

1
00:00:00,979 --> 00:00:14,218
okay hello everybody and welcome to our

2
00:00:11,669 --> 00:00:17,460
final webcast streaming from the double

3
00:00:14,218 --> 00:00:18,809
AAS meeting in Seattle Washington my

4
00:00:17,460 --> 00:00:20,189
name is Tony Darnell I work at the Space

5
00:00:18,809 --> 00:00:22,559
Telescope Science Institute and with me

6
00:00:20,189 --> 00:00:24,300
is dr. carol christian also from the

7
00:00:22,559 --> 00:00:25,799
Space Telescope Science Institute and

8
00:00:24,300 --> 00:00:27,539
what we're going to do every day at this

9
00:00:25,800 --> 00:00:29,460
time is we're going to just take a

10
00:00:27,539 --> 00:00:31,320
moment and kind of reflect on what we've

11
00:00:29,460 --> 00:00:33,780
we've seen during the day the kinds of

12
00:00:31,320 --> 00:00:35,340
the biggest press releases or news

13
00:00:33,780 --> 00:00:37,020
stories or discoveries that have stood

14
00:00:35,340 --> 00:00:40,890
out to us and kind of share them with

15
00:00:37,020 --> 00:00:42,899
you and I don't know if you guys

16
00:00:40,890 --> 00:00:45,120
remember if you remember back when I i

17
00:00:42,899 --> 00:00:47,910
first started space fan news i started

18
00:00:45,119 --> 00:00:49,558
in january i think about 34 years ago

19
00:00:47,909 --> 00:00:51,599
and I did it because I wanted to cover

20
00:00:49,558 --> 00:00:52,859
the news at those happening at the

21
00:00:51,600 --> 00:00:54,329
Winter Meetings that's always the

22
00:00:52,859 --> 00:00:57,269
biggest one they have to and usually the

23
00:00:54,329 --> 00:00:58,920
biggest one is in the winter and they

24
00:00:57,270 --> 00:01:00,329
also do one in the spring and I started

25
00:00:58,920 --> 00:01:03,120
space fan news just to cover those

26
00:01:00,329 --> 00:01:04,710
things well now look at me i'm here i'm

27
00:01:03,119 --> 00:01:05,908
at the meeting and I'm live streaming

28
00:01:04,709 --> 00:01:07,500
from it and being able to talk to some

29

00:01:05,909 --> 00:01:09,359
of the best astronomers the most amazing

30
00:01:07,500 --> 00:01:11,760
people and talk about the latest in

31
00:01:09,359 --> 00:01:14,188
astronomy happenings so it's been a long

32
00:01:11,760 --> 00:01:16,228
haul it's been really great but so Carol

33
00:01:14,188 --> 00:01:17,579
tell me what so you've been around I've

34
00:01:16,228 --> 00:01:18,929
been busy doing this all day you've

35
00:01:17,579 --> 00:01:21,599
actually been able to interact with

36
00:01:18,930 --> 00:01:23,100
people I have a little bit let me talk a

37
00:01:21,599 --> 00:01:24,868
little bit about the format of the

38
00:01:23,099 --> 00:01:26,489
meeting for those of you who are not

39
00:01:24,868 --> 00:01:28,500
familiar with it so the way this works

40
00:01:26,489 --> 00:01:32,250
is that in the morning there's usually a

41
00:01:28,500 --> 00:01:34,530
talk around 8 30 or nine for about an

42
00:01:32,250 --> 00:01:36,840
hour and that's in the big big ballroom

43
00:01:34,530 --> 00:01:39,239

lots of the attendees go to that and

44

00:01:36,840 --> 00:01:41,909

then we have a bunch of sessions after

45

00:01:39,239 --> 00:01:43,649

that we're different topics are

46

00:01:41,909 --> 00:01:46,439

discussed so people who are interested

47

00:01:43,649 --> 00:01:49,710

in exoplanets or supernova or galaxies

48

00:01:46,438 --> 00:01:52,169

or distant cosmology present papers

49

00:01:49,709 --> 00:01:54,539

little snippets come into papers on

50

00:01:52,170 --> 00:01:56,969

research that they're doing that are in

51

00:01:54,540 --> 00:01:59,430

progress during that period in the

52

00:01:56,968 --> 00:02:01,978

morning we also have a coffee break for

53

00:01:59,430 --> 00:02:05,189

all of us with jet lag and also a press

54

00:02:01,978 --> 00:02:07,590

conference then at noon there's a couple

55

00:02:05,188 --> 00:02:10,019

of town halls and other large

56

00:02:07,590 --> 00:02:12,000

discussions of interest to the community

57

00:02:10,020 --> 00:02:13,030

and then the afternoon we have a bunch

58
00:02:12,000 --> 00:02:15,729
of parallel session

59
00:02:13,030 --> 00:02:18,539
again and then we have a reception so

60
00:02:15,729 --> 00:02:21,429
we're winding down the sessions now and

61
00:02:18,539 --> 00:02:23,199
what happened today was in the morning

62
00:02:21,430 --> 00:02:25,659
there were a bunch of sessions about a

63
00:02:23,199 --> 00:02:27,939
variety of topics again and also there

64
00:02:25,659 --> 00:02:29,949
are a lot of posters to people present

65
00:02:27,939 --> 00:02:32,109
posters and they can show what they're

66
00:02:29,949 --> 00:02:33,759
doing and then they they can stand by

67
00:02:32,110 --> 00:02:36,640
the poster and explain they're all

68
00:02:33,759 --> 00:02:38,919
around us are people everywhere talking

69
00:02:36,639 --> 00:02:41,318
about their research so that they can do

70
00:02:38,919 --> 00:02:43,449
more in-depth discussion of the research

71
00:02:41,318 --> 00:02:47,199
that they're doing without being

72
00:02:43,449 --> 00:02:48,939
restricted to a ten minute talk so and

73
00:02:47,199 --> 00:02:50,889
that's also a good way to get to know

74
00:02:48,939 --> 00:02:52,780
people that are in your field or

75
00:02:50,889 --> 00:02:54,759
interested in the same thing as you are

76
00:02:52,780 --> 00:02:58,000
but that you don't know so a lot of

77
00:02:54,759 --> 00:03:01,509
networking exchanging ideas and making

78
00:02:58,000 --> 00:03:04,150
plans for drinks after so this morning

79
00:03:01,509 --> 00:03:06,280
there was a session a press conference

80
00:03:04,150 --> 00:03:08,950
on exoplanets oh there were a lot of

81
00:03:06,280 --> 00:03:12,009
discussion of what the Kepler results

82
00:03:08,949 --> 00:03:14,709
have been all the planets that have been

83
00:03:12,009 --> 00:03:17,889
confirmed by Kepler and then there were

84
00:03:14,709 --> 00:03:19,479
now we're starting to dig into a lot of

85
00:03:17,889 --> 00:03:21,729
those planets and other planets that

86

00:03:19,479 --> 00:03:24,069
have been discovered looking for water

87
00:03:21,729 --> 00:03:26,979
looking for methane looking for all

88
00:03:24,069 --> 00:03:29,680
those chemical elements that suggests

89
00:03:26,979 --> 00:03:31,869
that on some of these planets there are

90
00:03:29,680 --> 00:03:33,459
good environments for the formation of

91
00:03:31,870 --> 00:03:36,879
life of course people are always

92
00:03:33,459 --> 00:03:39,549
interested in well can the star system

93
00:03:36,879 --> 00:03:43,269
make planets and if they make planets do

94
00:03:39,549 --> 00:03:45,219
those star systems have planets in the

95
00:03:43,269 --> 00:03:48,189
right area right temperature right

96
00:03:45,219 --> 00:03:50,620
chemistry right everything in order to

97
00:03:48,189 --> 00:03:52,180
maybe make at least microbial life now

98
00:03:50,620 --> 00:03:53,920
we're a long way away from discovering

99
00:03:52,180 --> 00:03:57,310
microbial life but that was the big

100
00:03:53,919 --> 00:03:59,439

discussion this morning I also wanted to

101

00:03:57,310 --> 00:04:01,840

say that a lot of what goes on Tony as

102

00:03:59,439 --> 00:04:03,909

you all know is there's a lot of talk in

103

00:04:01,840 --> 00:04:06,009

the hallways you meet people in the

104

00:04:03,909 --> 00:04:08,169

exhibit hall or you talk to somebody in

105

00:04:06,009 --> 00:04:10,629

the hallway you see people what's going

106

00:04:08,169 --> 00:04:12,518

on here the latest news there's a lot of

107

00:04:10,629 --> 00:04:14,019

information so it's really important to

108

00:04:12,519 --> 00:04:16,600

come to the meeting and talk to people

109

00:04:14,019 --> 00:04:18,788

so that you find out behind the scenes

110

00:04:16,600 --> 00:04:20,320

what's going on yeah when they found out

111

00:04:18,788 --> 00:04:21,908

we were live streaming all of this the

112

00:04:20,319 --> 00:04:24,098

double-a s did they were very cautious

113

00:04:21,908 --> 00:04:24,670

they were very worried but no one's

114

00:04:24,098 --> 00:04:26,469

going to come

115
00:04:24,670 --> 00:04:28,569
but it's you know nothing replaces the

116
00:04:26,470 --> 00:04:30,340
interaction really you have to come see

117
00:04:28,569 --> 00:04:32,860
the posters listen to the talks and then

118
00:04:30,339 --> 00:04:34,750
interact with people so but it's a good

119
00:04:32,860 --> 00:04:37,960
record we will have the record of these

120
00:04:34,750 --> 00:04:40,149
streaming events which is great there

121
00:04:37,959 --> 00:04:42,310
was actually an interesting throughout

122
00:04:40,149 --> 00:04:44,469
the meeting there are some a little bit

123
00:04:42,310 --> 00:04:46,209
what I would say there on topic but not

124
00:04:44,470 --> 00:04:49,330
just research and there were apparently

125
00:04:46,209 --> 00:04:51,370
was a talk today by a professor from

126
00:04:49,329 --> 00:04:54,219
George Washington University about space

127
00:04:51,370 --> 00:04:56,139
policy and his advice was trying to

128
00:04:54,220 --> 00:05:00,460
delay the landscape of where does

129
00:04:56,139 --> 00:05:03,969
astronomy fit in NASA and where does

130
00:05:00,459 --> 00:05:06,759
NASA fit in the United States or in

131
00:05:03,970 --> 00:05:09,910
general in the global space community

132
00:05:06,759 --> 00:05:13,240
and how we astronomers can make our case

133
00:05:09,910 --> 00:05:15,220
for the kind of research facilities we

134
00:05:13,240 --> 00:05:17,410
want in the future and what kind of

135
00:05:15,220 --> 00:05:20,080
problems we are trying to address out

136
00:05:17,410 --> 00:05:22,000
there so we have to base what we want to

137
00:05:20,079 --> 00:05:24,310
do on what we know today and then

138
00:05:22,000 --> 00:05:25,899
speculate G in 10 years we're going to

139
00:05:24,310 --> 00:05:28,990
need blah blah blah and we have an

140
00:05:25,899 --> 00:05:32,199
opportunity in 2020 to produce another

141
00:05:28,990 --> 00:05:34,960
decade or report on where the science is

142
00:05:32,199 --> 00:05:36,670
and what kind of facilities are going to

143

00:05:34,959 --> 00:05:38,469
be needed the astronomers do every 10

144
00:05:36,670 --> 00:05:41,319
years we do it every 10 years but the

145
00:05:38,470 --> 00:05:43,690
preparation has to be made now so that

146
00:05:41,319 --> 00:05:45,939
we can look at what what technologies we

147
00:05:43,689 --> 00:05:47,560
have to do studies all that kind so what

148
00:05:45,939 --> 00:05:49,300
did he say what did he come to any

149
00:05:47,560 --> 00:05:51,759
conclusions well what is it saying was

150
00:05:49,300 --> 00:05:54,610
that trying to think a little bit

151
00:05:51,759 --> 00:05:59,379
outside of our little bubble think how

152
00:05:54,610 --> 00:06:02,650
you make the case to two other Sciences

153
00:05:59,379 --> 00:06:04,509
why is a facility of interest to

154
00:06:02,649 --> 00:06:06,519
astronomers and why is that important

155
00:06:04,509 --> 00:06:08,709
for science in general and then why is

156
00:06:06,519 --> 00:06:10,509
it in the public interest to have those

157
00:06:08,709 --> 00:06:12,310

facilities so we can't just be thinking

158

00:06:10,509 --> 00:06:14,800

about gee I really would like to have

159

00:06:12,310 --> 00:06:16,959

another Hubble Space Telescope which we

160

00:06:14,800 --> 00:06:20,290

would love to have but we need to think

161

00:06:16,959 --> 00:06:22,029

of it in the larger view but astronomy

162

00:06:20,290 --> 00:06:23,980

is doing very well his other point is

163

00:06:22,029 --> 00:06:25,989

astronomy's doing very well because we

164

00:06:23,980 --> 00:06:28,090

do make our case and we do events like

165

00:06:25,990 --> 00:06:28,939

this share we love sharing with the

166

00:06:28,089 --> 00:06:30,949

public on what

167

00:06:28,939 --> 00:06:33,649

so NASA does have a good important part

168

00:06:30,949 --> 00:06:35,659

in a strong absolutely absolutely one

169

00:06:33,649 --> 00:06:37,519

thing that the public doesn't realize

170

00:06:35,660 --> 00:06:39,860

and I hope our viewers really do

171

00:06:37,519 --> 00:06:44,689

understand is that the NASA budget is a

172
00:06:39,860 --> 00:06:46,460
tiny percentage of the US budget people

173
00:06:44,689 --> 00:06:48,500
always think it's like the same as the

174
00:06:46,459 --> 00:06:51,769
Department of Defense it's not it is a

175
00:06:48,500 --> 00:06:55,069
tiny tiny it's it's not even a penny on

176
00:06:51,769 --> 00:06:58,099
the tax dollar for every tax dollar paid

177
00:06:55,069 --> 00:07:00,889
so it's a tiny fraction of that and we

178
00:06:58,100 --> 00:07:03,320
need to help people understand that

179
00:07:00,889 --> 00:07:05,649
those little tiny pennies are really

180
00:07:03,319 --> 00:07:08,180
going a long way for advancing science

181
00:07:05,649 --> 00:07:11,060
it's one of the things that's also sort

182
00:07:08,180 --> 00:07:12,410
of constrained the human component of

183
00:07:11,060 --> 00:07:14,420
our space flight program to but this

184
00:07:12,410 --> 00:07:16,340
budget has just been pretty flat for a

185
00:07:14,420 --> 00:07:18,319
really long exactly but we're doing okay

186
00:07:16,339 --> 00:07:20,239
we're not being cut so that's a good

187
00:07:18,319 --> 00:07:22,250
thing so we need to think about what

188
00:07:20,240 --> 00:07:25,910
we're going to do in the next 20 years

189
00:07:22,250 --> 00:07:31,160
so after the exoplanet discussion then

190
00:07:25,910 --> 00:07:33,380
of course you had a hangout on sun

191
00:07:31,160 --> 00:07:35,870
shades and exoplanets and other

192
00:07:33,379 --> 00:07:37,819
astronomical objects will benefit for

193
00:07:35,870 --> 00:07:40,040
the sunshade so maybe you were talking

194
00:07:37,819 --> 00:07:42,620
about that just a little snippet of that

195
00:07:40,040 --> 00:07:46,040
yeah sure so yeah was this that we

196
00:07:42,620 --> 00:07:47,060
talked with a project astronomer and one

197
00:07:46,040 --> 00:07:48,950
of the engineers from the starshade

198
00:07:47,060 --> 00:07:51,319
project they they've tested successfully

199
00:07:48,949 --> 00:07:53,300
in the desert the concept what they did

200

00:07:51,319 --> 00:07:55,370
was they set up a very light bright

201
00:07:53,300 --> 00:07:57,079
source in the desert and they had that

202
00:07:55,370 --> 00:07:59,060
would they had a star shade move in

203
00:07:57,079 --> 00:08:01,310
front of it and then they had their

204
00:07:59,060 --> 00:08:04,459
detectors set away kilometers away just

205
00:08:01,310 --> 00:08:06,379
from the light source and they were able

206
00:08:04,459 --> 00:08:07,879
to confirm they had several small

207
00:08:06,379 --> 00:08:09,740
planets right next to it they were able

208
00:08:07,879 --> 00:08:11,719
or light sources next to it that were

209
00:08:09,740 --> 00:08:13,579
supposed to simulate what a planet would

210
00:08:11,720 --> 00:08:15,650
look like in orbit around at that star

211
00:08:13,579 --> 00:08:17,120
and they were able to find and see those

212
00:08:15,649 --> 00:08:19,339
planets and we're talking about looking

213
00:08:17,120 --> 00:08:21,500
at something that's ten million ten

214
00:08:19,339 --> 00:08:23,539

million times brighter or dimmer than

215

00:08:21,500 --> 00:08:25,279

that then its companion star so the

216

00:08:23,540 --> 00:08:27,770

testing of the concept of star shades

217

00:08:25,279 --> 00:08:29,000

has been set they're waiting I think now

218

00:08:27,769 --> 00:08:30,469

to start they're doing to a lot of

219

00:08:29,000 --> 00:08:33,019

preliminary testing on the space-based

220

00:08:30,470 --> 00:08:34,519

hardware but Northrop Grumman ISM is

221

00:08:33,019 --> 00:08:36,918

going forward with the project it's a

222

00:08:34,519 --> 00:08:39,588

really exciting one and so that's a case

223

00:08:36,918 --> 00:08:41,538

where it's become clear that the people

224

00:08:39,589 --> 00:08:42,560

who are studying exoplanets they say

225

00:08:41,538 --> 00:08:45,110

well we need to be

226

00:08:42,559 --> 00:08:46,609

able to look for these planets really

227

00:08:45,110 --> 00:08:48,289

close to bright stars and I have a

228

00:08:46,610 --> 00:08:50,899

bright light in front of me now but if I

229

00:08:48,289 --> 00:08:53,389
put my fist up and block it I can

230

00:08:50,899 --> 00:08:55,699
actually see the rest of the ceiling and

231

00:08:53,389 --> 00:08:58,159
so this is the same idea you block out

232

00:08:55,700 --> 00:08:59,810
the the bright light of the star and you

233

00:08:58,159 --> 00:09:02,509
can see what's surrounded that also

234

00:08:59,809 --> 00:09:04,338
works in galaxies block out the bright

235

00:09:02,509 --> 00:09:06,110
light from the center see what's around

236

00:09:04,339 --> 00:09:07,850
the rest of the galaxy so it's an

237

00:09:06,110 --> 00:09:09,980
important thing where we talk about what

238

00:09:07,850 --> 00:09:12,470
the science need is and then we talk

239

00:09:09,980 --> 00:09:14,330
about okay what do we need to build in

240

00:09:12,470 --> 00:09:17,540
order to investigate these things

241

00:09:14,330 --> 00:09:20,450
further so what does she got force

242

00:09:17,539 --> 00:09:23,569
Carolingian my name show that I actually

243
00:09:20,450 --> 00:09:25,129
did go to well I went to a team meeting

244
00:09:23,570 --> 00:09:26,810
i'm on a team where we're studying a lot

245
00:09:25,129 --> 00:09:29,838
of galaxies and that was interesting

246
00:09:26,809 --> 00:09:33,019
because this team always works on

247
00:09:29,839 --> 00:09:34,610
telecon so this is and we do use webex

248
00:09:33,019 --> 00:09:36,500
and we sometimes see each other but it

249
00:09:34,610 --> 00:09:38,509
was the first time that we actually saw

250
00:09:36,500 --> 00:09:40,399
each other face-to-face so that was kind

251
00:09:38,509 --> 00:09:43,039
of fun and we got to meet each other and

252
00:09:40,399 --> 00:09:45,709
talk about each individual person's role

253
00:09:43,039 --> 00:09:48,799
in this very big project so that that I

254
00:09:45,710 --> 00:09:50,870
enjoyed quite a lot and then we had a

255
00:09:48,799 --> 00:09:53,959
press conference in the afternoon where

256
00:09:50,870 --> 00:09:56,509
we had a number of results that were

257

00:09:53,960 --> 00:09:59,030
showcased that are about the Milky Way

258
00:09:56,509 --> 00:10:01,879
galaxy and the surrounding so that would

259
00:09:59,029 --> 00:10:05,269
be the Large Magellanic Cloud the Small

260
00:10:01,879 --> 00:10:07,850
Magellanic Cloud and the Andromeda m31

261
00:10:05,269 --> 00:10:10,730
galaxy which is a companion to our so

262
00:10:07,850 --> 00:10:12,470
that girl before kind of a little

263
00:10:10,730 --> 00:10:14,420
grouped together and so the press

264
00:10:12,470 --> 00:10:17,060
release is about the kind of research

265
00:10:14,419 --> 00:10:20,449
that's been being done and some of the

266
00:10:17,059 --> 00:10:22,729
highlights are that one group has been

267
00:10:20,450 --> 00:10:25,520
looking at the center of our galaxy and

268
00:10:22,730 --> 00:10:28,039
there have been some gas clouds and some

269
00:10:25,519 --> 00:10:30,199
flaring coming from the center and

270
00:10:28,039 --> 00:10:31,759
there's a supermassive black hole there

271
00:10:30,200 --> 00:10:33,680

and they're trying to understand how the

272

00:10:31,759 --> 00:10:35,899

materials going around and what's making

273

00:10:33,679 --> 00:10:37,729

the flaring and they have lots of data

274

00:10:35,899 --> 00:10:39,559

but they haven't been able to really

275

00:10:37,730 --> 00:10:41,360

figure out what's going on so that's

276

00:10:39,559 --> 00:10:44,299

it's exciting but it's kind of confusing

277

00:10:41,360 --> 00:10:47,060

and then there's the beautiful m31

278

00:10:44,299 --> 00:10:49,329

mosaic that is being examined for star

279

00:10:47,059 --> 00:10:52,519

clusters and looking for star formation

280

00:10:49,330 --> 00:10:55,309

looking for background galaxies and that

281

00:10:52,519 --> 00:10:59,789

has 13,000 pointings and

282

00:10:55,308 --> 00:11:03,028

414 different tiles on the sky covers

283

00:10:59,789 --> 00:11:05,368

about forty percent of m31 and it's all

284

00:11:03,028 --> 00:11:07,379

Hubble data and it's amazing and it's on

285

00:11:05,369 --> 00:11:09,199

the web and you can go in and zoom in

286
00:11:07,379 --> 00:11:12,449
and zoom in and zoom in and see

287
00:11:09,198 --> 00:11:14,608
individual stars in our companion galaxy

288
00:11:12,448 --> 00:11:16,979
so that was pretty exciting there was

289
00:11:14,609 --> 00:11:18,449
somebody else who's studying bubbles

290
00:11:16,980 --> 00:11:21,119
that have shot out of our own galaxy

291
00:11:18,448 --> 00:11:23,128
from the center and have been able to

292
00:11:21,119 --> 00:11:25,709
look through those bubbles and try to

293
00:11:23,129 --> 00:11:28,918
determine where they came from why are

294
00:11:25,708 --> 00:11:31,048
they there and what the history and the

295
00:11:28,918 --> 00:11:35,609
future of those bubbles is going to be

296
00:11:31,048 --> 00:11:41,899
and then we had of course the revealing

297
00:11:35,609 --> 00:11:44,668
of them 16 pillars 20 years later and

298
00:11:41,899 --> 00:11:45,958
that presentation was made at the press

299
00:11:44,668 --> 00:11:48,649
conference and then we just had a

300
00:11:45,958 --> 00:11:52,588
hangout on that that was pretty exciting

301
00:11:48,649 --> 00:11:54,149
so I I guess we're going to be doing

302
00:11:52,589 --> 00:11:55,169
this every day Carol and I'll take a few

303
00:11:54,149 --> 00:11:57,928
minutes out well just kind of give a

304
00:11:55,168 --> 00:11:59,129
quick recap and let you know what we

305
00:11:57,928 --> 00:12:00,988
thought was interesting for the day so

306
00:11:59,129 --> 00:12:03,149
we'll be here this time tomorrow as well

307
00:12:00,989 --> 00:12:05,249
tomorrow the Hangout highlights will be

308
00:12:03,149 --> 00:12:06,448
we have are we allowed to say what it is

309
00:12:05,249 --> 00:12:07,678
we live until it but the press

310
00:12:06,448 --> 00:12:12,058
conference doesn't come out like can I

311
00:12:07,678 --> 00:12:17,759
say that I always already been out today

312
00:12:12,058 --> 00:12:19,708
oh okay so tomorrow what is website AAS

313
00:12:17,759 --> 00:12:22,079
no but we have a look but we have our

314

00:12:19,708 --> 00:12:23,128
hangout schedule our hangout our hangout

315
00:12:22,078 --> 00:12:25,229
are paying us for tomorrow we're gonna

316
00:12:23,129 --> 00:12:27,058
be talking about the the zoomable image

317
00:12:25,230 --> 00:12:28,470
that carol was just talking about we're

318
00:12:27,058 --> 00:12:29,969
going to have the team on here and we're

319
00:12:28,470 --> 00:12:34,319
going to do that in front of this

320
00:12:29,970 --> 00:12:35,610
monitor here we learned right we did

321
00:12:34,318 --> 00:12:38,278
yeah for those of you who just saw a

322
00:12:35,610 --> 00:12:41,639
recent hang out you'll know that yes

323
00:12:38,278 --> 00:12:44,338
that's right that's right this is live

324
00:12:41,639 --> 00:12:45,869
and also there will be a jwst update at

325
00:12:44,339 --> 00:12:47,789
the Northrop Grumman booth with Scott

326
00:12:45,869 --> 00:12:50,160
Willoughby and Jon Arryn ehrenberg the

327
00:12:47,788 --> 00:12:52,318
chief engineer on jwst so that'll be

328
00:12:50,159 --> 00:12:54,448

tomorrow as well and Mark clamp and

329

00:12:52,318 --> 00:12:56,099

we'll be there as well yes that'll be at

330

00:12:54,448 --> 00:12:58,588

ten-thirty in the morning pacific time

331

00:12:56,100 --> 00:13:00,928

and ours is going to be is it 330 again

332

00:12:58,589 --> 00:13:02,789

I think it's 3 330 p.m. pacific time

333

00:13:00,928 --> 00:13:05,159

tomorrow and then right after that we'll

334

00:13:02,788 --> 00:13:06,299

do a recap so we ought to look for some

335

00:13:05,159 --> 00:13:08,490

schwag

336

00:13:06,299 --> 00:13:10,139

tomorrow oh yeah I haven't done that yet

337

00:13:08,490 --> 00:13:12,419

I haven't found anything lot of schwag

338

00:13:10,139 --> 00:13:14,699

because you know but with their some

339

00:13:12,419 --> 00:13:16,799

well so we'll nose around see if we can

340

00:13:14,700 --> 00:13:20,640

find anything oh yeah we have Hubble

341

00:13:16,799 --> 00:13:23,779

yeah that's like our swag yeah I got a

342

00:13:20,639 --> 00:13:23,779

little public pen but I never seen

343

00:13:24,980 --> 00:13:28,139

alright folks thank you guys for

344

00:13:26,669 --> 00:13:29,339

watching I hope you're getting something

345

00:13:28,139 --> 00:13:31,049

out of this we're enjoying making these

346

00:13:29,340 --> 00:13:32,519

for you please leave comments and

347

00:13:31,049 --> 00:13:34,319

questions for us anytime you want on any

348

00:13:32,519 --> 00:13:37,769

of the social media channels Twitter

349

00:13:34,320 --> 00:13:41,990

Facebook G+ we're around thank you all

350

00:13:37,769 --> 00:13:41,990

for watching and as always keep looking