
HUBBLE
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hangouts
Hubble Hangouts Live at AAS 225
#3: Monday Recap
Monday, Jan 4, 2014, 4:30pm PST, 12:30 UT (Tues), 1:30 CET (Tues)

1
00:00:14,209 --> 00:00:11,660
okay hello everybody and welcome to our

2
00:00:17,450 --> 00:00:14,219
final webcast streaming from the double

3
00:00:18,800 --> 00:00:17,460
AAS meeting in Seattle Washington my

4
00:00:20,179 --> 00:00:18,810
name is Tony Darnell I work at the Space

5
00:00:22,550 --> 00:00:20,189
Telescope Science Institute and with me

6
00:00:24,290 --> 00:00:22,560
is dr. carol christian also from the

7
00:00:25,790 --> 00:00:24,300
Space Telescope Science Institute and

8
00:00:27,529 --> 00:00:25,800
what we're going to do every day at this

9
00:00:29,450 --> 00:00:27,539
time is we're going to just take a

10
00:00:31,310 --> 00:00:29,460
moment and kind of reflect on what we've

11
00:00:33,770 --> 00:00:31,320
we've seen during the day the kinds of

12
00:00:35,330 --> 00:00:33,780
the biggest press releases or news

13
00:00:37,010 --> 00:00:35,340

stories or discoveries that have stood

14
00:00:40,880 --> 00:00:37,020
out to us and kind of share them with

15
00:00:42,889 --> 00:00:40,890
you and I don't know if you guys

16
00:00:45,110 --> 00:00:42,899
remember if you remember back when I i

17
00:00:47,900 --> 00:00:45,120
first started space fan news i started

18
00:00:49,549 --> 00:00:47,910
in january i think about 34 years ago

19
00:00:51,590 --> 00:00:49,559
and I did it because I wanted to cover

20
00:00:52,850 --> 00:00:51,600
the news at those happening at the

21
00:00:54,319 --> 00:00:52,860
Winter Meetings that's always the

22
00:00:57,260 --> 00:00:54,329
biggest one they have to and usually the

23
00:00:58,910 --> 00:00:57,270
biggest one is in the winter and they

24
00:01:00,319 --> 00:00:58,920
also do one in the spring and I started

25
00:01:03,110 --> 00:01:00,329
space fan news just to cover those

26
00:01:04,700 --> 00:01:03,120
things well now look at me i'm here i'm

27
00:01:05,899 --> 00:01:04,710
at the meeting and I'm live streaming

28
00:01:07,490 --> 00:01:05,909
from it and being able to talk to some

29
00:01:09,350 --> 00:01:07,500
of the best astronomers the most amazing

30
00:01:11,750 --> 00:01:09,360
people and talk about the latest in

31
00:01:14,179 --> 00:01:11,760
astronomy happenings so it's been a long

32
00:01:16,219 --> 00:01:14,189
haul it's been really great but so Carol

33
00:01:17,570 --> 00:01:16,229
tell me what so you've been around I've

34
00:01:18,920 --> 00:01:17,580
been busy doing this all day you've

35
00:01:21,590 --> 00:01:18,930
actually been able to interact with

36
00:01:23,090 --> 00:01:21,600
people I have a little bit let me talk a

37
00:01:24,859 --> 00:01:23,100
little bit about the format of the

38
00:01:26,480 --> 00:01:24,869

meeting for those of you who are not

39
00:01:28,490 --> 00:01:26,490
familiar with it so the way this works

40
00:01:32,240 --> 00:01:28,500
is that in the morning there's usually a

41
00:01:34,520 --> 00:01:32,250
talk around 8 30 or nine for about an

42
00:01:36,830 --> 00:01:34,530
hour and that's in the big big ballroom

43
00:01:39,230 --> 00:01:36,840
lots of the attendees go to that and

44
00:01:41,899 --> 00:01:39,240
then we have a bunch of sessions after

45
00:01:43,639 --> 00:01:41,909
that we're different topics are

46
00:01:46,429 --> 00:01:43,649
discussed so people who are interested

47
00:01:49,700 --> 00:01:46,439
in exoplanets or supernova or galaxies

48
00:01:52,160 --> 00:01:49,710
or distant cosmology present papers

49
00:01:54,530 --> 00:01:52,170
little snippets come into papers on

50
00:01:56,959 --> 00:01:54,540
research that they're doing that are in

51
00:01:59,420 --> 00:01:56,969
progress during that period in the

52
00:02:01,969 --> 00:01:59,430
morning we also have a coffee break for

53
00:02:05,179 --> 00:02:01,979
all of us with jet lag and also a press

54
00:02:07,580 --> 00:02:05,189
conference then at noon there's a couple

55
00:02:10,010 --> 00:02:07,590
of town halls and other large

56
00:02:11,990 --> 00:02:10,020
discussions of interest to the community

57
00:02:13,020 --> 00:02:12,000
and then the afternoon we have a bunch

58
00:02:15,720 --> 00:02:13,030
of parallel session

59
00:02:18,530 --> 00:02:15,730
again and then we have a reception so

60
00:02:21,420 --> 00:02:18,540
we're winding down the sessions now and

61
00:02:23,190 --> 00:02:21,430
what happened today was in the morning

62
00:02:25,650 --> 00:02:23,200
there were a bunch of sessions about a

63
00:02:27,930 --> 00:02:25,660

variety of topics again and also there

64
00:02:29,940 --> 00:02:27,940
are a lot of posters to people present

65
00:02:32,100 --> 00:02:29,950
posters and they can show what they're

66
00:02:33,750 --> 00:02:32,110
doing and then they they can stand by

67
00:02:36,630 --> 00:02:33,760
the poster and explain they're all

68
00:02:38,910 --> 00:02:36,640
around us are people everywhere talking

69
00:02:41,309 --> 00:02:38,920
about their research so that they can do

70
00:02:43,440 --> 00:02:41,319
more in-depth discussion of the research

71
00:02:47,190 --> 00:02:43,450
that they're doing without being

72
00:02:48,930 --> 00:02:47,200
restricted to a ten minute talk so and

73
00:02:50,880 --> 00:02:48,940
that's also a good way to get to know

74
00:02:52,770 --> 00:02:50,890
people that are in your field or

75
00:02:54,750 --> 00:02:52,780
interested in the same thing as you are

76
00:02:57,990 --> 00:02:54,760
but that you don't know so a lot of

77
00:03:01,500 --> 00:02:58,000
networking exchanging ideas and making

78
00:03:04,140 --> 00:03:01,510
plans for drinks after so this morning

79
00:03:06,270 --> 00:03:04,150
there was a session a press conference

80
00:03:08,940 --> 00:03:06,280
on exoplanets oh there were a lot of

81
00:03:12,000 --> 00:03:08,950
discussion of what the Kepler results

82
00:03:14,699 --> 00:03:12,010
have been all the planets that have been

83
00:03:17,880 --> 00:03:14,709
confirmed by Kepler and then there were

84
00:03:19,470 --> 00:03:17,890
now we're starting to dig into a lot of

85
00:03:21,720 --> 00:03:19,480
those planets and other planets that

86
00:03:24,060 --> 00:03:21,730
have been discovered looking for water

87
00:03:26,970 --> 00:03:24,070
looking for methane looking for all

88
00:03:29,670 --> 00:03:26,980

those chemical elements that suggests

89
00:03:31,860 --> 00:03:29,680
that on some of these planets there are

90
00:03:33,449 --> 00:03:31,870
good environments for the formation of

91
00:03:36,870 --> 00:03:33,459
life of course people are always

92
00:03:39,539 --> 00:03:36,880
interested in well can the star system

93
00:03:43,259 --> 00:03:39,549
make planets and if they make planets do

94
00:03:45,210 --> 00:03:43,269
those star systems have planets in the

95
00:03:48,180 --> 00:03:45,220
right area right temperature right

96
00:03:50,610 --> 00:03:48,190
chemistry right everything in order to

97
00:03:52,170 --> 00:03:50,620
maybe make at least microbial life now

98
00:03:53,910 --> 00:03:52,180
we're a long way away from discovering

99
00:03:57,300 --> 00:03:53,920
microbial life but that was the big

100
00:03:59,430 --> 00:03:57,310
discussion this morning I also wanted to

101
00:04:01,830 --> 00:03:59,440
say that a lot of what goes on Tony as

102
00:04:03,900 --> 00:04:01,840
you all know is there's a lot of talk in

103
00:04:06,000 --> 00:04:03,910
the hallways you meet people in the

104
00:04:08,160 --> 00:04:06,010
exhibit hall or you talk to somebody in

105
00:04:10,620 --> 00:04:08,170
the hallway you see people what's going

106
00:04:12,509 --> 00:04:10,630
on here the latest news there's a lot of

107
00:04:14,009 --> 00:04:12,519
information so it's really important to

108
00:04:16,590 --> 00:04:14,019
come to the meeting and talk to people

109
00:04:18,779 --> 00:04:16,600
so that you find out behind the scenes

110
00:04:20,310 --> 00:04:18,789
what's going on yeah when they found out

111
00:04:21,899 --> 00:04:20,320
we were live streaming all of this the

112
00:04:24,089 --> 00:04:21,909
double-a s did they were very cautious

113
00:04:24,660 --> 00:04:24,099

they were very worried but no one's

114
00:04:26,460 --> 00:04:24,670
going to come

115
00:04:28,560 --> 00:04:26,470
but it's you know nothing replaces the

116
00:04:30,330 --> 00:04:28,570
interaction really you have to come see

117
00:04:32,850 --> 00:04:30,340
the posters listen to the talks and then

118
00:04:34,740 --> 00:04:32,860
interact with people so but it's a good

119
00:04:37,950 --> 00:04:34,750
record we will have the record of these

120
00:04:40,140 --> 00:04:37,960
streaming events which is great there

121
00:04:42,300 --> 00:04:40,150
was actually an interesting throughout

122
00:04:44,460 --> 00:04:42,310
the meeting there are some a little bit

123
00:04:46,200 --> 00:04:44,470
what I would say there on topic but not

124
00:04:49,320 --> 00:04:46,210
just research and there were apparently

125
00:04:51,360 --> 00:04:49,330
was a talk today by a professor from

126
00:04:54,210 --> 00:04:51,370
George Washington University about space

127
00:04:56,130 --> 00:04:54,220
policy and his advice was trying to

128
00:05:00,450 --> 00:04:56,140
delay the landscape of where does

129
00:05:03,960 --> 00:05:00,460
astronomy fit in NASA and where does

130
00:05:06,750 --> 00:05:03,970
NASA fit in the United States or in

131
00:05:09,900 --> 00:05:06,760
general in the global space community

132
00:05:13,230 --> 00:05:09,910
and how we astronomers can make our case

133
00:05:15,210 --> 00:05:13,240
for the kind of research facilities we

134
00:05:17,400 --> 00:05:15,220
want in the future and what kind of

135
00:05:20,070 --> 00:05:17,410
problems we are trying to address out

136
00:05:21,990 --> 00:05:20,080
there so we have to base what we want to

137
00:05:24,300 --> 00:05:22,000
do on what we know today and then

138
00:05:25,890 --> 00:05:24,310

speculate G in 10 years we're going to

139
00:05:28,980 --> 00:05:25,900
need blah blah blah and we have an

140
00:05:32,190 --> 00:05:28,990
opportunity in 2020 to produce another

141
00:05:34,950 --> 00:05:32,200
decade or report on where the science is

142
00:05:36,660 --> 00:05:34,960
and what kind of facilities are going to

143
00:05:38,460 --> 00:05:36,670
be needed the astronomers do every 10

144
00:05:41,310 --> 00:05:38,470
years we do it every 10 years but the

145
00:05:43,680 --> 00:05:41,320
preparation has to be made now so that

146
00:05:45,930 --> 00:05:43,690
we can look at what what technologies we

147
00:05:47,550 --> 00:05:45,940
have to do studies all that kind so what

148
00:05:49,290 --> 00:05:47,560
did he say what did he come to any

149
00:05:51,750 --> 00:05:49,300
conclusions well what is it saying was

150
00:05:54,600 --> 00:05:51,760
that trying to think a little bit

151
00:05:59,370 --> 00:05:54,610
outside of our little bubble think how

152
00:06:02,640 --> 00:05:59,380
you make the case to two other Sciences

153
00:06:04,500 --> 00:06:02,650
why is a facility of interest to

154
00:06:06,510 --> 00:06:04,510
astronomers and why is that important

155
00:06:08,700 --> 00:06:06,520
for science in general and then why is

156
00:06:10,500 --> 00:06:08,710
it in the public interest to have those

157
00:06:12,300 --> 00:06:10,510
facilities so we can't just be thinking

158
00:06:14,790 --> 00:06:12,310
about gee I really would like to have

159
00:06:16,950 --> 00:06:14,800
another Hubble Space Telescope which we

160
00:06:20,280 --> 00:06:16,960
would love to have but we need to think

161
00:06:22,020 --> 00:06:20,290
of it in the larger view but astronomy

162
00:06:23,970 --> 00:06:22,030
is doing very well his other point is

163
00:06:25,980 --> 00:06:23,980

astronomy's doing very well because we

164
00:06:28,080 --> 00:06:25,990
do make our case and we do events like

165
00:06:28,930 --> 00:06:28,090
this share we love sharing with the

166
00:06:30,940 --> 00:06:28,940
public on what

167
00:06:33,640 --> 00:06:30,950
so NASA does have a good important part

168
00:06:35,650 --> 00:06:33,650
in a strong absolutely absolutely one

169
00:06:37,510 --> 00:06:35,660
thing that the public doesn't realize

170
00:06:39,850 --> 00:06:37,520
and I hope our viewers really do

171
00:06:44,680 --> 00:06:39,860
understand is that the NASA budget is a

172
00:06:46,450 --> 00:06:44,690
tiny percentage of the US budget people

173
00:06:48,490 --> 00:06:46,460
always think it's like the same as the

174
00:06:51,760 --> 00:06:48,500
Department of Defense it's not it is a

175
00:06:55,060 --> 00:06:51,770
tiny tiny it's it's not even a penny on

176
00:06:58,090 --> 00:06:55,070
the tax dollar for every tax dollar paid

177
00:07:00,880 --> 00:06:58,100
so it's a tiny fraction of that and we

178
00:07:03,310 --> 00:07:00,890
need to help people understand that

179
00:07:05,640 --> 00:07:03,320
those little tiny pennies are really

180
00:07:08,170 --> 00:07:05,650
going a long way for advancing science

181
00:07:11,050 --> 00:07:08,180
it's one of the things that's also sort

182
00:07:12,400 --> 00:07:11,060
of constrained the human component of

183
00:07:14,410 --> 00:07:12,410
our space flight program to but this

184
00:07:16,330 --> 00:07:14,420
budget has just been pretty flat for a

185
00:07:18,310 --> 00:07:16,340
really long exactly but we're doing okay

186
00:07:20,230 --> 00:07:18,320
we're not being cut so that's a good

187
00:07:22,240 --> 00:07:20,240
thing so we need to think about what

188
00:07:25,900 --> 00:07:22,250

we're going to do in the next 20 years

189
00:07:31,150 --> 00:07:25,910
so after the exoplanet discussion then

190
00:07:33,370 --> 00:07:31,160
of course you had a hangout on sun

191
00:07:35,860 --> 00:07:33,380
shades and exoplanets and other

192
00:07:37,810 --> 00:07:35,870
astronomical objects will benefit for

193
00:07:40,030 --> 00:07:37,820
the sunshade so maybe you were talking

194
00:07:42,610 --> 00:07:40,040
about that just a little snippet of that

195
00:07:46,030 --> 00:07:42,620
yeah sure so yeah was this that we

196
00:07:47,050 --> 00:07:46,040
talked with a project astronomer and one

197
00:07:48,940 --> 00:07:47,060
of the engineers from the starshade

198
00:07:51,310 --> 00:07:48,950
project they they've tested successfully

199
00:07:53,290 --> 00:07:51,320
in the desert the concept what they did

200
00:07:55,360 --> 00:07:53,300
was they set up a very light bright

201
00:07:57,070 --> 00:07:55,370
source in the desert and they had that

202
00:07:59,050 --> 00:07:57,080
would they had a star shade move in

203
00:08:01,300 --> 00:07:59,060
front of it and then they had their

204
00:08:04,450 --> 00:08:01,310
detectors set away kilometers away just

205
00:08:06,370 --> 00:08:04,460
from the light source and they were able

206
00:08:07,870 --> 00:08:06,380
to confirm they had several small

207
00:08:09,730 --> 00:08:07,880
planets right next to it they were able

208
00:08:11,710 --> 00:08:09,740
or light sources next to it that were

209
00:08:13,570 --> 00:08:11,720
supposed to simulate what a planet would

210
00:08:15,640 --> 00:08:13,580
look like in orbit around at that star

211
00:08:17,110 --> 00:08:15,650
and they were able to find and see those

212
00:08:19,330 --> 00:08:17,120
planets and we're talking about looking

213
00:08:21,490 --> 00:08:19,340

at something that's ten million ten

214
00:08:23,530 --> 00:08:21,500
million times brighter or dimmer than

215
00:08:25,270 --> 00:08:23,540
that then its companion star so the

216
00:08:27,760 --> 00:08:25,280
testing of the concept of star shades

217
00:08:28,990 --> 00:08:27,770
has been set they're waiting I think now

218
00:08:30,460 --> 00:08:29,000
to start they're doing to a lot of

219
00:08:33,010 --> 00:08:30,470
preliminary testing on the space-based

220
00:08:34,510 --> 00:08:33,020
hardware but Northrop Grumman ISM is

221
00:08:36,909 --> 00:08:34,520
going forward with the project it's a

222
00:08:39,579 --> 00:08:36,919
really exciting one and so that's a case

223
00:08:41,529 --> 00:08:39,589
where it's become clear that the people

224
00:08:42,550 --> 00:08:41,539
who are studying exoplanets they say

225
00:08:45,100 --> 00:08:42,560
well we need to be

226
00:08:46,600 --> 00:08:45,110
able to look for these planets really

227
00:08:48,280 --> 00:08:46,610
close to bright stars and I have a

228
00:08:50,890 --> 00:08:48,290
bright light in front of me now but if I

229
00:08:53,380 --> 00:08:50,900
put my fist up and block it I can

230
00:08:55,690 --> 00:08:53,390
actually see the rest of the ceiling and

231
00:08:58,150 --> 00:08:55,700
so this is the same idea you block out

232
00:08:59,800 --> 00:08:58,160
the the bright light of the star and you

233
00:09:02,500 --> 00:08:59,810
can see what's surrounded that also

234
00:09:04,329 --> 00:09:02,510
works in galaxies block out the bright

235
00:09:06,100 --> 00:09:04,339
light from the center see what's around

236
00:09:07,840 --> 00:09:06,110
the rest of the galaxy so it's an

237
00:09:09,970 --> 00:09:07,850
important thing where we talk about what

238
00:09:12,460 --> 00:09:09,980

the science need is and then we talk

239
00:09:14,320 --> 00:09:12,470
about okay what do we need to build in

240
00:09:17,530 --> 00:09:14,330
order to investigate these things

241
00:09:20,440 --> 00:09:17,540
further so what does she got force

242
00:09:23,560 --> 00:09:20,450
Carolingian my name show that I actually

243
00:09:25,120 --> 00:09:23,570
did go to well I went to a team meeting

244
00:09:26,800 --> 00:09:25,130
i'm on a team where we're studying a lot

245
00:09:29,829 --> 00:09:26,810
of galaxies and that was interesting

246
00:09:33,010 --> 00:09:29,839
because this team always works on

247
00:09:34,600 --> 00:09:33,020
telecon so this is and we do use webex

248
00:09:36,490 --> 00:09:34,610
and we sometimes see each other but it

249
00:09:38,500 --> 00:09:36,500
was the first time that we actually saw

250
00:09:40,390 --> 00:09:38,510
each other face-to-face so that was kind

251
00:09:43,030 --> 00:09:40,400
of fun and we got to meet each other and

252
00:09:45,700 --> 00:09:43,040
talk about each individual person's role

253
00:09:48,790 --> 00:09:45,710
in this very big project so that that I

254
00:09:50,860 --> 00:09:48,800
enjoyed quite a lot and then we had a

255
00:09:53,950 --> 00:09:50,870
press conference in the afternoon where

256
00:09:56,500 --> 00:09:53,960
we had a number of results that were

257
00:09:59,020 --> 00:09:56,510
showcased that are about the Milky Way

258
00:10:01,870 --> 00:09:59,030
galaxy and the surrounding so that would

259
00:10:05,260 --> 00:10:01,880
be the Large Magellanic Cloud the Small

260
00:10:07,840 --> 00:10:05,270
Magellanic Cloud and the Andromeda m31

261
00:10:10,720 --> 00:10:07,850
galaxy which is a companion to our so

262
00:10:12,460 --> 00:10:10,730
that girl before kind of a little

263
00:10:14,410 --> 00:10:12,470

grouped together and so the press

264
00:10:17,050 --> 00:10:14,420
release is about the kind of research

265
00:10:20,440 --> 00:10:17,060
that's been being done and some of the

266
00:10:22,720 --> 00:10:20,450
highlights are that one group has been

267
00:10:25,510 --> 00:10:22,730
looking at the center of our galaxy and

268
00:10:28,030 --> 00:10:25,520
there have been some gas clouds and some

269
00:10:30,190 --> 00:10:28,040
flaring coming from the center and

270
00:10:31,750 --> 00:10:30,200
there's a supermassive black hole there

271
00:10:33,670 --> 00:10:31,760
and they're trying to understand how the

272
00:10:35,890 --> 00:10:33,680
materials going around and what's making

273
00:10:37,720 --> 00:10:35,900
the flaring and they have lots of data

274
00:10:39,550 --> 00:10:37,730
but they haven't been able to really

275
00:10:41,350 --> 00:10:39,560
figure out what's going on so that's

276
00:10:44,290 --> 00:10:41,360
it's exciting but it's kind of confusing

277
00:10:47,050 --> 00:10:44,300
and then there's the beautiful m31

278
00:10:49,320 --> 00:10:47,060
mosaic that is being examined for star

279
00:10:52,510 --> 00:10:49,330
clusters and looking for star formation

280
00:10:55,299 --> 00:10:52,520
looking for background galaxies and that

281
00:10:59,780 --> 00:10:55,309
has 13,000 pointings and

282
00:11:03,019 --> 00:10:59,790
414 different tiles on the sky covers

283
00:11:05,359 --> 00:11:03,029
about forty percent of m31 and it's all

284
00:11:07,369 --> 00:11:05,369
Hubble data and it's amazing and it's on

285
00:11:09,189 --> 00:11:07,379
the web and you can go in and zoom in

286
00:11:12,439 --> 00:11:09,199
and zoom in and zoom in and see

287
00:11:14,599 --> 00:11:12,449
individual stars in our companion galaxy

288
00:11:16,970 --> 00:11:14,609

so that was pretty exciting there was

289
00:11:18,439 --> 00:11:16,980
somebody else who's studying bubbles

290
00:11:21,109 --> 00:11:18,449
that have shot out of our own galaxy

291
00:11:23,119 --> 00:11:21,119
from the center and have been able to

292
00:11:25,699 --> 00:11:23,129
look through those bubbles and try to

293
00:11:28,909 --> 00:11:25,709
determine where they came from why are

294
00:11:31,039 --> 00:11:28,919
they there and what the history and the

295
00:11:35,599 --> 00:11:31,049
future of those bubbles is going to be

296
00:11:41,889 --> 00:11:35,609
and then we had of course the revealing

297
00:11:44,659 --> 00:11:41,899
of them 16 pillars 20 years later and

298
00:11:45,949 --> 00:11:44,669
that presentation was made at the press

299
00:11:48,639 --> 00:11:45,959
conference and then we just had a

300
00:11:52,579 --> 00:11:48,649
hangout on that that was pretty exciting

301
00:11:54,139 --> 00:11:52,589
so I I guess we're going to be doing

302
00:11:55,159 --> 00:11:54,149
this every day Carol and I'll take a few

303
00:11:57,919 --> 00:11:55,169
minutes out well just kind of give a

304
00:11:59,119 --> 00:11:57,929
quick recap and let you know what we

305
00:12:00,979 --> 00:11:59,129
thought was interesting for the day so

306
00:12:03,139 --> 00:12:00,989
we'll be here this time tomorrow as well

307
00:12:05,239 --> 00:12:03,149
tomorrow the Hangout highlights will be

308
00:12:06,439 --> 00:12:05,249
we have are we allowed to say what it is

309
00:12:07,669 --> 00:12:06,449
we live until it but the press

310
00:12:12,049 --> 00:12:07,679
conference doesn't come out like can I

311
00:12:17,749 --> 00:12:12,059
say that I always already been out today

312
00:12:19,699 --> 00:12:17,759
oh okay so tomorrow what is website AAS

313
00:12:22,069 --> 00:12:19,709

no but we have a look but we have our

314
00:12:23,119 --> 00:12:22,079
hangout schedule our hangout our hangout

315
00:12:25,220 --> 00:12:23,129
are paying us for tomorrow we're gonna

316
00:12:27,049 --> 00:12:25,230
be talking about the the zoomable image

317
00:12:28,460 --> 00:12:27,059
that carol was just talking about we're

318
00:12:29,960 --> 00:12:28,470
going to have the team on here and we're

319
00:12:34,309 --> 00:12:29,970
going to do that in front of this

320
00:12:35,600 --> 00:12:34,319
monitor here we learned right we did

321
00:12:38,269 --> 00:12:35,610
yeah for those of you who just saw a

322
00:12:41,629 --> 00:12:38,279
recent hang out you'll know that yes

323
00:12:44,329 --> 00:12:41,639
that's right that's right this is live

324
00:12:45,859 --> 00:12:44,339
and also there will be a jwst update at

325
00:12:47,779 --> 00:12:45,869
the Northrop Grumman booth with Scott

326
00:12:50,150 --> 00:12:47,789
Willoughby and Jon Arryn ehrenberg the

327
00:12:52,309 --> 00:12:50,160
chief engineer on jwst so that'll be

328
00:12:54,439 --> 00:12:52,319
tomorrow as well and Mark clamp and

329
00:12:56,090 --> 00:12:54,449
we'll be there as well yes that'll be at

330
00:12:58,579 --> 00:12:56,100
ten-thirty in the morning pacific time

331
00:13:00,919 --> 00:12:58,589
and ours is going to be is it 330 again

332
00:13:02,779 --> 00:13:00,929
I think it's 3 330 p.m. pacific time

333
00:13:05,150 --> 00:13:02,789
tomorrow and then right after that we'll

334
00:13:06,290 --> 00:13:05,160
do a recap so we ought to look for some

335
00:13:08,480 --> 00:13:06,300
schwag

336
00:13:10,130 --> 00:13:08,490
tomorrow oh yeah I haven't done that yet

337
00:13:12,410 --> 00:13:10,140
I haven't found anything lot of schwag

338
00:13:14,690 --> 00:13:12,420

because you know but with their some

339
00:13:16,790 --> 00:13:14,700
well so we'll nose around see if we can

340
00:13:20,630 --> 00:13:16,800
find anything oh yeah we have Hubble

341
00:13:24,970 --> 00:13:20,640
yeah that's like our swag yeah I got a

342
00:13:28,130 --> 00:13:26,660
alright folks thank you guys for

343
00:13:29,330 --> 00:13:28,140
watching I hope you're getting something

344
00:13:31,040 --> 00:13:29,340
out of this we're enjoying making these

345
00:13:32,510 --> 00:13:31,050
for you please leave comments and

346
00:13:34,310 --> 00:13:32,520
questions for us anytime you want on any

347
00:13:37,760 --> 00:13:34,320
of the social media channels Twitter