it was

992
00:41:45,659 --> 00:41:50,789
easy you made these images you said and

993
00:41:47,670 --> 00:41:54,210
keep putting them out the public then is

994
00:41:50,789 --> 00:41:56,340
starting to support you and you know

995
00:41:54,210 --> 00:41:58,050
then they were willing to understand

996
00:41:56,340 --> 00:42:00,840
that we could do even better by

997
00:41:58,050 --> 00:42:02,880
upgrading the telescope even more time

998

00:42:00,840 --> 00:42:05,100
so it was a really exciting time it

999
00:42:02,880 --> 00:42:07,050
still is I mean it's so great I mean I

1000
00:42:05,099 --> 00:42:07,319
don't want the inter sense a brand new

1001
00:42:07,050 --> 00:42:10,680
tell

1002
00:42:07,320 --> 00:42:12,570
scope it was serviced in 2009 to me it's

1003
00:42:10,679 --> 00:42:15,000
a practically a five year old telescope

1004
00:42:12,570 --> 00:42:16,950
not 25 now one of the interesting things

1005
00:42:15,000 --> 00:42:18,599
to is from the all the work they did on

1006
00:42:16,949 --> 00:42:20,339
the deconvolution algorithms and the

1007
00:42:18,599 --> 00:42:22,049
work to pull that data out it actually

1008
00:42:20,340 --> 00:42:24,510
went and benefited other instruments do

1009
00:42:22,050 --> 00:42:26,730
not any found a still as other

1010
00:42:24,510 --> 00:42:28,980
telescopes so it was work that you know

1011
00:42:26,730 --> 00:42:30,179
at the time the how serendipitous it

1012
00:42:28,980 --> 00:42:33,300

sure looked like it was a pain at the

1013

00:42:30,179 --> 00:42:35,759
time exactly right so it's a good

1014

00:42:33,300 --> 00:42:38,280
technical contribution to science in

1015

00:42:35,760 --> 00:42:40,110
general yeah all right well that's

1016

00:42:38,280 --> 00:42:42,030
really great so I don't see any

1017

00:42:40,110 --> 00:42:43,710
questions or comments on that yet I've

1018

00:42:42,030 --> 00:42:46,830
got a great comment here oh ok go ahead

1019

00:42:43,710 --> 00:42:49,710
page from sub dust bunny says for me I

1020

00:42:46,829 --> 00:42:52,590
feel awesome pretty much all of society

1021

00:42:49,710 --> 00:42:54,990
cannot help but appreciate the HST it's

1022

00:42:52,590 --> 00:42:56,430
not only is it clear what is done for

1023

00:42:54,989 --> 00:42:59,159
science and the understanding of our

1024

00:42:56,429 --> 00:43:01,289
universe and then providing images that

1025

00:42:59,159 --> 00:43:02,969
allowed everyone even those with no

1026

00:43:01,289 --> 00:43:04,739
interest in science tomorrow at the

1027
00:43:02,969 --> 00:43:07,019
beauty and wonder of the universe and

1028
00:43:04,739 --> 00:43:09,629
inspires a new generation of scientists

1029
00:43:07,019 --> 00:43:12,840
that every complements our show by I

1030
00:43:09,630 --> 00:43:17,670
can't agree more i think that i know

1031
00:43:12,840 --> 00:43:20,220
inspired me i know that i'm the youngest

1032
00:43:17,670 --> 00:43:24,510
one in this hangout but it's been

1033
00:43:20,219 --> 00:43:30,359
something i don't have more by that um

1034
00:43:24,510 --> 00:43:34,530
oh carol is a close second yeah fine

1035
00:43:30,360 --> 00:43:36,059
fine but it's something that i feel very

1036
00:43:34,530 --> 00:43:38,340
proud to be able to help tell the story

1037
00:43:36,059 --> 00:43:41,279
of when it was something that had always

1038
00:43:38,340 --> 00:43:43,230
inspired me being able to see these

1039
00:43:41,280 --> 00:43:44,760
beautiful images and now having this

1040
00:43:43,230 --> 00:43:48,090
privilege of being able to be part of it

1041
00:43:44,760 --> 00:43:50,370
i absolutely love it i know that many of

1042
00:43:48,090 --> 00:43:52,530
my friends and colleagues that are up

1043
00:43:50,369 --> 00:43:54,329
here in California as well even though

1044
00:43:52,530 --> 00:43:56,460
they work in planetary science because

1045
00:43:54,329 --> 00:43:58,619
most of them are at JPL they tell all

1046
00:43:56,460 --> 00:44:00,000
the time that Hubble had inspired them

1047
00:43:58,619 --> 00:44:01,619
to get into science even though they're

1048
00:44:00,000 --> 00:44:04,050
doing something completely different it

1049
00:44:01,619 --> 00:44:06,659
still got them into space and wanting

1050
00:44:04,050 --> 00:44:10,320
them to find their own passion of

1051
00:44:06,659 --> 00:44:12,659
exploring space so handsome you do see

1052
00:44:10,320 --> 00:44:14,190
hubble pictures show up in interesting

1053
00:44:12,659 --> 00:44:16,259
places that I think maybe one of the

1054
00:44:14,190 --> 00:44:17,519
other hangouts I mentioned that you know

1055

00:44:16,260 --> 00:44:19,530
if you watch Star Trek The Next

1056
00:44:17,519 --> 00:44:19,929
Generation Star Trek Voyager some of

1057
00:44:19,530 --> 00:44:22,180
those image

1058
00:44:19,929 --> 00:44:23,710
showed up largely because of andre

1059
00:44:22,179 --> 00:44:26,109
bormanis and his love for it he would

1060
00:44:23,710 --> 00:44:28,240
say let's get these on there you see

1061
00:44:26,110 --> 00:44:30,099
them all the time and you know in many

1062
00:44:28,239 --> 00:44:33,549
places when I give I give a lot of

1063
00:44:30,099 --> 00:44:35,529
lectures on board ship and if I do a

1064
00:44:33,550 --> 00:44:36,789
Hubble talk it's like an instant hit you

1065
00:44:35,530 --> 00:44:37,930
know it doesn't matter what it is I

1066
00:44:36,789 --> 00:44:39,039
could show the same talk five times

1067
00:44:37,929 --> 00:44:41,559
everybody's gonna show up because they

1068
00:44:39,039 --> 00:44:43,960
really want to see it right well and one

1069
00:44:41,559 --> 00:44:46,029

that we just had a few weeks ago and you

1070

00:44:43,960 --> 00:44:48,539

know when my friends carry and carry

1071

00:44:46,030 --> 00:44:52,810

beam she's on the dawn mission oh yeah

1072

00:44:48,539 --> 00:44:55,750

they just released their their highest

1073

00:44:52,809 --> 00:44:58,480

resolution of series ever but Hubble was

1074

00:44:55,750 --> 00:45:00,159

used to in collaboration with those

1075

00:44:58,480 --> 00:45:01,480

other missions as well and she you know

1076

00:45:00,159 --> 00:45:04,179

she was always telling me about how

1077

00:45:01,480 --> 00:45:06,730

Hubble had inspired her and now she was

1078

00:45:04,179 --> 00:45:08,529

able to use Hubble data to help take

1079

00:45:06,730 --> 00:45:10,889

pictures to point the spacecraft at

1080

00:45:08,530 --> 00:45:14,950

series and now surpasses in resolution

1081

00:45:10,889 --> 00:45:17,920

for for serious so I think the phd zap

1082

00:45:14,949 --> 00:45:20,379

talent level stuff oh how far and wide

1083

00:45:17,920 --> 00:45:22,180

Hubble has been able to inspire people I

1084
00:45:20,380 --> 00:45:23,860
think that's been a little bit of a

1085
00:45:22,179 --> 00:45:26,289
surprise is that people don't think of

1086
00:45:23,860 --> 00:45:29,829
how much science has been done with in

1087
00:45:26,289 --> 00:45:31,750
this on solar system objects with Hubble

1088
00:45:29,829 --> 00:45:34,719
because you always think of Cosmos star

1089
00:45:31,750 --> 00:45:37,239
formation exoplanets you know you know

1090
00:45:34,719 --> 00:45:39,159
deep cosmology but there has been quite

1091
00:45:37,239 --> 00:45:42,729
a bit of work and you know and famously

1092
00:45:39,159 --> 00:45:44,379
the shoemaker-levy object that hit you

1093
00:45:42,730 --> 00:45:48,789
but it was early on to and that really

1094
00:45:44,380 --> 00:45:50,860
helped um the street creds for I was

1095
00:45:48,789 --> 00:45:55,360
going to share a little story antonella

1096
00:45:50,860 --> 00:45:58,180
and I many years ago um went to Papua

1097
00:45:55,360 --> 00:46:02,950
New Guinea and we were on a trip there

1098
00:45:58,179 --> 00:46:05,829
the families and we ran into well one of

1099
00:46:02,949 --> 00:46:07,599
the guys on the ship was a dive ship he

1100
00:46:05,829 --> 00:46:09,759
was not actually literate he couldn't

1101
00:46:07,599 --> 00:46:11,679
read and he sort of made a mark for his

1102
00:46:09,760 --> 00:46:14,290
name but he could pick Hubble out in the

1103
00:46:11,679 --> 00:46:16,750
sky he knew what about halls got was

1104
00:46:14,289 --> 00:46:18,369
that's great notice one night you

1105
00:46:16,750 --> 00:46:22,119
because it was really dr. we like Erica

1106
00:46:18,369 --> 00:46:24,219
very happy the number one number two we

1107
00:46:22,119 --> 00:46:25,569
handed out some we had just made a bunch

1108
00:46:24,219 --> 00:46:29,109
of these little trading cards with

1109
00:46:25,570 --> 00:46:30,910
galaxies and planets hotel and we had a

1110
00:46:29,110 --> 00:46:32,710
pack a couple packs of them with us and

1111
00:46:30,909 --> 00:46:33,250
we handed them out to these little kids

1112

00:46:32,710 --> 00:46:35,230
and they were

1113
00:46:33,250 --> 00:46:39,400
cool they had kind of heard about this

1114
00:46:35,230 --> 00:46:40,990
telescope and another thing was we had

1115
00:46:39,400 --> 00:46:43,840
we had been traveling around and we

1116
00:46:40,989 --> 00:46:48,579
visit a guy who had a cook plantation

1117
00:46:43,840 --> 00:46:50,769
and during our tour he radioed to the

1118
00:46:48,579 --> 00:46:53,650
captain the observations of the moon

1119
00:46:50,769 --> 00:46:55,989
from Hubble the results which I thought

1120
00:46:53,650 --> 00:46:58,630
was kind of amazing every man and we're

1121
00:46:55,989 --> 00:47:00,849
like oh oh it was kind of like that's

1122
00:46:58,630 --> 00:47:04,030
neat but how did they find us we were

1123
00:47:00,849 --> 00:47:06,509
trying to escape work they're sending us

1124
00:47:04,030 --> 00:47:09,460
work results and we're like neat but

1125
00:47:06,510 --> 00:47:17,020
okay thanks there's no order as you can

1126
00:47:09,460 --> 00:47:19,539

go Carol apparently not so Adam synergy

1127

00:47:17,019 --> 00:47:21,250

has an interesting question on QA if you

1128

00:47:19,539 --> 00:47:23,590

were to ask people that don't have a big

1129

00:47:21,250 --> 00:47:26,920

interest in astronomy to name a Space

1130

00:47:23,590 --> 00:47:28,660

Telescope what would they say and I

1131

00:47:26,920 --> 00:47:29,800

think we would have to be hubble right

1132

00:47:28,659 --> 00:47:31,960

if they're going to name I mean that

1133

00:47:29,800 --> 00:47:35,140

would be the one that that is is most

1134

00:47:31,960 --> 00:47:37,300

well known so but the great thing about

1135

00:47:35,139 --> 00:47:39,519

Hubble and in an astronomy in general

1136

00:47:37,300 --> 00:47:41,289

it's always been very easy to get people

1137

00:47:39,519 --> 00:47:44,530

interested in astronomy because of the

1138

00:47:41,289 --> 00:47:46,539

content the material is very it's very

1139

00:47:44,530 --> 00:47:48,220

accessible very beautiful they buried it

1140

00:47:46,539 --> 00:47:50,079

really captures the imagination so

1141
00:47:48,219 --> 00:47:53,049
astronomy has always made it very easy

1142
00:47:50,079 --> 00:47:55,719
to get people into science but Hubble

1143
00:47:53,050 --> 00:48:00,310
has given views of the sky that are just

1144
00:47:55,719 --> 00:48:02,259
unparalleled so I did so we got a couple

1145
00:48:00,309 --> 00:48:04,779
more comment questions here Cecil Morgan

1146
00:48:02,260 --> 00:48:06,760
is asking can we use interview excerpts

1147
00:48:04,780 --> 00:48:10,870
from the front from your hangouts and

1148
00:48:06,760 --> 00:48:13,210
our we use interview excerpts from your

1149
00:48:10,869 --> 00:48:15,279
hangouts in our video for the contest

1150
00:48:13,210 --> 00:48:21,070
not if you make us say things we didn't

1151
00:48:15,280 --> 00:48:24,970
intend to say out of context not a scary

1152
00:48:21,070 --> 00:48:29,140
the perilous seas all not sure Nikita

1153
00:48:24,969 --> 00:48:31,089
net is is asking is HST replacement when

1154
00:48:29,139 --> 00:48:34,210
needed a must for the Advancement of

1155
00:48:31,090 --> 00:48:36,309
science the explanation to the general

1156
00:48:34,210 --> 00:48:42,769
public and or the enhancement of other

1157
00:48:36,309 --> 00:48:45,679
projects uh the HTS replacement for days

1158
00:48:42,769 --> 00:48:49,280
yeah uh that guess that means jdub James

1159
00:48:45,679 --> 00:48:54,559
Webb Space Telescope magon w first after

1160
00:48:49,280 --> 00:48:55,910
ya w first following that uh it is it

1161
00:48:54,559 --> 00:48:57,349
needed for the advancement of science

1162
00:48:55,909 --> 00:48:58,730
and makes explanation to the general

1163
00:48:57,349 --> 00:49:02,269
public i would my answer to that would

1164
00:48:58,730 --> 00:49:04,880
be absolutely we cannot see some areas

1165
00:49:02,269 --> 00:49:07,400
of the universe without the webb space

1166
00:49:04,880 --> 00:49:09,530
telescope and the infrared capabilities

1167
00:49:07,400 --> 00:49:11,539
are going to make us see things that

1168
00:49:09,530 --> 00:49:14,390
also Hubble can't not currently c plus

1169

00:49:11,539 --> 00:49:19,130
the size of the objective resolution

1170
00:49:14,389 --> 00:49:21,170
will be way beyond what Hubble can

1171
00:49:19,130 --> 00:49:23,720
currently do so and it's a good analogy

1172
00:49:21,170 --> 00:49:25,849
is you know going from having just an

1173
00:49:23,719 --> 00:49:27,829
optical microscope to having a scanning

1174
00:49:25,849 --> 00:49:30,710
electron microscope the thinking the

1175
00:49:27,829 --> 00:49:32,659
things that we've learned by pushing our

1176
00:49:30,710 --> 00:49:34,820
limits of what we can observe with it so

1177
00:49:32,659 --> 00:49:37,639
it goes on all scales and when we're

1178
00:49:34,820 --> 00:49:39,650
able to observe things in a deeper way

1179
00:49:37,639 --> 00:49:42,980
so now we're having to look getting to

1180
00:49:39,650 --> 00:49:45,019
look at longer wavelengths with just it

1181
00:49:42,980 --> 00:49:46,820
has worked the same way in the opposite

1182
00:49:45,019 --> 00:49:48,829
direction so the further we can reach

1183
00:49:46,820 --> 00:49:50,420

into observing the universe in any

1184

00:49:48,829 --> 00:49:53,389
direction i think is going to help the

1185

00:49:50,420 --> 00:49:56,090
advancement of science well i also will

1186

00:49:53,389 --> 00:49:58,219
say that that Hubble makes it I mean any

1187

00:49:56,090 --> 00:50:00,530
telescope makes advances we do these

1188

00:49:58,219 --> 00:50:03,319
observations and so we get some answers

1189

00:50:00,530 --> 00:50:05,390
we do build models we say okay we think

1190

00:50:03,320 --> 00:50:07,789
it's like that but you know what what

1191

00:50:05,389 --> 00:50:09,469
about this other part or you know what

1192

00:50:07,789 --> 00:50:12,619
about if we looked back a little further

1193

00:50:09,469 --> 00:50:15,919
Oh clan we actually see resolve those

1194

00:50:12,619 --> 00:50:18,409
disks around planet so for every

1195

00:50:15,920 --> 00:50:20,059
breakthrough and discovery we have we

1196

00:50:18,409 --> 00:50:21,829
have more questions we want to know

1197

00:50:20,059 --> 00:50:24,829
things in greater detail we want to have

1198
00:50:21,829 --> 00:50:28,460
better models so it's it it that science

1199
00:50:24,829 --> 00:50:30,469
doesn't stop right one telescope can we

1200
00:50:28,460 --> 00:50:31,460
know everything well I thought yeah

1201
00:50:30,469 --> 00:50:33,649
that's what I thought we knew everything

1202
00:50:31,460 --> 00:50:37,550
about home whores for a while now so

1203
00:50:33,650 --> 00:50:41,960
yeah sorry oh okay the hub is the small

1204
00:50:37,550 --> 00:50:43,850
things yes oh poor meter is you know

1205
00:50:41,960 --> 00:50:46,099
comparing even to the ground-based

1206
00:50:43,849 --> 00:50:48,500
telescope we see now it's a small

1207
00:50:46,099 --> 00:50:52,039
telescope so if we want to go deeper

1208
00:50:48,500 --> 00:50:54,469
farther or more sensitive we need you

1209
00:50:52,039 --> 00:50:55,849
know a larger telescope in space so you

1210
00:50:54,469 --> 00:50:58,459
have this eve of the large

1211
00:50:55,849 --> 00:51:00,440
we need even larger telescope in the

1212
00:50:58,460 --> 00:51:03,289
future if you want to find life out

1213
00:51:00,440 --> 00:51:06,200
there for example so I'm gonna think

1214
00:51:03,289 --> 00:51:07,969
about that's true all right Scott if I

1215
00:51:06,199 --> 00:51:09,739
if I gotten everything did you do you

1216
00:51:07,969 --> 00:51:11,299
see anything else I and I believe have

1217
00:51:09,739 --> 00:51:14,750
everything else taking care of that I

1218
00:51:11,300 --> 00:51:16,340
can find all right well I guess we will

1219
00:51:14,750 --> 00:51:18,019
wrap it up there for this week folks i

1220
00:51:16,340 --> 00:51:19,880
want to thank Carolyn Collins Peterson

1221
00:51:18,019 --> 00:51:21,199
and Antonella nota for joining us thank

1222
00:51:19,880 --> 00:51:23,720
you both very much this has been a lot

1223
00:51:21,199 --> 00:51:25,819
of fun and candle be we will be back

1224
00:51:23,719 --> 00:51:28,939
next week where I think we're talking

1225
00:51:25,820 --> 00:51:31,400
about Jupiter yeah leave is that right

1226

00:51:28,940 --> 00:51:33,289
Carol okay well i sure will finalize the

1227
00:51:31,400 --> 00:51:35,090
exact time we're still working on the

1228
00:51:33,289 --> 00:51:36,559
calendar but it will be about some

1229
00:51:35,090 --> 00:51:37,940
images of jupiter and solar system

1230
00:51:36,559 --> 00:51:40,070
objects so they definitely want to come

1231
00:51:37,940 --> 00:51:41,599
back and see us for that one don't

1232
00:51:40,070 --> 00:51:43,550
forget about the video contest starting

1233
00:51:41,599 --> 00:51:46,130
on Monday morning and submit your

1234
00:51:43,550 --> 00:51:49,220
entries early and often and have it be

1235
00:51:46,130 --> 00:51:50,720
crowd-sourced and then whittled down and

1236
00:51:49,219 --> 00:51:52,819
hopefully you'll win a piece of the

1237
00:51:50,719 --> 00:51:55,429
solar panel anyway that's it for this

1238
00:51:52,820 --> 00:51:57,650
week Thank You Carol thank you Scott not

1239
00:51:55,429 --> 00:51:59,299
a problem Tony see ya did you go see you

1240
00:51:57,650 --> 00:52:02,450

guys next week thank you for watching as

1241

00:51:59,300 --> 00:52:05,710

always keep looking up keep up

1242

00:52:02,449 --> 00:52:05,710

up up up up