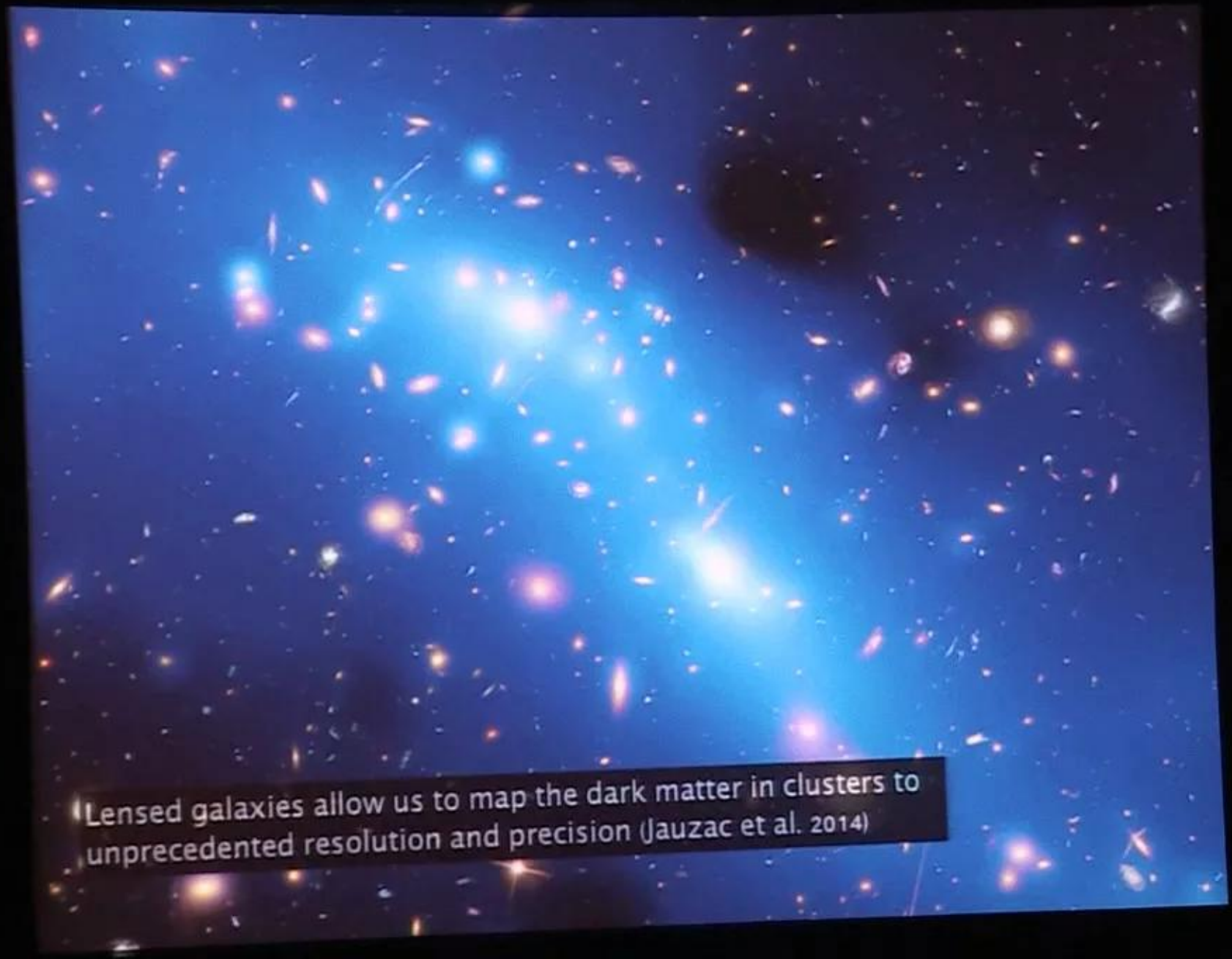
Lensed galaxies allow us to map the dark matter in clusters to
unprecedented resolution and precision (Jauzac et al. 2014)

1
00:00:07,900 --> 00:00:02,960
so thank you very much for coming for

2
00:00:12,169 --> 00:00:10,280
you're here to the bitter end and we're

3
00:00:15,410 --> 00:00:12,179
glad to have you here

4
00:00:16,760 --> 00:00:15,420
we're very we're very excited and I

5
00:00:18,830 --> 00:00:16,770
think the whole community should be

6
00:00:21,980 --> 00:00:18,840
excited that this marvellous telescope

7
00:00:25,790 --> 00:00:21,990
has lasted through to this year and this

8
00:00:29,359 --> 00:00:25,800
begins the 25th year of Hubble Space

9
00:00:31,939 --> 00:00:29,369
Telescope operations who knew it's done

10
00:00:33,889 --> 00:00:31,949
an amazing amount of science it's really

11
00:00:35,840 --> 00:00:33,899
transformed a lot of the way we do

12
00:00:39,979 --> 00:00:35,850
science as well as our thinking on many

13
00:00:42,500 --> 00:00:39,989

topics and so today as part of the

14
00:00:44,900 --> 00:00:42,510
anniversary here at the kick-off

15
00:00:47,869 --> 00:00:44,910
proceedings at the double-a s we started

16
00:00:50,930 --> 00:00:47,879
with some great press releases

17
00:00:53,720 --> 00:00:50,940
beautifully beautiful imagery and now

18
00:00:57,319 --> 00:00:53,730
with the Town Hall which is being

19
00:01:00,920 --> 00:00:57,329
recorded for posterity and also if you

20
00:01:03,470 --> 00:01:00,930
like to share with your friends that we

21
00:01:05,479 --> 00:01:03,480
did record this and we will put it on

22
00:01:07,789 --> 00:01:05,489
YouTube so it can be viewed later by

23
00:01:10,850 --> 00:01:07,799
those who were not fortunate enough to

24
00:01:14,149 --> 00:01:10,860
be here in this town hall we're going to

25
00:01:17,780 --> 00:01:14,159
have three speakers first can Sam Bach

26
00:01:21,320 --> 00:01:17,790
from Space Telescope who is the Hubble

27
00:01:23,749 --> 00:01:21,330
Space Telescope mission had that and

28
00:01:26,810 --> 00:01:23,759
he's going to review a little bit about

29
00:01:30,710 --> 00:01:26,820
where we are with HST and it's bright

30
00:01:33,230 --> 00:01:30,720
future then we're going to have Jennifer

31
00:01:35,660 --> 00:01:33,240
lots who's from Space Telescope who's

32
00:01:39,590 --> 00:01:35,670
going to talk to us about our major

33
00:01:42,980 --> 00:01:39,600
effort of large observation for the

34
00:01:45,830 --> 00:01:42,990
frontier fields and she's the PI of that

35
00:01:48,170 --> 00:01:45,840
program and some really beautiful data

36
00:01:52,580 --> 00:01:48,180
and fantastic results have come out of

37
00:01:55,280 --> 00:01:52,590
that program and then amber straw from

38
00:01:57,620 --> 00:01:55,290

NASA headquarters is going to talk to

39
00:02:00,649 --> 00:01:57,630
you about the 25th anniversary

40
00:02:03,859 --> 00:02:00,659
celebration the year of activities that

41
00:02:06,289 --> 00:02:03,869
are ongoing and how you can participate

42
00:02:08,240 --> 00:02:06,299
and I will let each speaker handoff to

43
00:02:11,500 --> 00:02:08,250
the next and then at the end we will

44
00:02:13,020 --> 00:02:11,510
have ample time for your questions and

45
00:02:15,000 --> 00:02:13,030
discussion

46
00:02:22,020 --> 00:02:15,010
thank you so first off we'll be ken-san

47
00:02:26,760 --> 00:02:22,030
Bach on what about HST today and Thank

48
00:02:27,809 --> 00:02:26,770
You Carol so yeah today I'm going to

49
00:02:29,520 --> 00:02:27,819
tell you a little bit about where we

50
00:02:31,470 --> 00:02:29,530
stand with the observatory today and

51
00:02:34,440 --> 00:02:31,480
where we're heading and heading in the

52
00:02:37,229 --> 00:02:34,450
next few years and punchline is this

53
00:02:38,309 --> 00:02:37,239
Hubble is just doing beautifully it's as

54
00:02:41,070 --> 00:02:38,319
powerful as ever

55
00:02:44,370 --> 00:02:41,080
we have excellent imaging and

56
00:02:46,710 --> 00:02:44,380
spectroscopy capabilities we're still

57
00:02:49,199 --> 00:02:46,720
doing choreography and Strama tree with

58
00:02:53,340 --> 00:02:49,209
the telescope and the observing program

59
00:02:54,900 --> 00:02:53,350
is addressing everything from exoplanet

60
00:02:58,050 --> 00:02:54,910
science to the architecture of the

61
00:03:00,540 --> 00:02:58,060
universe the science that Hubble does

62
00:03:03,750 --> 00:03:00,550
cuts across NASA's main science themes

63
00:03:07,199 --> 00:03:03,760

and as always Hubble remains a great

64
00:03:10,710 --> 00:03:07,209
Observatory multi-purpose and in my

65
00:03:12,630 --> 00:03:10,720
demand by the observing community you

66
00:03:15,600 --> 00:03:12,640
probably saw this beautiful image on

67
00:03:17,670 --> 00:03:15,610
Monday when it was released this

68
00:03:20,789 --> 00:03:17,680
original image of the Eagle Nebula was

69
00:03:24,509 --> 00:03:20,799
taken 20 years ago now our Wide Field

70
00:03:27,300 --> 00:03:24,519
Camera 3 has reimaged that field both at

71
00:03:30,509 --> 00:03:27,310
visible and at near-infrared wavelengths

72
00:03:33,600 --> 00:03:30,519
and you can see how remarkable that

73
00:03:36,270 --> 00:03:33,610
field looks both in the visible with a

74
00:03:39,090 --> 00:03:36,280
wider field of view and in the infrared

75
00:03:42,660 --> 00:03:39,100
where you can see deep into some of

76
00:03:44,340 --> 00:03:42,670
these pillars of star formation many of

77
00:03:47,759 --> 00:03:44,350
you have probably also seen the

78
00:03:52,740 --> 00:03:47,769
tremendous m31 mosaic that's outside the

79
00:03:55,710 --> 00:03:52,750
other hall that we have conference talks

80
00:03:57,750 --> 00:03:55,720
in that image is the largest image ever

81
00:04:01,440 --> 00:03:57,760
produced by the observatory both

82
00:04:03,240 --> 00:04:01,450
physically printed by the observatory as

83
00:04:04,890 --> 00:04:03,250
well as the largest mosaic we've ever

84
00:04:07,259 --> 00:04:04,900
made on the sky and that was done by

85
00:04:08,729 --> 00:04:07,269
julian del canton and heard folks here

86
00:04:10,590 --> 00:04:08,739
at the university of washington so it

87
00:04:14,670 --> 00:04:10,600
was very fitting that we were able to

88
00:04:16,289 --> 00:04:14,680

bring that mosaic here to Seattle take a

89
00:04:18,630 --> 00:04:16,299
look at that get your nose up close to

90
00:04:21,620 --> 00:04:18,640
that particular image 100 million stars

91
00:04:24,270 --> 00:04:21,630
and that image resolved it's amazing

92
00:04:26,060 --> 00:04:24,280
hobo science output continues to be

93
00:04:28,220 --> 00:04:26,070
extremely good

94
00:04:30,470 --> 00:04:28,230
past year was another excellent year

95
00:04:33,590 --> 00:04:30,480
with more than 800 papers published

96
00:04:35,750 --> 00:04:33,600
based on HST data we're running right

97
00:04:38,390 --> 00:04:35,760
around 800 papers a year or so for the

98
00:04:40,910 --> 00:04:38,400
last four or five years there have now

99
00:04:44,450 --> 00:04:40,920
been almost 13,000 papers published to

100
00:04:46,970 --> 00:04:44,460
date based on HST data and an even more

101
00:04:50,210 --> 00:04:46,980
remarkable number is that almost 13,000

102
00:04:53,990 --> 00:04:50,220
700 different people have published or

103
00:04:55,700 --> 00:04:54,000
had their names on HST papers think

104
00:04:57,830 --> 00:04:55,710
about that for a minute that's that's

105
00:05:00,290 --> 00:04:57,840
bigger than the size of the SS for sure

106
00:05:02,200 --> 00:05:00,300
and so you know Hubble is definitely

107
00:05:05,180 --> 00:05:02,210
touching generations of astronomers

108
00:05:07,220 --> 00:05:05,190
there have been more than 500 PhD theses

109
00:05:09,640 --> 00:05:07,230
based on Hubble data and right now

110
00:05:13,940 --> 00:05:09,650
approximately 40 or 50 people a year

111
00:05:18,260 --> 00:05:13,950
have PhD theses published that are based

112
00:05:20,720 --> 00:05:18,270
on Hubble data overall the observatory

113
00:05:22,310 --> 00:05:20,730

is doing extremely well the science

114
00:05:24,620 --> 00:05:22,320
instruments are all healthy and

115
00:05:26,810 --> 00:05:24,630
operating the advanced camera for

116
00:05:29,510 --> 00:05:26,820
surveys is and the Wide Field Camera 3

117
00:05:32,390 --> 00:05:29,520
both have charge transfer Corrections in

118
00:05:33,740 --> 00:05:32,400
place for their CCD cameras which is

119
00:05:36,050 --> 00:05:33,750
great because it means that we're

120
00:05:39,140 --> 00:05:36,060
actually able to rollback the aging

121
00:05:41,810 --> 00:05:39,150
clocks a bit on those cameras the cosmic

122
00:05:45,200 --> 00:05:41,820
origins spectrograph sensitivity is

123
00:05:47,030 --> 00:05:45,210
still very very good we now have very

124
00:05:50,480 --> 00:05:47,040
blue modes that get down well below

125
00:05:52,100 --> 00:05:50,490
lyman-alpha the Space Telescope imaging

126
00:05:53,330 --> 00:05:52,110
spectrograph is operating well and as I

127
00:05:56,090 --> 00:05:53,340
said before it's being used for

128
00:05:58,550 --> 00:05:56,100
choreography as well as spectroscopy and

129
00:06:00,880 --> 00:05:58,560
imaging on the main systems of the

130
00:06:03,770 --> 00:06:00,890
observatory those are also working well

131
00:06:05,840 --> 00:06:03,780
five of the six gyros are available for

132
00:06:09,050 --> 00:06:05,850
use we lost one gyro back in March of

133
00:06:10,550 --> 00:06:09,060
last year not a surprise gyros are not a

134
00:06:12,200 --> 00:06:10,560
life limiting factor for this

135
00:06:16,340 --> 00:06:12,210
Observatory we know how to run in a

136
00:06:20,750 --> 00:06:18,440
overall the thermal control the data

137
00:06:24,760 --> 00:06:20,760
management systems and so on are all in

138
00:06:26,990 --> 00:06:24,770

excellent health one interesting tidbit

139
00:06:28,850 --> 00:06:27,000
two instruments were repaired during

140
00:06:31,040 --> 00:06:28,860
servicing mission five and a half years

141
00:06:33,580 --> 00:06:31,050
ago that advanced camera for surveys and

142
00:06:36,470 --> 00:06:33,590
Space Telescope imaging spectrograph

143
00:06:39,439 --> 00:06:36,480
those failures that originally occurred

144
00:06:41,689 --> 00:06:39,449
were electronic in nature the

145
00:06:45,350 --> 00:06:41,699
astronauts installed new electronics in

146
00:06:47,689 --> 00:06:45,360
both instruments those two new

147
00:06:49,519 --> 00:06:47,699
instruments have run now on those newly

148
00:06:52,640 --> 00:06:49,529
installed electronics longer than they

149
00:06:54,379 --> 00:06:52,650
ran on the original electronics that's

150
00:06:56,659 --> 00:06:54,389
very encouraging because it suggests

151
00:06:59,209 --> 00:06:56,669
that the instruments have outlived their

152
00:07:01,279 --> 00:06:59,219
infant mortality period so it's quite

153
00:07:02,929 --> 00:07:01,289
possible even though we originally

154
00:07:04,700 --> 00:07:02,939
thought those two instruments might not

155
00:07:06,350 --> 00:07:04,710
last more than five years they may

156
00:07:11,029 --> 00:07:06,360
actually last considerably longer than

157
00:07:12,860 --> 00:07:11,039
that we'll see in looking forward the

158
00:07:15,019 --> 00:07:12,870
mission has put together what it calls a

159
00:07:16,939 --> 00:07:15,029
20/20 vision for the observatory and

160
00:07:19,339 --> 00:07:16,949
that 20/20 vision is very

161
00:07:22,459 --> 00:07:19,349
straightforward and simple is to operate

162
00:07:23,809 --> 00:07:22,469
the observatory out to 2020 or beyond so

163
00:07:26,360 --> 00:07:23,819

that there's at least a year of

164
00:07:29,209 --> 00:07:26,370
overlapping science observations with

165
00:07:30,800 --> 00:07:29,219
JWST and that's going to be performed in

166
00:07:33,230 --> 00:07:30,810
a manner that maximizes the science

167
00:07:36,829 --> 00:07:33,240
return of both observatories takes full

168
00:07:39,369 --> 00:07:36,839
advantages of HST unique capabilities

169
00:07:42,290 --> 00:07:39,379
and really addresses the community's

170
00:07:45,559 --> 00:07:42,300
scientific curiosity and engages the

171
00:07:47,869 --> 00:07:45,569
public in scientific discovery let's

172
00:07:49,489 --> 00:07:47,879
think about that for a minute if we

173
00:07:52,459 --> 00:07:49,499
operate out through the end of fiscal

174
00:07:54,829 --> 00:07:52,469
year twenty one which is cycle 28 we're

175
00:07:58,159 --> 00:07:54,839
currently in cycle 22 right now that's

176
00:08:00,850 --> 00:07:58,169
about seven cycles of observations at

177
00:08:03,589 --> 00:08:00,860
about 4,000 science orbits per cycle

178
00:08:06,050 --> 00:08:03,599
4,000 hours per cycle roughly that's

179
00:08:08,389 --> 00:08:06,060
28,000 orbits of science remaining and

180
00:08:12,260 --> 00:08:08,399
for comparison we typically have about

181
00:08:15,110 --> 00:08:12,270
20,000 hours or orbits requested each

182
00:08:16,760 --> 00:08:15,120
cycle there's clearly no loss of things

183
00:08:18,679 --> 00:08:16,770
or lack of things to do with this

184
00:08:21,529 --> 00:08:18,689
Observatory in its remaining years the

185
00:08:24,559 --> 00:08:21,539
question is what do we do and so we've

186
00:08:29,300 --> 00:08:24,569
put out a call for HST 2020 as an extra

187
00:08:34,160 --> 00:08:32,120
you never know we put out a call for

188
00:08:36,890 --> 00:08:34,170

vision white paper short white papers

189
00:08:38,180 --> 00:08:36,900
from the community just asking what is

190
00:08:39,740 --> 00:08:38,190
it that we should be doing with the

191
00:08:41,660 --> 00:08:39,750
observatory over the next five or six

192
00:08:45,110 --> 00:08:41,670
years that would enhance the scientific

193
00:08:48,020 --> 00:08:45,120
legacy those are due February 20th and

194
00:08:50,000 --> 00:08:48,030
the submission details are there those

195
00:08:51,770 --> 00:08:50,010
papers can address any aspect of a

196
00:08:54,410 --> 00:08:51,780
Hubble program so I'll put forward a

197
00:08:55,970 --> 00:08:54,420
couple of questions to you are there

198
00:08:58,520 --> 00:08:55,980
specific programs we should be

199
00:08:59,930 --> 00:08:58,530
undertaking now in preparation for JWST

200
00:09:02,780 --> 00:08:59,940
or during the period of overlapping

201
00:09:04,130 --> 00:09:02,790
observations what types of synergies

202
00:09:05,110 --> 00:09:04,140
might be available we'd like to hear

203
00:09:07,820 --> 00:09:05,120
your thoughts on that

204
00:09:10,310 --> 00:09:07,830
are there other observations from ground

205
00:09:11,900 --> 00:09:10,320
or space-based observatories that should

206
00:09:13,700 --> 00:09:11,910
be more closely linked to HST

207
00:09:15,230 --> 00:09:13,710
observations over the next few years

208
00:09:17,180 --> 00:09:15,240
should we have some kind of a reciprocal

209
00:09:21,590 --> 00:09:17,190
observing agreement like we do with nao

210
00:09:22,970 --> 00:09:21,600
nao or NRAO for example are there

211
00:09:24,680 --> 00:09:22,980
science questions that should receive

212
00:09:26,480 --> 00:09:24,690
greater emphasis over the next five

213
00:09:28,130 --> 00:09:26,490

years that's kind of a loaded question

214
00:09:31,370 --> 00:09:28,140
but we'd like to hear your thoughts on

215
00:09:35,090 --> 00:09:31,380
that and of course your rationale for

216
00:09:37,190 --> 00:09:35,100
why that should be should we devote a

217
00:09:41,210 --> 00:09:37,200
greater proportion of observing time to

218
00:09:43,010 --> 00:09:41,220
specific purposes and one that I

219
00:09:45,530 --> 00:09:43,020
mentioned earlier should we be putting

220
00:09:47,450 --> 00:09:45,540
more emphasis on making sure that

221
00:09:49,790 --> 00:09:47,460
students can finish their PhDs or use

222
00:09:50,990 --> 00:09:49,800
Hubble for their PhD thesis I think

223
00:09:53,720 --> 00:09:51,000
that's a great question to ask the

224
00:09:55,520 --> 00:09:53,730
community should we make a special

225
00:09:57,440 --> 00:09:55,530
effort to optimize the observing

226
00:10:00,620 --> 00:09:57,450
programme for transient phenomena in the

227
00:10:04,520 --> 00:10:00,630
area of pan-starrs LSST transient

228
00:10:05,900 --> 00:10:04,530
phenomena are going to be leading to all

229
00:10:09,380 --> 00:10:05,910
kinds of discoveries should we be doing

230
00:10:10,730 --> 00:10:09,390
something with Hubble to optimize their

231
00:10:13,190 --> 00:10:10,740
science return from those kinds of

232
00:10:15,770 --> 00:10:13,200
observations and given that Hubble's

233
00:10:17,570 --> 00:10:15,780
feit lifetime is finite are there

234
00:10:19,760 --> 00:10:17,580
changes the time allocation committee

235
00:10:22,670 --> 00:10:19,770
that maybe we should make not that it

236
00:10:24,140 --> 00:10:22,680
needs to be made it runs well but maybe

237
00:10:25,730 --> 00:10:24,150
there's something that we could do to

238
00:10:27,170 --> 00:10:25,740

enable quicker responses to new

239
00:10:31,640 --> 00:10:27,180
discoveries is there something that we

240
00:10:34,190 --> 00:10:31,650
should be doing let us know so we have a

241
00:10:37,210 --> 00:10:34,200
call for proposals out now that was

242
00:10:41,450 --> 00:10:37,220
released yesterday the proposals are due

243
00:10:43,280 --> 00:10:41,460
April 10th there are key features remain

244
00:10:45,079 --> 00:10:43,290
from previous

245
00:10:47,600 --> 00:10:45,089
so the ultraviolet observing initiative

246
00:10:49,940 --> 00:10:47,610
continues the medium proposal category

247
00:10:51,230 --> 00:10:49,950
continues the frontier fields which

248
00:10:53,750 --> 00:10:51,240
you'll hear about in just a moment from

249
00:10:55,670 --> 00:10:53,760
Jennifer continue and we encourage

250
00:10:58,160 --> 00:10:55,680
people to submit archival in theory in

251
00:10:59,630 --> 00:10:58,170
general observer proposals specifically

252
00:11:02,960 --> 00:10:59,640
that develops not the scientific

253
00:11:05,380 --> 00:11:02,970
landscape for JWST and help maximize its

254
00:11:07,850 --> 00:11:05,390
scientific return or can exploit

255
00:11:11,000 --> 00:11:07,860
potential of those frontier field

256
00:11:12,590 --> 00:11:11,010
programs we'll be talking with the

257
00:11:15,220 --> 00:11:12,600
community some more about this at our

258
00:11:18,980 --> 00:11:15,230
May symposium at the Institute in April

259
00:11:21,290 --> 00:11:18,990
that's the symposium devoted to looking

260
00:11:24,019 --> 00:11:21,300
not only back at the extraordinary

261
00:11:26,540 --> 00:11:24,029
impact that Hubble has had on science

262
00:11:29,449 --> 00:11:26,550
culture and society but also looking at

263
00:11:32,329 --> 00:11:29,459

how we can craft a real scientific

264
00:11:33,560 --> 00:11:32,339
legacy for the mission and to focus on

265
00:11:36,590 --> 00:11:33,570
what we should be doing in the coming

266
00:11:38,949 --> 00:11:36,600
years so in addition to the white papers

267
00:11:41,329 --> 00:11:38,959
this will be another place for people to

268
00:11:46,400 --> 00:11:41,339
convey their thoughts to us that which

269
00:11:49,150 --> 00:11:46,410
would be great now each year we do about

270
00:11:51,740 --> 00:11:49,160
40 press releases or so this is just a

271
00:11:54,590 --> 00:11:51,750
kind of an eye chart and you just look

272
00:11:58,639 --> 00:11:54,600
at the bars that on the chart and notice

273
00:12:00,949 --> 00:11:58,649
that the y-axis is millions and this is

274
00:12:03,560 --> 00:12:00,959
the potential circulation of the media

275
00:12:05,090 --> 00:12:03,570
outlets that pick up Hubble results so

276
00:12:06,710 --> 00:12:05,100
we typically measure those in hundreds

277
00:12:08,449 --> 00:12:06,720
of millions and you can see that some

278
00:12:10,910 --> 00:12:08,459
things really capture the imagination of

279
00:12:14,269 --> 00:12:10,920
the public I understand from our press

280
00:12:17,600 --> 00:12:14,279
people yesterday that the Eagle Nebula

281
00:12:19,519 --> 00:12:17,610
and m31 images that were released at the

282
00:12:21,980 --> 00:12:19,529
SS this week will probably be somewhere

283
00:12:24,980 --> 00:12:21,990
up around the 500 or 600 million mark on

284
00:12:27,490 --> 00:12:24,990
this particular kind of plot so with

285
00:12:29,980 --> 00:12:27,500
that being said let us help you

286
00:12:32,389 --> 00:12:29,990
communicate your science to the public

287
00:12:34,970 --> 00:12:32,399
alert us to the newsworthy science

288
00:12:37,250 --> 00:12:34,980

results that you have and let's get your

289
00:12:42,500 --> 00:12:37,260
let's get your science results up on to

290
00:12:46,490 --> 00:12:42,510
that chart I have one final slide and

291
00:12:50,630 --> 00:12:46,500
that is the HST budget here's the budget

292
00:12:52,699 --> 00:12:50,640
breakdown between grants and operations

293
00:12:55,540 --> 00:12:52,709
both at the Institute and at Goddard you

294
00:12:58,890 --> 00:12:55,550
can see it's roughly a third third of

295
00:13:02,080 --> 00:12:58,900
I show this for one reason and that's to

296
00:13:04,420 --> 00:13:02,090
let you know that a fair fraction of the

297
00:13:05,620 --> 00:13:04,430
money that's spent on Hubble actually

298
00:13:08,260 --> 00:13:05,630
goes out to the scientific community

299
00:13:09,970 --> 00:13:08,270
directly in the form of grants and we're

300
00:13:12,850 --> 00:13:09,980
committed as a mission to make sure that

301
00:13:14,380 --> 00:13:12,860
that continues we very much like to see

302
00:13:16,750 --> 00:13:14,390
something on the order of twenty eight

303
00:13:18,970 --> 00:13:16,760
to thirty million dollars a year from

304
00:13:21,010 --> 00:13:18,980
the mission budget being put out to the

305
00:13:23,830 --> 00:13:21,020
community directly in the form of a

306
00:13:26,170 --> 00:13:23,840
grants that help support getting the

307
00:13:29,590 --> 00:13:26,180
science out to the public and to our

308
00:13:31,030 --> 00:13:29,600
scientific colleagues so I'll leave you

309
00:13:32,050 --> 00:13:31,040
with one final slide and the thought

310
00:13:35,620 --> 00:13:32,060
from John Bacall

311
00:13:36,730 --> 00:13:35,630
Blake John Bacall we often frame our

312
00:13:38,800 --> 00:13:36,740
understanding what the Space Telescope

313
00:13:40,720 --> 00:13:38,810

will do in terms of what we expect to

314
00:13:43,090 --> 00:13:40,730
find and actually it would be terribly

315
00:13:45,460 --> 00:13:43,100
anticlimactic if in fact we find what we

316
00:13:47,050 --> 00:13:45,470
expect to find the most important

317
00:13:48,730 --> 00:13:47,060
discoveries will provide answers to

318
00:13:51,130 --> 00:13:48,740
questions that we do not yet know how to

319
00:13:53,650 --> 00:13:51,140
ask and will concern objects we have not

320
00:13:55,600 --> 00:13:53,660
yet imagined I suspect that will remain

321
00:13:57,790 --> 00:13:55,610
true throughout Hubble's lifetime and

322
00:14:18,519 --> 00:13:57,800
will almost certainly be the case in the

323
00:14:24,489 --> 00:14:22,539
okay so it's my pleasure to talk to you

324
00:14:27,039 --> 00:14:24,499
this afternoon about the frontier fields

325
00:14:29,919 --> 00:14:27,049
a major initiative using directors

326
00:14:31,659 --> 00:14:29,929
discretionary time to try to peer deeper

327
00:14:32,349 --> 00:14:31,669
into the universe than we ever have

328
00:14:34,929 --> 00:14:32,359
before

329
00:14:37,269 --> 00:14:34,939
so I'm acting as the PI of this program

330
00:14:39,039 --> 00:14:37,279
on behalf of Mount Mountain and I'm very

331
00:14:40,719 --> 00:14:39,049
privileged to work with a dedicated and

332
00:14:45,119 --> 00:14:40,729
talents a team of people at Space

333
00:14:48,999 --> 00:14:47,529
so the image in the background here is

334
00:14:52,059 --> 00:14:49,009
one that we all know and love and has

335
00:14:53,739 --> 00:14:52,069
become iconic but more than being a

336
00:14:55,979 --> 00:14:53,749
beautiful image the Hubble ultra-deep

337
00:14:57,789 --> 00:14:55,989
field has really transformed our

338
00:15:00,579 --> 00:14:57,799

understanding of the history of the

339
00:15:04,269 --> 00:15:00,589
universe and in fact it represents a

340
00:15:06,939 --> 00:15:04,279
huge investment of Hubble time so as

341
00:15:08,499 --> 00:15:06,949
this version of the observations the

342
00:15:10,779 --> 00:15:08,509
infrared observations of the Hubble

343
00:15:12,309 --> 00:15:10,789
ultra-deep field were wrapping up the

344
00:15:14,979 --> 00:15:12,319
director of Space Telescope mount

345
00:15:16,509 --> 00:15:14,989
Mountain asked the question could we top

346
00:15:18,989 --> 00:15:16,519
the Hubble ultra-deep field

347
00:15:21,609 --> 00:15:18,999
can we appear deeper into the universe

348
00:15:23,979 --> 00:15:21,619
with Hubble before the launch of the

349
00:15:26,349 --> 00:15:23,989
James Webb Space Telescope is there

350
00:15:29,589 --> 00:15:26,359
exciting D field science left to be done

351
00:15:31,119 --> 00:15:29,599
with Hubble in its remaining years so he

352
00:15:33,279 --> 00:15:31,129
posed this question to a group of

353
00:15:34,839 --> 00:15:33,289
astronomers and of course when you ask

354
00:15:36,729 --> 00:15:34,849
them could they do interesting things

355
00:15:40,689 --> 00:15:36,739
with lots of Hubble time the answer is

356
00:15:42,849 --> 00:15:40,699
usually yes and the answer they came

357
00:15:45,549 --> 00:15:42,859
back with was to use a trick you use

358
00:15:48,879 --> 00:15:45,559
gravitational lensing that is nature's

359
00:15:50,649 --> 00:15:48,889
telescopes strong lensing clusters plus

360
00:15:53,649 --> 00:15:50,659
Hubble to peer deeper into the universe

361
00:15:57,249 --> 00:15:53,659
than we have before using less exposure

362
00:15:59,949 --> 00:15:57,259
time and they propose not just looking

363
00:16:02,829 --> 00:15:59,959

at one strong lensing cluster but to

364
00:16:04,899 --> 00:16:02,839
look at six and to put turn on both of

365
00:16:06,939 --> 00:16:04,909
Hubble's primary workhorse cameras and

366
00:16:10,689 --> 00:16:06,949
use those in parallel so that you will

367
00:16:12,999 --> 00:16:10,699
get six lens fields in addition to six

368
00:16:15,099 --> 00:16:13,009
blank fields and this would add up to an

369
00:16:19,629 --> 00:16:15,109
exciting new parameter space for

370
00:16:21,909 --> 00:16:19,639
exploring the distant universe so the

371
00:16:23,829 --> 00:16:21,919
primary science goals of this program as

372
00:16:25,719 --> 00:16:23,839
outlined by that science working group

373
00:16:27,789 --> 00:16:25,729
are firstly

374
00:16:29,379 --> 00:16:27,799
simply to see deeper than we have before

375
00:16:31,540 --> 00:16:29,389
and to probe those galaxies that are

376
00:16:34,060 --> 00:16:31,550
intrinsically fainter

377
00:16:37,600 --> 00:16:34,070
anything we've seen and those galaxies

378
00:16:39,070 --> 00:16:37,610
that are that we can see at times before

379
00:16:42,040 --> 00:16:39,080
and during the epoch of reorganization

380
00:16:44,019 --> 00:16:42,050
and by going this deep we would be able

381
00:16:46,090 --> 00:16:44,029
to trace the early star formation

382
00:16:48,460 --> 00:16:46,100
histories of those galaxies small enough

383
00:16:51,759 --> 00:16:48,470
faint enough to be the early progenitors

384
00:16:53,470 --> 00:16:51,769
of our own Milky Way of course

385
00:16:55,120 --> 00:16:53,480
gravitational lensing not only makes

386
00:16:56,710 --> 00:16:55,130
things appear brighter but it stretches

387
00:16:59,110 --> 00:16:56,720
them out and so we would have the

388
00:17:01,240 --> 00:16:59,120

opportunity to study these galaxies and

389
00:17:03,730 --> 00:17:01,250
greater spatial with greater spatial

390
00:17:06,220 --> 00:17:03,740
resolution than possible with Hubble

391
00:17:08,949 --> 00:17:06,230
alone looking at their resolved

392
00:17:11,110 --> 00:17:08,959
structures their colors their sizes and

393
00:17:12,549 --> 00:17:11,120
some of these galaxies may be boosted

394
00:17:16,569 --> 00:17:12,559
enough for ground-based spectroscopic

395
00:17:18,220 --> 00:17:16,579
follow-up finally with six lens fields

396
00:17:20,650 --> 00:17:18,230
and six parallel fields we could build

397
00:17:25,179 --> 00:17:20,660
up a better statistical picture of

398
00:17:27,100 --> 00:17:25,189
galaxy formation at early times so this

399
00:17:29,500 --> 00:17:27,110
slide is my one slide summary of our

400
00:17:31,030 --> 00:17:29,510
observing program all of these

401
00:17:33,010 --> 00:17:31,040
observations with Hubble are beyond

402
00:17:35,680 --> 00:17:33,020
being done with directors discretionary

403
00:17:38,919 --> 00:17:35,690
time and so for each cluster parallel

404
00:17:43,390 --> 00:17:38,929
pointing we are dedicating 140 HST

405
00:17:46,000 --> 00:17:43,400
orbits using both the ACS optical imager

406
00:17:49,169 --> 00:17:46,010
and the wide field Infrared channel in

407
00:17:52,180 --> 00:17:49,179
parallel obtaining optical and infrared

408
00:17:55,360 --> 00:17:52,190
images and seven bands going down to

409
00:17:57,130 --> 00:17:55,370
27th magnitude and our observing plan is

410
00:17:58,960 --> 00:17:57,140
such that we're looking at two of these

411
00:18:01,890 --> 00:17:58,970
clusters per year spread out over three

412
00:18:04,659 --> 00:18:01,900
years for a total of 840 orbits a

413
00:18:06,880 --> 00:18:04,669

spitzer has also dedicated a major chunk

414
00:18:09,310 --> 00:18:06,890
of its directors discretionary time and

415
00:18:11,140 --> 00:18:09,320
so for every cluster and blank field

416
00:18:13,659 --> 00:18:11,150
pointing they will be exceptionally deep

417
00:18:16,210 --> 00:18:13,669
Iraq channel 1 and channel 2 imaging and

418
00:18:17,980 --> 00:18:16,220
all of this data is public the raw data

419
00:18:20,890 --> 00:18:17,990
is public and we're working very hard at

420
00:18:25,630 --> 00:18:20,900
Space Telescope to produce high quality

421
00:18:28,720 --> 00:18:25,640
science images as well so these are our

422
00:18:31,510 --> 00:18:28,730
six frontier fields the clusters and

423
00:18:33,880 --> 00:18:31,520
these were selected in consultation with

424
00:18:36,430 --> 00:18:33,890
the community primarily based on the

425
00:18:37,870 --> 00:18:36,440
known lensing strength at the time but

426
00:18:40,060 --> 00:18:37,880
also on their locate based on their

427
00:18:42,130 --> 00:18:40,070
location in the sky how dark was the

428
00:18:45,420 --> 00:18:42,140
background and whether or not there was

429
00:18:46,890 --> 00:18:45,430
any ancillary data available

430
00:18:49,460 --> 00:18:46,900
and I'll just highlight our last two

431
00:18:51,600 --> 00:18:49,470
clusters recently these were approved

432
00:18:54,570 --> 00:18:51,610
and we'll be going forward with the

433
00:18:56,370 --> 00:18:54,580
observations for these in cycle 23 and I

434
00:18:57,930 --> 00:18:56,380
recommend you take a look at at the call

435
00:19:00,150 --> 00:18:57,940
for proposals that went out yesterday

436
00:19:04,470 --> 00:19:00,160
for more details about how to use these

437
00:19:06,420 --> 00:19:04,480
for your science so this is a beautiful

438
00:19:08,370 --> 00:19:06,430

image which may be familiar to you it's

439
00:19:10,920 --> 00:19:08,380
been shown a few times around at the

440
00:19:14,670 --> 00:19:10,930
double-a s meeting this year this is our

441
00:19:16,440 --> 00:19:14,680
first cluster Abell 2744 all of the data

442
00:19:18,390 --> 00:19:16,450
is in hand for this cluster you can go

443
00:19:20,040 --> 00:19:18,400
to our website get the raw data get to

444
00:19:23,220 --> 00:19:20,050
the reduced data get lots of beautiful

445
00:19:25,980 --> 00:19:23,230
images but I also like to show an

446
00:19:30,420 --> 00:19:25,990
amped-up version of this image so this

447
00:19:33,150 --> 00:19:30,430
is the infrared version of a bell 27:44

448
00:19:35,100 --> 00:19:33,160
with the stretch maximized to show just

449
00:19:37,200 --> 00:19:35,110
how deep we're really going when we look

450
00:19:38,970 --> 00:19:37,210
at this cluster so if you're a cluster

451
00:19:40,650 --> 00:19:38,980
scientist you'll see we've got lots of

452
00:19:43,110 --> 00:19:40,660
inter cluster light you can see the

453
00:19:45,540 --> 00:19:43,120
tidal features of cluster galaxies that

454
00:19:47,130 --> 00:19:45,550
are interacting with each other and if

455
00:19:48,660 --> 00:19:47,140
you were to zoom in very close in this

456
00:19:51,330 --> 00:19:48,670
image you'll see we'll are also finding

457
00:19:53,130 --> 00:19:51,340
lots of little faint red galaxies in the

458
00:19:59,700 --> 00:19:53,140
background which of course is one of the

459
00:20:02,160 --> 00:19:59,710
primary goals of this program to

460
00:20:03,780 --> 00:20:02,170
interpret this image you need to have an

461
00:20:07,170 --> 00:20:03,790
understanding of the optics of the

462
00:20:08,910 --> 00:20:07,180
cluster so we've gotten a number of

463
00:20:10,830 --> 00:20:08,920

modelers from the community to provide

464
00:20:13,290 --> 00:20:10,840
us their best models for the maps of the

465
00:20:15,810 --> 00:20:13,300
dark matter and the lensing strengths of

466
00:20:18,000 --> 00:20:15,820
these clusters so shown in blue overlaid

467
00:20:19,710 --> 00:20:18,010
in blue is that blue is an estimate of

468
00:20:23,220 --> 00:20:19,720
the Dark Matter mass distribution in the

469
00:20:25,490 --> 00:20:23,230
cluster and in red is the critical curve

470
00:20:28,410 --> 00:20:25,500
so those areas of highest magnification

471
00:20:31,290 --> 00:20:28,420
so background galaxies that that are

472
00:20:33,810 --> 00:20:31,300
fall behind those critical lines can be

473
00:20:36,930 --> 00:20:33,820
magnified by factors up to a 10 or even

474
00:20:39,090 --> 00:20:36,940
100 and it's along those let those red

475
00:20:44,070 --> 00:20:39,100
regions where we are getting the deepest

476
00:20:46,530 --> 00:20:44,080
ever views into the universe so we've

477
00:20:48,480 --> 00:20:46,540
been going along here for over a year

478
00:20:51,330 --> 00:20:48,490
now and I'm pleased to say we have some

479
00:20:53,400 --> 00:20:51,340
very exciting science results we have in

480
00:20:55,920 --> 00:20:53,410
fact detected one of the most distant

481
00:20:57,600 --> 00:20:55,930
and intrinsically faintest objects so

482
00:21:00,420 --> 00:20:57,610
this is a redshift 10

483
00:21:03,330 --> 00:21:00,430
galaxy candidate which is triply imaged

484
00:21:04,590 --> 00:21:03,340
by this cluster and so one of the

485
00:21:07,170 --> 00:21:04,600
reasons why we think this is such a

486
00:21:09,240 --> 00:21:07,180
secure candidate for a redshift n object

487
00:21:11,880 --> 00:21:09,250
is not just the fact that has extremely

488
00:21:14,310 --> 00:21:11,890

red colors but where it lies relative to

489
00:21:16,530 --> 00:21:14,320
those critical curves its position it

490
00:21:19,020 --> 00:21:16,540
positions in this image provide further

491
00:21:23,400 --> 00:21:19,030
evidence of it being at an exceptionally

492
00:21:25,800 --> 00:21:23,410
high redshift so this is our second

493
00:21:27,630 --> 00:21:25,810
cluster Maxima for 1/6 all of the data

494
00:21:31,050 --> 00:21:27,640
for this cluster is also in hand

495
00:21:33,840 --> 00:21:31,060
unavailable and available online and

496
00:21:36,000 --> 00:21:33,850
these first two HST frontier fields and

497
00:21:37,770 --> 00:21:36,010
their parallels have have really been a

498
00:21:39,450 --> 00:21:37,780
success they've dramatically increased

499
00:21:43,290 --> 00:21:39,460
the number of intrinsically faint

500
00:21:46,950 --> 00:21:43,300
galaxies known to be in the first

501
00:21:49,740 --> 00:21:46,960
billion years of the universe why is

502
00:21:51,960 --> 00:21:49,750
this important well this is a result

503
00:21:55,290 --> 00:21:51,970
from a very recent paper looking just at

504
00:21:58,500 --> 00:21:55,300
the first cluster Abell 2744 this is a

505
00:22:01,230 --> 00:21:58,510
redshift 7 UV luminosity function I show

506
00:22:03,030 --> 00:22:01,240
with a black arrow the limit for the

507
00:22:04,620 --> 00:22:03,040
Hubble ultra-deep field and you can see

508
00:22:07,500 --> 00:22:04,630
we're going several magnitudes fainter

509
00:22:09,150 --> 00:22:07,510
than that one of the reasons why you

510
00:22:10,890 --> 00:22:09,160
know we're not just posted we're not

511
00:22:12,840 --> 00:22:10,900
just collecting little faint galaxies

512
00:22:15,360 --> 00:22:12,850
this is actually quite important because

513
00:22:17,730 --> 00:22:15,370

understanding how many faint galaxies

514
00:22:20,250 --> 00:22:17,740
they are can help us count up the number

515
00:22:21,870 --> 00:22:20,260
of photons that could contribute to the

516
00:22:24,540 --> 00:22:21,880
reionization of the universe at this

517
00:22:26,250 --> 00:22:24,550
epoch so as we go forward and we collect

518
00:22:28,140 --> 00:22:26,260
the rest of the clusters we'll be able

519
00:22:29,550 --> 00:22:28,150
to place incredibly good constraints on

520
00:22:31,950 --> 00:22:29,560
the slope of the faint end of the

521
00:22:35,880 --> 00:22:31,960
luminosity function during the era of

522
00:22:37,500 --> 00:22:35,890
reionisation of course there's lots and

523
00:22:39,180 --> 00:22:37,510
lots of other science that can be done

524
00:22:40,830 --> 00:22:39,190
with these images and I think that's one

525
00:22:43,710 --> 00:22:40,840
of the more exciting aspects of the

526
00:22:45,060 --> 00:22:43,720
program you know it's not just redshift

527
00:22:47,040 --> 00:22:45,070
10 galaxies that are interesting

528
00:22:49,260 --> 00:22:47,050
galaxies at cosmic high noon at rest

529
00:22:50,580 --> 00:22:49,270
just one to four will also be magnified

530
00:22:52,830 --> 00:22:50,590
and stretched and we can do

531
00:22:56,040 --> 00:22:52,840
groundbreaking science with those images

532
00:22:57,690 --> 00:22:56,050
on the clusters themselves will be you

533
00:22:59,850 --> 00:22:57,700
know can be studied in great detail

534
00:23:01,350 --> 00:22:59,860
we'll be able to map out the dark matter

535
00:23:04,500 --> 00:23:01,360
and the substructure within those

536
00:23:06,750 --> 00:23:04,510
clusters to unprecedented levels study

537
00:23:09,030 --> 00:23:06,760
the cluster galaxies the dwarfs and

538
00:23:10,840 --> 00:23:09,040

inter cluster light and some of the most

539
00:23:12,730 --> 00:23:10,850
exciting science is coming out of the

540
00:23:14,590 --> 00:23:12,740
franzine science looking for supernovae

541
00:23:17,560 --> 00:23:14,600
in these fields and there are lots of

542
00:23:20,950 --> 00:23:17,570
other things on going i'll just note

543
00:23:23,190 --> 00:23:20,960
that we have three geo programs that are

544
00:23:27,340 --> 00:23:23,200
getting ancillary data on these these

545
00:23:29,830 --> 00:23:27,350
clusters in the UV with the wif c3i are

546
00:23:32,080 --> 00:23:29,840
grism and then Steve Rodney's program

547
00:23:33,940 --> 00:23:32,090
which is a t oo program to follow up any

548
00:23:36,700 --> 00:23:33,950
exciting transients and there's

549
00:23:39,100 --> 00:23:36,710
something like 10 or 11 HST archival and

550
00:23:41,560 --> 00:23:39,110
theory programs from cycle 21 and 22

551
00:23:44,140 --> 00:23:41,570
that are dedicated to doing science with

552
00:23:46,030 --> 00:23:44,150
these data and so I encourage you to

553
00:23:47,530 --> 00:23:46,040
look again at the call for proposals and

554
00:23:52,000 --> 00:23:47,540
think about what you might want to do

555
00:23:55,270 --> 00:23:52,010
for cycle 23 I mentioned Dark Matter as

556
00:23:57,310 --> 00:23:55,280
one of the things that you can do and

557
00:23:59,140 --> 00:23:57,320
these data are also going to be

558
00:24:00,550 --> 00:23:59,150
transformative in our understanding of

559
00:24:02,890 --> 00:24:00,560
the Dark Matter distribution and

560
00:24:05,350 --> 00:24:02,900
clusters the fact that we are going so

561
00:24:08,440 --> 00:24:05,360
deep provides many multiplied image

562
00:24:10,050 --> 00:24:08,450
galaxies which provides allows us to map

563
00:24:13,120 --> 00:24:10,060

out the dark matter to unprecedented

564
00:24:14,710 --> 00:24:13,130
resolution and precision and so this is

565
00:24:18,070 --> 00:24:14,720
a map of the Dark Matter distribution

566
00:24:22,360 --> 00:24:18,080
made by Mathilde jazak earlier or last

567
00:24:24,310 --> 00:24:22,370
year this is our third cluster max oh

568
00:24:26,710 --> 00:24:24,320
seven one seven we're about halfway done

569
00:24:29,500 --> 00:24:26,720
with this cluster this image is of the

570
00:24:33,220 --> 00:24:29,510
ACS optical we're going to start getting

571
00:24:35,140 --> 00:24:33,230
the whiff c3 IR in a few weeks here we

572
00:24:36,820 --> 00:24:35,150
as of yesterday we're officially halfway

573
00:24:39,190 --> 00:24:36,830
complete with our frontier field

574
00:24:40,900 --> 00:24:39,200
observations and as I said those last

575
00:24:44,050 --> 00:24:40,910
two clusters and parallels are approved

576
00:24:46,810 --> 00:24:44,060
for next year's observations so this is

577
00:24:50,740 --> 00:24:46,820
the cluster that we were getting data

578
00:24:52,870 --> 00:24:50,750
for yesterday max 11:49 we completed the

579
00:24:55,930 --> 00:24:52,880
whiff c3 our observations will start

580
00:24:57,700 --> 00:24:55,940
again in April with ACS the background

581
00:25:00,100 --> 00:24:57,710
image here is beautiful but not quite as

582
00:25:02,050 --> 00:25:00,110
deep as our frontier fields will be this

583
00:25:04,930 --> 00:25:02,060
is taken from The Clash survey of a few

584
00:25:06,910 --> 00:25:04,940
years ago and I'm just going to zoom in

585
00:25:09,760 --> 00:25:06,920
here on the center of this cluster and

586
00:25:12,400 --> 00:25:09,770
sort of highlight this spiral galaxy in

587
00:25:14,230 --> 00:25:12,410
the middle so this is a spiral galaxy

588
00:25:17,170 --> 00:25:14,240

that's a background galaxy behind the

589
00:25:18,159 --> 00:25:17,180
cluster one of its arms as being lens by

590
00:25:20,409 --> 00:25:18,169
that one of the

591
00:25:23,950 --> 00:25:20,419
little red cluster galaxies in the

592
00:25:26,379 --> 00:25:23,960
middle and this object has been a source

593
00:25:27,789 --> 00:25:26,389
of one of the most unexpected things I

594
00:25:29,619 --> 00:25:27,799
think is coming out of the frontier

595
00:25:31,629 --> 00:25:29,629
fields so for any of the press in the

596
00:25:34,539 --> 00:25:31,639
audience this is embargoed but I just

597
00:25:36,669 --> 00:25:34,549
had to share these images see Rodney

598
00:25:40,180 --> 00:25:36,679
talked about this yesterday at the

599
00:25:42,430 --> 00:25:40,190
frontier fields hyperwall so the so this

600
00:25:44,560 --> 00:25:42,440
an object I said the this cluster was

601
00:25:47,619 --> 00:25:44,570
observed in 2011 as part of the clash

602
00:25:50,919 --> 00:25:47,629
program glass which is the grism program

603
00:25:52,690 --> 00:25:50,929
went back in November and the supernova

604
00:25:54,460 --> 00:25:52,700
team including Patrick Kelly and Steve

605
00:25:57,909 --> 00:25:54,470
Rodney were looking at these images and

606
00:26:02,349 --> 00:25:57,919
bam a pop not one not two not three but

607
00:26:04,450 --> 00:26:02,359
four images and they were incredibly

608
00:26:06,970 --> 00:26:04,460
lucky because we were about to start our

609
00:26:09,729 --> 00:26:06,980
seven week observing campaign getting

610
00:26:12,430 --> 00:26:09,739
seventy orbits on this cluster shortly

611
00:26:14,259 --> 00:26:12,440
thereafter so this object is actually

612
00:26:16,210 --> 00:26:14,269
the first detected multiply image

613
00:26:19,840 --> 00:26:16,220

supernova if christened its supernova

614
00:26:23,710 --> 00:26:19,850
ref stall after a seminal paper but

615
00:26:25,810 --> 00:26:23,720
that's not all so the arm of this spiral

616
00:26:27,879 --> 00:26:25,820
is being multiplied imaged by that

617
00:26:31,239 --> 00:26:27,889
little red galaxy but the spiral galaxy

618
00:26:33,340 --> 00:26:31,249
itself appears multiple times as well so

619
00:26:37,629 --> 00:26:33,350
there are three more images of that

620
00:26:39,489 --> 00:26:37,639
spiral arm in the in this cluster and we

621
00:26:41,799 --> 00:26:39,499
think that that super manova may have

622
00:26:44,320 --> 00:26:41,809
appeared several times before and will

623
00:26:46,629 --> 00:26:44,330
appear again so the light from this

624
00:26:48,580 --> 00:26:46,639
supernova has traveled seven has

625
00:26:51,700 --> 00:26:48,590
traveled or will travel seven separate

626
00:26:56,769 --> 00:26:51,710
paths around max 11:49 on its way to

627
00:26:59,919 --> 00:26:56,779
earth so just to summarize here with the

628
00:27:01,779 --> 00:26:59,929
ways that you can use this data as I

629
00:27:03,759 --> 00:27:01,789
said we had the raw data the science

630
00:27:07,119 --> 00:27:03,769
quality data and lensing maps are all

631
00:27:08,919 --> 00:27:07,129
public on mast and on our website we're

632
00:27:10,960 --> 00:27:08,929
done with the first two clusters we're

633
00:27:12,519 --> 00:27:10,970
halfway through with the second two

634
00:27:14,979 --> 00:27:12,529
clusters and they're breaking new

635
00:27:17,320 --> 00:27:14,989
frontiers left and right we had a

636
00:27:18,789 --> 00:27:17,330
successful midterm review and we're

637
00:27:21,759 --> 00:27:18,799
going forward with those last two

638
00:27:23,529 --> 00:27:21,769

clusters in cycle 23 and we're also

639
00:27:25,509 --> 00:27:23,539
thinking about providing additional

640
00:27:28,479 --> 00:27:25,519
funding opportunities for updating and

641
00:27:30,249 --> 00:27:28,489
improving the lensing models I didn't

642
00:27:31,300 --> 00:27:30,259
have any time to talk about Spitzer and

643
00:27:33,340 --> 00:27:31,310
Chandra but this

644
00:27:34,630 --> 00:27:33,350
Iraq observations for those last two

645
00:27:37,330 --> 00:27:34,640
clusters are underway

646
00:27:39,490 --> 00:27:37,340
Chandra there's lots of observations

647
00:27:42,820 --> 00:27:39,500
being done by Steve Murray and by

648
00:27:44,680 --> 00:27:42,830
Christine Jones foreman and in August at

649
00:27:46,750 --> 00:27:44,690
the IU there will be a several day

650
00:28:22,500 --> 00:27:46,760
workshop highlighting the frontier

651
00:28:28,470 --> 00:28:25,230
okay well the 25th anniversary of Hubble

652
00:28:31,230 --> 00:28:28,480
is obviously a huge milestone and we

653
00:28:34,110 --> 00:28:31,240
have an entire year of activities and

654
00:28:36,780 --> 00:28:34,120
events and programs planned starting

655
00:28:38,970 --> 00:28:36,790
really here at this meeting you've all

656
00:28:41,940 --> 00:28:38,980
seen all the great press that's come out

657
00:28:43,890 --> 00:28:41,950
all the the hype on social media from

658
00:28:46,230 --> 00:28:43,900
the release of the images this week so

659
00:28:48,330 --> 00:28:46,240
things are really kicking off this week

660
00:28:50,760 --> 00:28:48,340
for this year of celebration so I just

661
00:28:52,590 --> 00:28:50,770
wanted to highlight some of the our

662
00:28:55,440 --> 00:28:52,600
high-level plans and some of the the

663
00:28:57,000 --> 00:28:55,450

specifics that we have going on in the

664
00:29:01,380 --> 00:28:57,010
next year to celebrate Hubble's 25th

665
00:29:04,110 --> 00:29:01,390
anniversary so in a high level and we're

666
00:29:07,020 --> 00:29:04,120
sort of going on the the broad basic

667
00:29:09,360 --> 00:29:07,030
themes of celebrating this past quarter

668
00:29:12,120 --> 00:29:09,370
century of discovery and inspiration and

669
00:29:15,180 --> 00:29:12,130
really the effect on culture that Hubble

670
00:29:17,909 --> 00:29:15,190
has had and we want to not only look to

671
00:29:20,250 --> 00:29:17,919
the past but we want to also emphasize

672
00:29:22,140 --> 00:29:20,260
that the Hubble is going strong we

673
00:29:24,840 --> 00:29:22,150
expect it to last out till 2020 maybe

674
00:29:29,400 --> 00:29:24,850
longer and then of course emphasized

675
00:29:31,620 --> 00:29:29,410
Hubble's successor JWST and again sort

676
00:29:33,539 --> 00:29:31,630
of taking taking advantage of the fact

677
00:29:35,970 --> 00:29:33,549
that the Hubble is really infiltrated

678
00:29:38,250 --> 00:29:35,980
our culture in all these different

679
00:29:41,010 --> 00:29:38,260
realms we want to get out that message

680
00:29:42,570 --> 00:29:41,020
and be be really promoting the the idea

681
00:29:44,610 --> 00:29:42,580
that Hubble is the people's telescope

682
00:29:47,400 --> 00:29:44,620
it's not just a tool for astronomers

683
00:29:49,590 --> 00:29:47,410
that it's something that the public that

684
00:29:51,570 --> 00:29:49,600
our society can can celebrate and we

685
00:29:54,840 --> 00:29:51,580
also want to talk about how Hubble is a

686
00:29:57,330 --> 00:29:54,850
human story you know the the science

687
00:29:59,700 --> 00:29:57,340
that we do we people do the science and

688
00:30:01,650 --> 00:29:59,710

in addition to that of course Hubble has

689
00:30:03,480 --> 00:30:01,660
the great legacy of having had

690
00:30:05,730 --> 00:30:03,490
astronauts go to service it and that's a

691
00:30:06,960 --> 00:30:05,740
story that really resonates with the

692
00:30:09,180 --> 00:30:06,970
public and so we really want to

693
00:30:12,650 --> 00:30:09,190
emphasize the the human side of Hubble

694
00:30:14,610 --> 00:30:12,660
all along through the next year and so

695
00:30:18,450 --> 00:30:14,620
anytime we're doing these sort of

696
00:30:20,039 --> 00:30:18,460
outreach communications plans we take an

697
00:30:21,570 --> 00:30:20,049
audience based approach to make sure

698
00:30:23,330 --> 00:30:21,580
that what we're getting out is

699
00:30:25,950 --> 00:30:23,340
appropriate for the different audiences

700
00:30:27,720 --> 00:30:25,960
we really want to celebrate and engage

701
00:30:29,940 --> 00:30:27,730
what John Grunsfeld calls the Hubble

702
00:30:32,159 --> 00:30:29,950
generation so this generation of people

703
00:30:33,990 --> 00:30:32,169
25 and younger that have grown up with

704
00:30:34,799 --> 00:30:34,000
Hubble always having been in space and

705
00:30:37,710 --> 00:30:34,809
so

706
00:30:41,159 --> 00:30:37,720
we really want to emphasize on to that

707
00:30:42,930 --> 00:30:41,169
generation in our outreach events so we

708
00:30:46,440 --> 00:30:42,940
have a whole year of events and programs

709
00:30:48,960 --> 00:30:46,450
and products and we have of course along

710
00:30:50,669 --> 00:30:48,970
with the the specific discrete events we

711
00:30:52,980 --> 00:30:50,679
have a really robust social media and

712
00:30:54,720 --> 00:30:52,990
traditional media outreach plan which

713
00:30:57,480 --> 00:30:54,730

again has already started really in

714
00:31:00,330 --> 00:30:57,490
earnest this week our audience based

715
00:31:04,919 --> 00:31:00,340
approach is what you would expect of

716
00:31:07,889 --> 00:31:04,929
course we are celebrating and and really

717
00:31:09,930 --> 00:31:07,899
trying to to get the message out about

718
00:31:12,419 --> 00:31:09,940
that the team that built Hubble and the

719
00:31:15,450 --> 00:31:12,429
teams of scientists that have have used

720
00:31:17,399 --> 00:31:15,460
Hubble over the past 25 years and and of

721
00:31:19,710 --> 00:31:17,409
course the public is a big target of our

722
00:31:21,299 --> 00:31:19,720
outreach as always we really want to

723
00:31:24,299 --> 00:31:21,309
focus on on getting to non-traditional

724
00:31:25,950 --> 00:31:24,309
audiences you know there's a whole host

725
00:31:27,779 --> 00:31:25,960
of people out there that are already big

726
00:31:29,759 --> 00:31:27,789
NASA fans and we're glad about that

727
00:31:31,980 --> 00:31:29,769
we're happy about that we want to reach

728
00:31:35,430 --> 00:31:31,990
into some more audiences that might not

729
00:31:37,499 --> 00:31:35,440
already sort of be our fans and try to

730
00:31:40,289 --> 00:31:37,509
reach out to them and to get them

731
00:31:42,419 --> 00:31:40,299
engaged in the Hubble celebrations and

732
00:31:44,789 --> 00:31:42,429
then of course we have a very robust

733
00:31:47,100 --> 00:31:44,799
plan to reach out to teachers and

734
00:31:48,779 --> 00:31:47,110
students in the classroom which the

735
00:31:51,749 --> 00:31:48,789
Space Telescope Science Institute has a

736
00:31:53,489 --> 00:31:51,759
really great an excellent team that has

737
00:31:55,680 --> 00:31:53,499
been doing that for many years already

738
00:31:58,619 --> 00:31:55,690

and so we're just going to incorporate

739
00:32:00,600 --> 00:31:58,629
Hubble 25th into all of the great things

740
00:32:02,190 --> 00:32:00,610
that that Space Telescope does over the

741
00:32:04,289 --> 00:32:02,200
next year and then of course there's our

742
00:32:07,409 --> 00:32:04,299
external stakeholders or friends on

743
00:32:09,359 --> 00:32:07,419
Capitol Hill and our corporate partners

744
00:32:11,759 --> 00:32:09,369
that will be involved in a lot of these

745
00:32:14,999 --> 00:32:11,769
things as well this is all a big

746
00:32:16,169 --> 00:32:15,009
collaboration between NASA ISA obviously

747
00:32:19,230 --> 00:32:16,179
the Space Telescope Science Institute

748
00:32:22,049 --> 00:32:19,240
and then our external partners and also

749
00:32:24,330 --> 00:32:22,059
our have have a big role in a lot of our

750
00:32:25,950 --> 00:32:24,340
events as well so when I tell you about

751
00:32:27,210 --> 00:32:25,960
some of the specific things that we have

752
00:32:29,340 --> 00:32:27,220
planned and this is just going to

753
00:32:30,960 --> 00:32:29,350
scratch the surface of everything and

754
00:32:33,950 --> 00:32:30,970
just keep in mind again that everything

755
00:32:36,840 --> 00:32:33,960
that we do is going to be amplified by

756
00:32:38,759 --> 00:32:36,850
traditional and social media so the

757
00:32:40,889 --> 00:32:38,769
first big thing of course is a

758
00:32:43,889 --> 00:32:40,899
celebration event at the National Air

759
00:32:45,079 --> 00:32:43,899
and Space Museum in Washington DC so we

760
00:32:47,809 --> 00:32:45,089
have the

761
00:32:49,579 --> 00:32:47,819
the evenings secured on April 24th which

762
00:32:52,729 --> 00:32:49,589
is of course the launch anniversary and

763
00:32:55,729 --> 00:32:52,739

so that will be a large event to to

764
00:32:59,269 --> 00:32:55,739
celebrate to celebrate the launch and in

765
00:33:00,439 --> 00:32:59,279
addition to to that event IMAX has

766
00:33:02,689 --> 00:33:00,449
confirmed that they're going to

767
00:33:04,699 --> 00:33:02,699
re-release Hubble 3d in the month of

768
00:33:06,709 --> 00:33:04,709
April of this year so if you haven't

769
00:33:09,349 --> 00:33:06,719
seen that be sure to check out your

770
00:33:12,109 --> 00:33:09,359
local IMAX and it's a really great film

771
00:33:13,999 --> 00:33:12,119
so one of the things that we wanted to

772
00:33:16,069 --> 00:33:14,009
do for that event obviously only a

773
00:33:18,259 --> 00:33:16,079
certain number of people can attend it

774
00:33:21,919 --> 00:33:18,269
so we are planning to webcast that event

775
00:33:23,749 --> 00:33:21,929
and then have science centers planet

776
00:33:26,029 --> 00:33:23,759
area and all the NASA centers sort of

777
00:33:28,099 --> 00:33:26,039
host their own satellite sort of

778
00:33:29,869 --> 00:33:28,109
birthday parties for Hubble around the

779
00:33:32,749 --> 00:33:29,879
webcast and then kind of put their own

780
00:33:34,789 --> 00:33:32,759
Flair on whatever they want to do as to

781
00:33:37,219 --> 00:33:34,799
have their own localized event so we're

782
00:33:39,709 --> 00:33:37,229
envisioning you know a nationwide and

783
00:33:43,729 --> 00:33:39,719
even a worldwide celebration on that day

784
00:33:46,549 --> 00:33:43,739
of the launch anniversary so in addition

785
00:33:48,529 --> 00:33:46,559
to that all the NASA centers are engaged

786
00:33:50,089 --> 00:33:48,539
in the anniversary and they all have

787
00:33:52,759 --> 00:33:50,099
their again their different sort of spin

788
00:33:55,039 --> 00:33:52,769

that they'll put on on Hubble um a lot

789
00:33:57,889 --> 00:33:55,049
of the center's have besides Goddard

790
00:34:00,169 --> 00:33:57,899
obviously Goddard a big Center but many

791
00:34:01,759 --> 00:34:00,179
of the NASA centers had had parts in in

792
00:34:04,759 --> 00:34:01,769
the development of Hubble and the

793
00:34:06,919 --> 00:34:04,769
engineering especially so we're getting

794
00:34:09,019 --> 00:34:06,929
all the NASA centers engaged and they

795
00:34:11,329 --> 00:34:09,029
have their own sort of events plan in

796
00:34:15,529 --> 00:34:11,339
addition to the April 24th sort of

797
00:34:17,960 --> 00:34:15,539
Keystone event we're working on a big

798
00:34:21,139 --> 00:34:17,970
event the next day on April 25th that's

799
00:34:23,180 --> 00:34:21,149
Saturday at var hozy many of the

800
00:34:24,649 --> 00:34:23,190
astronauts the servicing mission and

801
00:34:26,779 --> 00:34:24,659
deployment astronauts will be in town

802
00:34:28,339 --> 00:34:26,789
for the event on the 24th so we wanted

803
00:34:30,680 --> 00:34:28,349
to take that great opportunity while we

804
00:34:33,319 --> 00:34:30,690
have all the astronauts in town to come

805
00:34:35,240 --> 00:34:33,329
up and have a big public event so we're

806
00:34:38,089 --> 00:34:35,250
working with the Smithsonian to to plan

807
00:34:40,549 --> 00:34:38,099
a big public event on that Saturday the

808
00:34:42,829 --> 00:34:40,559
25th attitude raha Zi with astronauts so

809
00:34:44,359 --> 00:34:42,839
that should be a lot of fun and we'll

810
00:34:48,710 --> 00:34:44,369
also look into the possibility of doing

811
00:34:52,190 --> 00:34:48,720
some webcast of that event as well New

812
00:34:54,200 --> 00:34:52,200
York City is very interested and already

813
00:34:56,659 --> 00:34:54,210

involved in many ways in celebrating

814
00:34:58,320 --> 00:34:56,669
Hubble and there's so many I mean

815
00:35:00,840 --> 00:34:58,330
there's several different

816
00:35:02,340 --> 00:35:00,850
museums which most of us familiar for

817
00:35:04,260 --> 00:35:02,350
and the American Museum of national

818
00:35:06,060 --> 00:35:04,270
history there's the intrepid museum the

819
00:35:07,890 --> 00:35:06,070
World Science Festival takes place every

820
00:35:09,450 --> 00:35:07,900
summer in New York City and so there's

821
00:35:11,250 --> 00:35:09,460
all these different groups that are all

822
00:35:14,190 --> 00:35:11,260
interested in have already started to

823
00:35:16,140 --> 00:35:14,200
contact us at NASA about how they can be

824
00:35:19,140 --> 00:35:16,150
involved in celebrating hubble's 25th

825
00:35:21,030 --> 00:35:19,150
anniversary so we're working on untying

826
00:35:23,460 --> 00:35:21,040
all those pieces together and really

827
00:35:26,940 --> 00:35:23,470
having a big celebration in the month of

828
00:35:28,440 --> 00:35:26,950
April in New York City so we did have

829
00:35:32,700 --> 00:35:28,450
something that has already happened in

830
00:35:34,680 --> 00:35:32,710
New York on New Year's Eve we had the

831
00:35:36,780 --> 00:35:34,690
Hubble video which I'll play for you in

832
00:35:39,900 --> 00:35:36,790
a few minutes it's a sort of a teaser

833
00:35:41,700 --> 00:35:39,910
video we had that played on a big

834
00:35:43,470 --> 00:35:41,710
Toshiba screen in Times Square on New

835
00:35:45,570 --> 00:35:43,480
Year's Eve where there were so many

836
00:35:48,870 --> 00:35:45,580
people gathered there and Mike Massimino

837
00:35:49,980 --> 00:35:48,880
gave a little a little short talk on the

838
00:35:52,470 --> 00:35:49,990

webcast of the New Year's Eve

839
00:35:55,320 --> 00:35:52,480
celebration so we've already had a

840
00:35:57,300 --> 00:35:55,330
really a really good a good event happen

841
00:35:59,940 --> 00:35:57,310
in New York City and we're looking

842
00:36:03,540 --> 00:35:59,950
forward to other events in the coming

843
00:36:05,820 --> 00:36:03,550
several months so in addition to New

844
00:36:12,300 --> 00:36:05,830
York there are of course museums

845
00:36:14,010 --> 00:36:12,310
planetary accretion events and in

846
00:36:16,380 --> 00:36:14,020
particular I mentioned the intrepid

847
00:36:18,900 --> 00:36:16,390
museum in New York City has already

848
00:36:22,320 --> 00:36:18,910
opened up in October an event dedicated

849
00:36:23,550 --> 00:36:22,330
to to the Hubble 25th anniversary so the

850
00:36:24,990 --> 00:36:23,560
next time you're in New York check that

851
00:36:27,810 --> 00:36:25,000
out it's a really beautiful exhibit

852
00:36:30,750 --> 00:36:27,820
it'll be up through next fall there was

853
00:36:33,060 --> 00:36:30,760
a panel there in October with the in

854
00:36:34,670 --> 00:36:33,070
November with the servicing mission for

855
00:36:37,470 --> 00:36:34,680
astronauts that was really well attended

856
00:36:42,450 --> 00:36:37,480
and that was also videoed and replayed

857
00:36:44,400 --> 00:36:42,460
on NASA TV and of course will work with

858
00:36:47,430 --> 00:36:44,410
NASA headquarters office of legislative

859
00:36:49,970 --> 00:36:47,440
and Inter government affairs and our

860
00:36:53,070 --> 00:36:49,980
industry partners to engage all our

861
00:36:54,720 --> 00:36:53,080
external stakeholders in in a lot of the

862
00:36:56,070 --> 00:36:54,730
events that they already do so the NASA

863
00:36:58,410 --> 00:36:56,080

day on the hill and those sorts of

864
00:37:01,110 --> 00:36:58,420
events so we have we're working with

865
00:37:05,280 --> 00:37:01,120
with them to to plan those things as

866
00:37:06,990 --> 00:37:05,290
well one really great way to reach out

867
00:37:09,420 --> 00:37:07,000
to some of the non-traditional audiences

868
00:37:10,300 --> 00:37:09,430
I mentioned is and these big public

869
00:37:11,770 --> 00:37:10,310
events that happen

870
00:37:14,290 --> 00:37:11,780
so one good example is South by

871
00:37:16,690 --> 00:37:14,300
Southwest down in Austin and that

872
00:37:18,490 --> 00:37:16,700
happens every March so the last few

873
00:37:20,200 --> 00:37:18,500
years NASA's had a very big presence at

874
00:37:22,240 --> 00:37:20,210
South by Southwest and this is an

875
00:37:24,490 --> 00:37:22,250
audience that is very tech interested

876
00:37:26,560 --> 00:37:24,500
but not necessarily space interested and

877
00:37:28,750 --> 00:37:26,570
so they love it when we show up with

878
00:37:30,910 --> 00:37:28,760
NASA stuff at South by Southwest and so

879
00:37:33,280 --> 00:37:30,920
we're going back again this year we have

880
00:37:35,950 --> 00:37:33,290
a panel in the interactive session on

881
00:37:39,370 --> 00:37:35,960
Hubble 25th and John Grunsfeld is on

882
00:37:41,140 --> 00:37:39,380
that panel and we have a big NASA

883
00:37:42,850 --> 00:37:41,150
exhibit that we're gonna have Hubble

884
00:37:46,090 --> 00:37:42,860
25th Clinton out we're going to take the

885
00:37:48,790 --> 00:37:46,100
big the Andromeda mosaic down to that so

886
00:37:50,320 --> 00:37:48,800
a lot of really exciting things for

887
00:37:51,730 --> 00:37:50,330
different large festivals that happen

888
00:37:53,320 --> 00:37:51,740

across the country and I already

889
00:37:55,750 --> 00:37:53,330
mentioned in World Science Festival and

890
00:37:57,040 --> 00:37:55,760
there are several other sort of events

891
00:38:01,230 --> 00:37:57,050
like that across the country that we're

892
00:38:05,020 --> 00:38:01,240
going to be doing over the next year

893
00:38:08,070 --> 00:38:05,030
we're excited to have secured exhibits

894
00:38:11,710 --> 00:38:08,080
in the Dulles and Reagan airports and

895
00:38:13,510 --> 00:38:11,720
this is just some some concepts of what

896
00:38:16,540 --> 00:38:13,520
that might look like and we're also

897
00:38:18,880 --> 00:38:16,550
reaching out to BWI and to some other

898
00:38:20,310 --> 00:38:18,890
airports across the country as well and

899
00:38:22,720 --> 00:38:20,320
Space Telescope is leading that effort

900
00:38:24,520 --> 00:38:22,730
but so when next time you fly through

901
00:38:27,190 --> 00:38:24,530
one of these major airports look out for

902
00:38:29,110 --> 00:38:27,200
Hubble cuz it'll be there there'll be a

903
00:38:31,180 --> 00:38:29,120
nationwide University lecture series

904
00:38:33,910 --> 00:38:31,190
going on I through the month of April

905
00:38:36,130 --> 00:38:33,920
and we're still working on that slide

906
00:38:38,920 --> 00:38:36,140
deck for that and so um get in touch

907
00:38:41,380 --> 00:38:38,930
with us to get to get slides to get

908
00:38:44,920 --> 00:38:41,390
support material for that of course the

909
00:38:47,560 --> 00:38:44,930
Hubble 2020 I'm symposium and that's

910
00:38:49,570 --> 00:38:47,570
coming up in April and then really just

911
00:38:51,430 --> 00:38:49,580
some other events of course double yes

912
00:38:53,880 --> 00:38:51,440
so we're at right now and other

913
00:38:57,010 --> 00:38:53,890

scientific meetings throughout the year

914
00:38:58,750 --> 00:38:57,020
Space Telescope again has a excellent

915
00:39:01,180 --> 00:38:58,760
team that's doing formal and informal

916
00:39:03,760 --> 00:39:01,190
education and so there's a whole host of

917
00:39:05,860 --> 00:39:03,770
education programs going on throughout

918
00:39:08,230 --> 00:39:05,870
the year that all focus on on Hubble

919
00:39:11,080 --> 00:39:08,240
25th I've already mentioned several

920
00:39:15,340 --> 00:39:11,090
times we have an extensive traditional

921
00:39:18,520 --> 00:39:15,350
and social media outreach plan we have a

922
00:39:19,960 --> 00:39:18,530
really a willing audience on social

923
00:39:22,690 --> 00:39:19,970
media and so we really hope to leverage

924
00:39:23,560 --> 00:39:22,700
all our different accounts the at NASA

925
00:39:25,330 --> 00:39:23,570
Twitter

926
00:39:28,470 --> 00:39:25,340
has eight and a half million followers

927
00:39:30,850 --> 00:39:28,480
just to give you an example and so we

928
00:39:33,190 --> 00:39:30,860
will work with all of the different

929
00:39:35,980 --> 00:39:33,200
partners and our corporate partners to

930
00:39:38,350 --> 00:39:35,990
just to really have a really consistent

931
00:39:40,090 --> 00:39:38,360
year-long presence on social media

932
00:39:42,700 --> 00:39:40,100
Twitter Facebook and all the other

933
00:39:44,920 --> 00:39:42,710
platforms and then the traditional media

934
00:39:48,670 --> 00:39:44,930
of course is also I'm a key part of this

935
00:39:50,680 --> 00:39:48,680
we there will be helpful 25th specials

936
00:39:52,750 --> 00:39:50,690
on National Geographic and Nova is also

937
00:39:54,760 --> 00:39:52,760
doing a documentary I already mentioned

938
00:39:58,900 --> 00:39:54,770

that um the Hubble 3d will be released

939
00:40:01,620 --> 00:39:58,910
on IMAX and then ISA is leading an

940
00:40:04,000 --> 00:40:01,630
effort to to get planetarium shorts

941
00:40:07,570 --> 00:40:04,010
distributed throughout throughout Europe

942
00:40:09,010 --> 00:40:07,580
and also throughout the US so that is

943
00:40:10,810 --> 00:40:09,020
another really exciting thing that will

944
00:40:13,300 --> 00:40:10,820
be happening across the planet area

945
00:40:15,760 --> 00:40:13,310
across the country and then Space

946
00:40:17,080 --> 00:40:15,770
Telescope is also doing three minute

947
00:40:18,490 --> 00:40:17,090
videos that they're going to be

948
00:40:20,740 --> 00:40:18,500
releasing every month and the preview

949
00:40:22,750 --> 00:40:20,750
for that sorry yacht so be looking for

950
00:40:24,580 --> 00:40:22,760
that one thing I haven't actually put in

951
00:40:26,620 --> 00:40:24,590
my slides but the place where you can go

952
00:40:29,200 --> 00:40:26,630
to find all of this information that

953
00:40:30,790 --> 00:40:29,210
will be constantly updated is a website

954
00:40:33,490 --> 00:40:30,800
that we have dedicated to the to the

955
00:40:36,520 --> 00:40:33,500
25th and that's Hubble 25th org so it's

956
00:40:39,250 --> 00:40:36,530
Hubble - 5 th org and so all of this

957
00:40:42,220 --> 00:40:39,260
information and ways to get involved for

958
00:40:44,560 --> 00:40:42,230
free for you you all to get involved in

959
00:40:45,580 --> 00:40:44,570
this will be available there and of

960
00:40:46,180 --> 00:40:45,590
course you can always get in touch with

961
00:40:50,440 --> 00:40:46,190
any of us

962
00:40:52,750 --> 00:40:50,450
to find out details as well so I'm gonna

963
00:40:54,850 --> 00:40:52,760

leave you with the the video that the

964
00:40:57,790 --> 00:40:54,860
NASA TV folks at headquarters um made

965
00:40:59,560 --> 00:40:57,800
for us just a couple months ago and I'm

966
00:42:16,840 --> 00:40:59,570
gonna go and play that now and finish

967
00:42:22,160 --> 00:42:19,790
thank you to our speakers for these

968
00:42:24,080 --> 00:42:22,170
great presentations and now if you we

969
00:42:26,810 --> 00:42:24,090
have a couple of minutes if you'd like

970
00:42:32,180 --> 00:42:26,820
to ask a question please make your way

971
00:42:33,800 --> 00:42:32,190
to a microphone and think not only of a

972
00:42:35,990 --> 00:42:33,810
question that you'd like to ask but

973
00:42:38,230 --> 00:42:36,000
maybe somebody out there in the

974
00:42:41,150 --> 00:42:38,240
community who'd like to ask a question

975
00:42:43,820 --> 00:42:41,160
and you can do that on behalf of them so

976
00:42:44,480 --> 00:42:43,830
that when we play this back they'll have

977
00:42:50,870 --> 00:42:44,490
the answer

978
00:42:53,480 --> 00:42:50,880
anybody don't be shy okay we've got a

979
00:42:56,180 --> 00:42:53,490
very shy audience okay great Martin

980
00:42:58,370 --> 00:42:56,190
thanks you Carol thanks oh is that the

981
00:42:59,600 --> 00:42:58,380
science right a meeting there was done

982
00:43:02,330 --> 00:42:59,610
yesterday and I was kind of curious

983
00:43:04,910 --> 00:43:02,340
there was a an omission and I'm kind of

984
00:43:07,160 --> 00:43:04,920
curious what is happening with cus

985
00:43:08,990 --> 00:43:07,170
that's such a powerful instrument

986
00:43:12,500 --> 00:43:09,000
there's a lot of science and interesting

987
00:43:14,270 --> 00:43:12,510
stories coming out could somebody tell

988
00:43:17,060 --> 00:43:14,280

us something about the cosmic origins

989
00:43:23,630 --> 00:43:17,070
spectrograph for for promote you know

990
00:43:24,890 --> 00:43:23,640
telling what Hubble is doing you'd like

991
00:43:26,540 --> 00:43:24,900
to hear about what kind of science is

992
00:43:29,600 --> 00:43:26,550
coming out is that the is that the

993
00:43:32,420 --> 00:43:29,610
question or is when was installed there

994
00:43:35,240 --> 00:43:32,430
was a lot of interest in what it was

995
00:43:38,570 --> 00:43:35,250
going to do but most of the public stuff

996
00:43:40,760 --> 00:43:38,580
that is out there is imagery right right

997
00:43:43,130 --> 00:43:40,770
but I'm wondering if there are stories

998
00:43:45,170 --> 00:43:43,140
in there for science writers or

999
00:43:46,640 --> 00:43:45,180
communicators like me and planetariums

1000
00:43:51,260 --> 00:43:46,650
and things that we can really highlight

1001
00:43:52,130 --> 00:43:51,270
yes the race person because advocate of

1002
00:43:54,860 --> 00:43:52,140
the conflict

1003
00:43:56,960 --> 00:43:54,870
yeah I'm spectroscopy is by training so

1004
00:43:59,020 --> 00:43:56,970
that's a it's an instrument that's near

1005
00:44:01,400 --> 00:43:59,030
and dear to my heart

1006
00:44:04,130 --> 00:44:01,410
cost is touching all kinds of

1007
00:44:07,060 --> 00:44:04,140
interesting subjects we've had several

1008
00:44:09,950 --> 00:44:07,070
large programs over the past few years

1009
00:44:12,680 --> 00:44:09,960
devoted to understanding

1010
00:44:14,150 --> 00:44:12,690
material out of which galaxies form the

1011
00:44:16,849 --> 00:44:14,160
circum Galactic medium and the

1012
00:44:20,060 --> 00:44:16,859
intergalactic medium and there's great

1013
00:44:22,250 --> 00:44:20,070

stories there about how you know this

1014
00:44:26,510 --> 00:44:22,260
the universe evolves and that structure

1015
00:44:29,210 --> 00:44:26,520
out of which galaxies forms on which

1016
00:44:32,960 --> 00:44:29,220
galaxies form evolves you've probably

1017
00:44:35,359 --> 00:44:32,970
seen some of that the the press update

1018
00:44:37,640 --> 00:44:35,369
that Andrew Fox gave on Monday was just

1019
00:44:39,800 --> 00:44:37,650
a little snippet of that and there's a

1020
00:44:42,290 --> 00:44:39,810
much bigger picture there much bigger

1021
00:44:45,829 --> 00:44:42,300
context cost is doing really great

1022
00:44:47,720 --> 00:44:45,839
things in the exoplanet area in the

1023
00:44:50,870 --> 00:44:47,730
looking at the atmospheres of exoplanets

1024
00:44:54,560 --> 00:44:50,880
and detecting heavy elements and

1025
00:44:58,099 --> 00:44:54,570
different kinds of species in the plan

1026
00:45:01,880 --> 00:44:58,109
planets that are essentially evaporating

1027
00:45:06,670 --> 00:45:01,890
these hot Jupiters there's lots of

1028
00:45:09,770 --> 00:45:06,680
interest in observations of hot stars

1029
00:45:12,800 --> 00:45:09,780
active galactic nuclei material

1030
00:45:16,010 --> 00:45:12,810
funneling into black holes just about

1031
00:45:18,680 --> 00:45:16,020
every area that you can think of causes

1032
00:45:21,290 --> 00:45:18,690
touching in some ways it's unfortunate

1033
00:45:24,710 --> 00:45:21,300
that oftentimes because of the

1034
00:45:27,500 --> 00:45:24,720
spectroscopic result it doesn't get put

1035
00:45:31,730 --> 00:45:27,510
into a context that's easy for the

1036
00:45:33,500 --> 00:45:31,740
public to understand and i'm carol knows

1037
00:45:34,940 --> 00:45:33,510
this i keep bugging her about this and

1038
00:45:37,339 --> 00:45:34,950

our other folks in our office of public

1039
00:45:40,579 --> 00:45:37,349
outreach to you know to try and make

1040
00:45:42,440 --> 00:45:40,589
that case better make it easier for you

1041
00:45:44,450 --> 00:45:42,450
and other science writers out there to

1042
00:45:46,910 --> 00:45:44,460
convey those interesting science results

1043
00:45:49,579 --> 00:45:46,920
so one of the things that we've started

1044
00:45:52,970 --> 00:45:49,589
doing is including some of the spectra

1045
00:45:54,710 --> 00:45:52,980
from costs and cysts in the material

1046
00:45:56,290 --> 00:45:54,720
that we release with press releases and

1047
00:45:58,520 --> 00:45:56,300
we're going to continue to do that

1048
00:46:01,760 --> 00:45:58,530
that's incredibly important because

1049
00:46:02,839 --> 00:46:01,770
James Webb is a spectroscopic machine

1050
00:46:04,160 --> 00:46:02,849
right

1051
00:46:05,990 --> 00:46:04,170
it will certainly produce beautiful

1052
00:46:08,870 --> 00:46:06,000
images but it's going to produce a

1053
00:46:10,160 --> 00:46:08,880
boatload of spectroscopy and most of its

1054
00:46:13,490 --> 00:46:10,170
science is going to be spectroscopy

1055
00:46:15,470 --> 00:46:13,500
related so thanks for asking that

1056
00:46:18,020 --> 00:46:15,480
question I'd be happy to talk with you

1057
00:46:21,079 --> 00:46:18,030
more individually one on one about some

1058
00:46:22,710 --> 00:46:21,089
specific suggestions and now that you've

1059
00:46:24,900 --> 00:46:22,720
asked that question I'm going

1060
00:46:28,050 --> 00:46:24,910
I'm gonna be emailing you and your

1061
00:46:30,420 --> 00:46:28,060
colleagues about how to help us convey

1062
00:46:31,859 --> 00:46:30,430
that information because you know we

1063
00:46:34,260 --> 00:46:31,869

often get these results and we're

1064
00:46:36,210 --> 00:46:34,270
working with the scientist to get their

1065
00:46:39,089 --> 00:46:36,220
results forward but we do need to be

1066
00:46:40,470 --> 00:46:39,099
able to convey that information to the

1067
00:46:45,810 --> 00:46:40,480
public so we have a question here and

1068
00:46:49,280 --> 00:46:45,820
then a question here so was launched I I

1069
00:46:51,780 --> 00:46:49,290
was about learning to read or write but

1070
00:46:53,520 --> 00:46:51,790
and I understand that I mean some

1071
00:46:57,000 --> 00:46:53,530
instruments and Hubble have been changed

1072
00:46:58,800 --> 00:46:57,010
but the things Hubble has Hubble has

1073
00:47:02,910 --> 00:46:58,810
apparently done very well in the past is

1074
00:47:05,609 --> 00:47:02,920
images but they'd say visit Gemini

1075
00:47:08,550 --> 00:47:05,619
planet image and so ground-based AO has

1076
00:47:11,070 --> 00:47:08,560
caught up almost called a plus Apple do

1077
00:47:13,830 --> 00:47:11,080
you see it trained to spectroscopy or

1078
00:47:15,300 --> 00:47:13,840
trained to UV in the proposals which are

1079
00:47:17,400 --> 00:47:15,310
areas where there's no ground-based

1080
00:47:22,109 --> 00:47:17,410
machine or no ground-based telescope

1081
00:47:29,130 --> 00:47:22,119
they'll ever be able to do that it's

1082
00:47:31,859 --> 00:47:29,140
it's certainly it's certainly good to

1083
00:47:33,390 --> 00:47:31,869
encourage things that you know people to

1084
00:47:35,460 --> 00:47:33,400
propose only things that Hubble can do

1085
00:47:36,990 --> 00:47:35,470
and like you said UV spectroscopy of

1086
00:47:38,280 --> 00:47:37,000
things of that nature is something that

1087
00:47:40,620 --> 00:47:38,290
only Hubble can do and when Hubble is

1088
00:47:42,530 --> 00:47:40,630

gone there won't be a resource at least

1089
00:47:44,820 --> 00:47:42,540
in the near term future to do that

1090
00:47:47,070 --> 00:47:44,830
Hubble is still extremely competitive

1091
00:47:49,160 --> 00:47:47,080
with even 8 and 10 meter telescopes on

1092
00:47:54,320 --> 00:47:49,170
the ground from an imaging standpoint

1093
00:47:57,839 --> 00:47:54,330
both from a resolution and sensitivity

1094
00:47:59,940 --> 00:47:57,849
standpoint but also from a grism

1095
00:48:02,480 --> 00:47:59,950
spectroscopy standpoint Wide Field

1096
00:48:05,070 --> 00:48:02,490
Camera 3 Grissom's

1097
00:48:06,839 --> 00:48:05,080
we can go deeper with those grism zan

1098
00:48:11,550 --> 00:48:06,849
you can possibly go from the ground now

1099
00:48:14,609 --> 00:48:11,560
that era to will end with the advent of

1100
00:48:16,410 --> 00:48:14,619
extremely large telescopes but for now

1101
00:48:18,660 --> 00:48:16,420
in at least the next couple years Hubble

1102
00:48:21,540 --> 00:48:18,670
should be very competitive with

1103
00:48:22,650 --> 00:48:21,550
ground-based observatories synergistic

1104
00:48:26,220 --> 00:48:22,660
certainly with some of the things that

1105
00:48:30,740 --> 00:48:26,230
Alma is doing and still have you know a

1106
00:48:34,290 --> 00:48:30,750
lot of discovery space available to it

1107
00:48:35,400 --> 00:48:34,300
yes your question thanks I'm Gregg

1108
00:48:36,049 --> 00:48:35,410
running from the University of Kansas

1109
00:48:37,999 --> 00:48:36,059
and

1110
00:48:39,289 --> 00:48:38,009
I want to ask a question about the

1111
00:48:41,299 --> 00:48:39,299
celebrations are at the 25th anniversary

1112
00:48:44,959 --> 00:48:41,309
I mean many of the activities are New

1113
00:48:47,209 --> 00:48:44,969

York City Washington area airports but

1114
00:48:50,420 --> 00:48:47,219
there is a distributed interest across

1115
00:48:52,099 --> 00:48:50,430
the entire country and so I was my

1116
00:48:53,779 --> 00:48:52,109
interest was piqued partly by your

1117
00:48:54,679 --> 00:48:53,789
University lecture series so I'd like to

1118
00:48:57,469 --> 00:48:54,689
hear a little bit more about what that

1119
00:48:59,449 --> 00:48:57,479
is but I also like to hear about what

1120
00:49:04,729 --> 00:48:59,459
kind of efforts are there to extend the

1121
00:49:06,620 --> 00:49:04,739
celebrations to institutions for example

1122
00:49:07,729 --> 00:49:06,630
all across the country for us so for

1123
00:49:10,099 --> 00:49:07,739
example one of the largest amateur

1124
00:49:12,829 --> 00:49:10,109
astronomy organizations in the country

1125
00:49:15,019 --> 00:49:12,839
is in Kansas City there are astronauts

1126
00:49:16,729 --> 00:49:15,029
spread all around the country we have a

1127
00:49:18,739 --> 00:49:16,739
few in Kansas Steve Hall is actually

1128
00:49:21,019 --> 00:49:18,749
offices next to mine so you know I'm

1129
00:49:22,910 --> 00:49:21,029
curious what efforts throw out to tap

1130
00:49:24,589 --> 00:49:22,920
into those resources or well all those

1131
00:49:27,079 --> 00:49:24,599
people be flying to DC I mean you know

1132
00:49:30,589 --> 00:49:27,089
for the anniversary and so we'll miss

1133
00:49:34,609 --> 00:49:30,599
that opportunity so I mentioned this one

1134
00:49:35,870 --> 00:49:34,619
yeah I mentioned the the event on April

1135
00:49:39,859 --> 00:49:35,880
24th that we're doing will be webcast

1136
00:49:42,709 --> 00:49:39,869
and we have someone that is going to be

1137
00:49:45,079 --> 00:49:42,719
like the point person for coordinating

1138
00:49:46,609 --> 00:49:45,089

and helping to distribute materials and

1139
00:49:50,390 --> 00:49:46,619
information to sort of host their own

1140
00:49:53,799 --> 00:49:50,400
celebrations that day so she has a list

1141
00:49:56,630 --> 00:49:53,809
of 200 you know science centers

1142
00:49:59,839 --> 00:49:56,640
planetary it's more focused on sort of

1143
00:50:02,029 --> 00:49:59,849
museums but also the University lecture

1144
00:50:03,949 --> 00:50:02,039
series is they'll be going on during

1145
00:50:05,719 --> 00:50:03,959
during that month that you mentioned

1146
00:50:08,660 --> 00:50:05,729
that's also a great way to get involved

1147
00:50:12,499 --> 00:50:08,670
so the the website that I mentioned will

1148
00:50:15,169 --> 00:50:12,509
will soon be hosting you know materials

1149
00:50:17,120 --> 00:50:15,179
that you can go and download or use and

1150
00:50:18,890 --> 00:50:17,130
then we'll also find ways to facilitate

1151
00:50:23,029 --> 00:50:18,900
you know sending materials to people who

1152
00:50:24,259 --> 00:50:23,039
want to do things so those those things

1153
00:50:27,829 --> 00:50:24,269
are definitely being planned

1154
00:50:31,489 --> 00:50:27,839
so anyone it can get in touch with us

1155
00:50:33,890 --> 00:50:31,499
for for help and for materials to to

1156
00:50:36,049 --> 00:50:33,900
sort of you know make your own sort of

1157
00:50:38,779 --> 00:50:36,059
celebration and we're working closely

1158
00:50:40,880 --> 00:50:38,789
with the astronaut office at NASA in

1159
00:50:42,890 --> 00:50:40,890
order to like you said to to sort of

1160
00:50:44,299 --> 00:50:42,900
take advantage of the fact that a lot of

1161
00:50:46,009 --> 00:50:44,309
the Hubble astronauts are sort of spread

1162
00:50:47,179 --> 00:50:46,019
out across the country so yeah we're

1163
00:50:48,890 --> 00:50:47,189

definitely we're definitely thinking

1164
00:50:49,400 --> 00:50:48,900
about those things but but yeah get in

1165
00:50:51,680 --> 00:50:49,410
touch

1166
00:50:55,039 --> 00:50:51,690
after the fact if you want more details

1167
00:50:57,289 --> 00:50:55,049
are to be you know to lead an event or

1168
00:51:00,859 --> 00:50:57,299
anything like that thanks very much

1169
00:51:03,769 --> 00:51:00,869
thank you question over here like your I

1170
00:51:05,479 --> 00:51:03,779
liked your slide on the status of Hubble

1171
00:51:07,339 --> 00:51:05,489
and in the fact that the gyro was

1172
00:51:09,620 --> 00:51:07,349
weren't going to be a foreseeable issue

1173
00:51:13,430 --> 00:51:09,630
but I heard from a friend of an engineer

1174
00:51:15,380 --> 00:51:13,440
that the the most critical component are

1175
00:51:17,299 --> 00:51:15,390
the one that that is they're most

1176
00:51:19,039 --> 00:51:17,309
concerned about is actually the solar

1177
00:51:21,349 --> 00:51:19,049
panels but I didn't see that on your

1178
00:51:24,019 --> 00:51:21,359
slide and that I'm hearing correctly

1179
00:51:27,019 --> 00:51:24,029
from my friend of the engineer or can

1180
00:51:29,960 --> 00:51:27,029
you give me an update on that at the

1181
00:51:31,430 --> 00:51:29,970
moment the electrical system on Hubble

1182
00:51:33,890 --> 00:51:31,440
is extremely good

1183
00:51:38,180 --> 00:51:33,900
I know of no issues with the solar

1184
00:51:41,059 --> 00:51:38,190
panels the solar panels do slowly

1185
00:51:43,609 --> 00:51:41,069
degrade with time we have not had any

1186
00:51:46,489 --> 00:51:43,619
issues with them in the last five years

1187
00:51:48,859 --> 00:51:46,499
or so the amount of power that they're

1188
00:51:52,009 --> 00:51:48,869

able to produce is declining with time

1189
00:51:53,690 --> 00:51:52,019
but it's not declining rapidly enough

1190
00:51:58,640 --> 00:51:53,700
that we would have to shut off an

1191
00:51:59,900 --> 00:51:58,650
instrument say honestly I think unless

1192
00:52:04,099 --> 00:51:59,910
there's some kind of a catastrophic

1193
00:52:06,140 --> 00:52:04,109
failure or meteorite hit or some kind of

1194
00:52:07,969 --> 00:52:06,150
catastrophic electrical failure that the

1195
00:52:10,609 --> 00:52:07,979
solar panels are not an issue it'd be

1196
00:52:24,140 --> 00:52:10,619
interesting to know exactly what your

1197
00:52:29,390 --> 00:52:24,150
engineer friend was thinking about very

1198
00:52:34,819 --> 00:52:29,400
same question Wow no problem with the

1199
00:52:35,630 --> 00:52:34,829
solar panels batteries batteries are in

1200
00:52:38,950 --> 00:52:35,640
really good shape

1201
00:52:41,900 --> 00:52:38,960
we've got about 500 amp hours a charge

1202
00:52:46,130 --> 00:52:41,910
capability with those now that's still

1203
00:52:48,319 --> 00:52:46,140
up well above what we need and so they

1204
00:52:49,640 --> 00:52:48,329
were they were replaced during the

1205
00:52:53,989 --> 00:52:49,650
servicing mission as well and they're

1206
00:52:55,969 --> 00:52:53,999
performing beautifully well let's thank

1207
00:52:58,309 --> 00:52:55,979
our speakers again and thank you for

1208
00:53:03,289 --> 00:52:58,319
coming to the town hall

1209
00:53:05,749 --> 00:53:03,299
oh we have one more question sorry so I

1210
00:53:08,170 --> 00:53:05,759
think it was a few months ago that a

1211
00:53:11,630 --> 00:53:08,180
very interesting paper by Neil Reed

1212
00:53:14,779 --> 00:53:11,640
appeared in a strop eh and I'm just

1213
00:53:16,969 --> 00:53:14,789

wondering if anything is being done to

1214
00:53:19,459 --> 00:53:16,979
mitigate the problem that he pointed out

1215
00:53:23,029 --> 00:53:19,469
exists statistically in the proposal

1216
00:53:25,910 --> 00:53:23,039
reviews sure I'll I'll take that I'm

1217
00:53:29,059 --> 00:53:25,920
part of the science mission office so

1218
00:53:31,969 --> 00:53:29,069
the the study that the speaker's is

1219
00:53:34,609 --> 00:53:31,979
referring to was an analysis of the

1220
00:53:38,239 --> 00:53:34,619
success rates of female and male PI's

1221
00:53:40,670 --> 00:53:38,249
over the history of HSTs tack process

1222
00:53:44,839 --> 00:53:40,680
and every year there is a very very

1223
00:53:46,959 --> 00:53:44,849
small but but really there difference in

1224
00:53:49,670 --> 00:53:46,969
that women pis are underrepresented

1225
00:53:52,339 --> 00:53:49,680
relative to the male PI's and when you

1226
00:53:54,140 --> 00:53:52,349
add that up over you know the 20 or so

1227
00:53:56,449 --> 00:53:54,150
tax it becomes apparent that this is a

1228
00:53:59,420 --> 00:53:56,459
real trend this happens every single

1229
00:54:01,699 --> 00:53:59,430
year so we're we're aware of the problem

1230
00:54:04,640 --> 00:54:01,709
we don't really know how to fix this

1231
00:54:10,609 --> 00:54:04,650
last year we tried an experiment where

1232
00:54:13,579 --> 00:54:10,619
we removed we took the names of the pis

1233
00:54:15,140 --> 00:54:13,589
we only included the first initial so

1234
00:54:17,569 --> 00:54:15,150
that people didn't necessarily know

1235
00:54:20,120 --> 00:54:17,579
whether it was a male or female PI we

1236
00:54:22,579 --> 00:54:20,130
also put the names on a second page and

1237
00:54:25,670 --> 00:54:22,589
we labeled the proposals by number not

1238
00:54:28,539 --> 00:54:25,680

name and we instructed people to discuss

1239
00:54:30,559 --> 00:54:28,549
the proposal and not who the PI's were

1240
00:54:32,809 --> 00:54:30,569
that didn't seem to make a big

1241
00:54:34,910 --> 00:54:32,819
difference so will we're going to

1242
00:54:37,549 --> 00:54:34,920
continue to investigate this problem the

1243
00:54:39,620 --> 00:54:37,559
other thing that we do during the at the

1244
00:54:41,900 --> 00:54:39,630
start of each attack during the

1245
00:54:44,749 --> 00:54:41,910
orientation that we remind people about

1246
00:54:46,640 --> 00:54:44,759
the issue of unconscious bias and make

1247
00:54:48,199 --> 00:54:46,650
sure that all the panelists and the takt

1248
00:54:50,979 --> 00:54:48,209
chairs are aware that this is a real

1249
00:54:54,199 --> 00:54:50,989
issue in when you're discussing

1250
00:54:57,499 --> 00:54:54,209
proposals and and female versus male pis

1251
00:55:04,459 --> 00:54:57,509
but you know we're aware we're doing the

1252
00:55:06,229 --> 00:55:04,469
best that we can I would say is there a

1253
00:55:10,130 --> 00:55:06,239
new study that's going to be done about

1254
00:55:12,050 --> 00:55:10,140
whether there's institutional bias you

1255
00:55:14,600 --> 00:55:12,060
mean at the level of

1256
00:55:16,640 --> 00:55:14,610
can you ask about can you clarify I can

1257
00:55:23,000 --> 00:55:16,650
clarify that because I was at an

1258
00:55:25,700 --> 00:55:23,010
institution 16 years ago and one year I

1259
00:55:27,920 --> 00:55:25,710
submitted three Hubble proposals and I

1260
00:55:30,050 --> 00:55:27,930
had three Hubble proposals accepted

1261
00:55:32,780 --> 00:55:30,060
which was excellent I then moved to a

1262
00:55:35,200 --> 00:55:32,790
much larger institution and since then

1263
00:55:38,330 --> 00:55:35,210

my success rate has gone down

1264
00:55:41,630 --> 00:55:38,340
significantly and I'm just you know it

1265
00:55:43,880 --> 00:55:41,640
just seemed very very peculiar that's

1266
00:55:46,070 --> 00:55:43,890
that's we can look into that we I don't

1267
00:55:47,960 --> 00:55:46,080
know that we have done that study of

1268
00:55:49,580 --> 00:55:47,970
large versus small institutions but

1269
00:55:53,030 --> 00:55:49,590
that's something that I think the idea

1270
00:55:54,860 --> 00:55:53,040
to look at okay thank you I will say

1271
00:55:58,460 --> 00:55:54,870
that I'm on a proposal studying

1272
00:56:01,430 --> 00:55:58,470
Westerlund too and it's all women sort

1273
00:56:04,670 --> 00:56:01,440
of not by accident but we did get the

1274
00:56:06,920 --> 00:56:04,680
time so and we're coming out pretty soon

1275
00:56:10,010 --> 00:56:06,930
with some pretty impressive results so