1
00:00:13,589 --> 00:00:11,669
you are currently looking at a view of

2
00:00:15,990 --> 00:00:13,599
the space telescope operations control

3
00:00:18,070 --> 00:00:16,000
center also known as the stock located

4
00:00:19,590 --> 00:00:18,080
at nasa's goddard space flight center in

5
00:00:21,189 --> 00:00:19,600
greenbelt maryland

6
00:00:23,029 --> 00:00:21,199
the astronauts aboard space shuttle

7
00:00:24,710 --> 00:00:23,039
atlantis along with ground teams of

8
00:00:27,429 --> 00:00:24,720
flight controllers at johnson space

9
00:00:28,950 --> 00:00:27,439
center houston and here at goddard had a

10
00:00:31,029 --> 00:00:28,960
challenging but ultimately very

11
00:00:32,790 --> 00:00:31,039
satisfying day as the two main

12
00:00:34,870 --> 00:00:32,800
objectives for the second spacewalk of

13
00:00:36,709 --> 00:00:34,880

the mission were both accomplished

14
00:00:38,709 --> 00:00:36,719
we spoke with mission operations manager

15
00:00:41,030 --> 00:00:38,719
keith wallis just after he stepped off

16
00:00:43,510 --> 00:00:41,040
console to get his views on both the

17
00:00:45,029 --> 00:00:43,520
issues his team had to work as well as

18
00:00:47,910 --> 00:00:45,039
the significant accomplishments of

19
00:00:50,389 --> 00:00:47,920
flight day five

20
00:00:52,229 --> 00:00:50,399
so today was our second spacewalk day we

21
00:00:55,590 --> 00:00:52,239
called it eva2 the extra vehicular

22
00:00:57,830 --> 00:00:55,600
activity it was a challenging day

23
00:01:00,150 --> 00:00:57,840
we started off on a euphoric note that

24
00:01:02,150 --> 00:01:00,160
first rc the first two drivers they went

25
00:01:03,990 --> 00:01:02,160
in no problem and we're really happy

26
00:01:06,469 --> 00:01:04,000
about everything was going great and

27
00:01:07,750 --> 00:01:06,479
then the challenges started it was tough

28
00:01:09,190 --> 00:01:07,760
the crew tried to get it in they

29
00:01:11,190 --> 00:01:09,200
couldn't get in they tried different

30
00:01:12,550 --> 00:01:11,200
methods it was impressive how well they

31
00:01:14,390 --> 00:01:12,560
were working getting this done but it

32
00:01:16,149 --> 00:01:14,400
still wasn't happening and there was a

33
00:01:18,469 --> 00:01:16,159
sense of concern in the stock and you

34
00:01:21,109 --> 00:01:18,479
definitely have some nervousness however

35
00:01:22,789 --> 00:01:21,119
having said that we also know

36
00:01:23,910 --> 00:01:22,799
how well this crew does oh look at the

37
00:01:26,550 --> 00:01:23,920
great job they did yesterday with

38
00:01:28,230 --> 00:01:26,560

winefield camera so yeah it was

39
00:01:29,910 --> 00:01:28,240
definitely some tough feelings but we

40
00:01:31,109 --> 00:01:29,920
never lost faith that they were going to

41
00:01:33,590 --> 00:01:31,119
get it done and they did and they

42
00:01:35,429 --> 00:01:33,600
absolutely did a fantastic job we tested

43
00:01:37,190 --> 00:01:35,439
it out we did that aliveness test to see

44
00:01:39,190 --> 00:01:37,200
to make sure everything turns on right

45
00:01:41,109 --> 00:01:39,200
heaters come on perfect everything's

46
00:01:42,789 --> 00:01:41,119
looking very very good with them and

47
00:01:44,069 --> 00:01:42,799
then finally the batteries so we went on

48
00:01:45,190 --> 00:01:44,079
to the battery test and we actually

49
00:01:47,350 --> 00:01:45,200
thought that was going to be a little

50
00:01:49,350 --> 00:01:47,360
more challenging turned out to be no

51
00:01:51,990 --> 00:01:49,360
problem the crew took care of that

52
00:01:53,830 --> 00:01:52,000
very they made it look easy it worked

53
00:01:55,749 --> 00:01:53,840
wonderfully we've done our liveness test

54
00:01:57,030 --> 00:01:55,759
and our functional tests and those are

55
00:01:58,709 --> 00:01:57,040
working great so our first three

56
00:02:00,630 --> 00:01:58,719
batteries are changed out

57
00:02:02,709 --> 00:02:00,640
everything today despite the challenges

58
00:02:05,109 --> 00:02:02,719
was a fantastic success

59
00:02:06,950 --> 00:02:05,119
tomorrow we have a very long day of

60
00:02:09,749 --> 00:02:06,960
working on the advanced camera for

61
00:02:12,070 --> 00:02:09,759
surveys and cause camera and they did

62
00:02:13,670 --> 00:02:12,080
the small get-ahead task and it was a

63
00:02:15,990 --> 00:02:13,680

get ahead test today where they had to

64
00:02:18,550 --> 00:02:16,000
route some cables and connect uh the

65
00:02:19,589 --> 00:02:18,560
cable together to provide power to this

66
00:02:23,350 --> 00:02:19,599
new

67
00:02:25,030 --> 00:02:23,360
for surveys and they could access them

68
00:02:26,790 --> 00:02:25,040
more easily from the door that they're

69
00:02:28,710 --> 00:02:26,800
in today they did it tomorrow they'd

70
00:02:31,030 --> 00:02:28,720
have to literally bend over backwards to

71
00:02:32,550 --> 00:02:31,040
get to that cable they did it today and

72
00:02:34,550 --> 00:02:32,560
work fine so that's going to save us

73
00:02:35,750 --> 00:02:34,560
time tomorrow and that's important

74
00:02:37,830 --> 00:02:35,760
because tomorrow is going to be a really

75
00:02:38,949 --> 00:02:37,840
long day the two activities we have

76
00:02:40,710 --> 00:02:38,959
tomorrow

77
00:02:42,470 --> 00:02:40,720
we're going to take out the original

78
00:02:44,869 --> 00:02:42,480
corrective optics which is installed

79
00:02:47,350 --> 00:02:44,879
back in 1993 and put in a new

80
00:02:49,350 --> 00:02:47,360
spectrograph when i say a camera or

81
00:02:51,030 --> 00:02:49,360
spectrograph it's not a small camera

82
00:02:52,470 --> 00:02:51,040
like you see at a store it's about the

83
00:02:54,309 --> 00:02:52,480
size refrigerator and the astronauts are

84
00:02:56,790 --> 00:02:54,319
going to change that out if we take out

85
00:02:58,949 --> 00:02:56,800
this old corrective optics from this new

86
00:03:00,630 --> 00:02:58,959
cosmic origin spectrograph

87
00:03:01,750 --> 00:03:00,640
then the real challenging task happens

88
00:03:03,350 --> 00:03:01,760

afterwards

89
00:03:05,270 --> 00:03:03,360
we have one of our

90
00:03:06,710 --> 00:03:05,280
most famous cameras our advanced camera

91
00:03:08,710 --> 00:03:06,720
for surveys which really takes some of

92
00:03:10,790 --> 00:03:08,720
the best pictures you've seen so far

93
00:03:12,949 --> 00:03:10,800
well unfortunately about two years ago

94
00:03:14,790 --> 00:03:12,959
this camera failed it had an electrical

95
00:03:17,030 --> 00:03:14,800
problem on board and this is a camera we

96
00:03:18,550 --> 00:03:17,040
just installed in 2002 well the

97
00:03:19,750 --> 00:03:18,560
astronauts are actually going in and

98
00:03:21,350 --> 00:03:19,760
repairing it

99
00:03:22,949 --> 00:03:21,360
so they're going to go inside get into

100
00:03:24,390 --> 00:03:22,959
the guts of it and they're going to take

101
00:03:26,550 --> 00:03:24,400
out some of the boards that aren't

102
00:03:27,830 --> 00:03:26,560
working and put in new ones and after

103
00:03:30,070 --> 00:03:27,840
that they're going to button it all up

104
00:03:31,589 --> 00:03:30,080
again and it should work fine it's going

105
00:03:33,270 --> 00:03:31,599
to take a little longer to do on this

106
00:03:35,110 --> 00:03:33,280
day and we've looked and if everything

107
00:03:37,830 --> 00:03:35,120
is going according to schedule it'll be

108
00:03:39,750 --> 00:03:37,840
a longer space walk than what we do on a

109
00:03:41,750 --> 00:03:39,760
normal basis and that's one of the

110
00:03:43,270 --> 00:03:41,760
reasons for that get ahead test today

111
00:03:45,430 --> 00:03:43,280
anything we can do ahead of time to make

112
00:03:46,949 --> 00:03:45,440
it easier in fact those

113
00:03:48,869 --> 00:03:46,959

latch over center kits those door

114
00:03:51,030 --> 00:03:48,879
latches we put on the first day those

115
00:03:52,949 --> 00:03:51,040
are get a head test for this also so

116
00:03:54,550 --> 00:03:52,959
anything we can do we try to get this

117
00:03:55,990 --> 00:03:54,560
done ahead of time so that tomorrow we

118
00:03:58,390 --> 00:03:56,000
hope everything will go as smoothly as

119
00:04:01,750 --> 00:04:00,070
saturday spacewalk will see the

120
00:04:04,070 --> 00:04:01,760
installation of kos with the cosmic

121
00:04:06,390 --> 00:04:04,080
origin spectrograph the second new

122
00:04:20,629 --> 00:04:06,400
science instrument being added to hubble

123
00:04:24,629 --> 00:04:23,030
cause is the most sensitive

124
00:04:32,310 --> 00:04:24,639
spectroscope

125
00:04:34,629 --> 00:04:32,320
are

126
00:04:37,430 --> 00:04:34,639
so important for research

127
00:04:38,310 --> 00:04:37,440
they produce ugly pictures

128
00:04:41,270 --> 00:04:38,320
but

129
00:04:42,710 --> 00:04:41,280
they are the nuts and bolts of physical

130
00:04:46,230 --> 00:04:42,720
science

131
00:04:49,110 --> 00:04:46,240
they put the physics in astrophysics

132
00:04:50,710 --> 00:04:49,120
cos was conceived in the mid-1990s by dr

133
00:04:53,590 --> 00:04:50,720
jim green and his colleagues at the

134
00:04:56,790 --> 00:04:53,600
university of colorado primarily to

135
00:04:58,550 --> 00:04:56,800
study the cosmic web which is made up of

136
00:05:03,029 --> 00:04:58,560
the largest scale structures of matter

137
00:05:07,909 --> 00:05:04,629
if you want to know what something is

138
00:05:10,070 --> 00:05:07,919

made of how hot it is how dense it is

139
00:05:12,390 --> 00:05:10,080
how fast it's moving in space how fast

140
00:05:14,550 --> 00:05:12,400
it's rotating for example a spectrograph

141
00:05:16,870 --> 00:05:14,560
will give you all that information with

142
00:05:17,830 --> 00:05:16,880
cost we can acquire information like

143
00:05:19,350 --> 00:05:17,840
that

144
00:05:27,670 --> 00:05:19,360
farther out across the universe than

145
00:05:32,150 --> 00:05:29,990
spectroscopy is

146
00:05:35,189 --> 00:05:32,160
taking light from an object

147
00:05:37,350 --> 00:05:35,199
and breaking it up into

148
00:05:39,350 --> 00:05:37,360
the different colors that that light

149
00:05:40,870 --> 00:05:39,360
consists of

150
00:05:42,550 --> 00:05:40,880
each of the elements each of the

151
00:05:44,550 --> 00:05:42,560
chemical elements has

152
00:05:47,430 --> 00:05:44,560
characteristic wavelengths

153
00:05:49,749 --> 00:05:47,440
characteristic colors at which it emits

154
00:05:51,029 --> 00:05:49,759
light when you heat it up or absorbs

155
00:05:53,830 --> 00:05:51,039
light

156
00:05:56,950 --> 00:05:53,840
for example if i have a

157
00:05:59,270 --> 00:05:56,960
a tube full of hydrogen between

158
00:06:00,790 --> 00:05:59,280
me and that light instead of seeing the

159
00:06:02,550 --> 00:06:00,800
normal spectrum of that light when i

160
00:06:04,629 --> 00:06:02,560
look at it with the spectrograph i'll

161
00:06:06,710 --> 00:06:04,639
see that spectrum but with some of the

162
00:06:09,029 --> 00:06:06,720
light taken away at the wavelengths

163
00:06:10,469 --> 00:06:09,039

where hydrogen has its characteristic

164
00:06:12,710 --> 00:06:10,479
absorptions

165
00:06:14,790 --> 00:06:12,720
and so by measuring that the depth of

166
00:06:16,950 --> 00:06:14,800
those notches and the velocities and the

167
00:06:18,469 --> 00:06:16,960
width of them and so on you can infer

168
00:06:20,710 --> 00:06:18,479
all kinds of things about the physical

169
00:06:23,189 --> 00:06:20,720
state of that cloud

170
00:06:25,510 --> 00:06:23,199
kos has taken a really key part of

171
00:06:28,390 --> 00:06:25,520
spectroscopic science and said how can

172
00:06:30,309 --> 00:06:28,400
we do that in the absolutely best most

173
00:06:31,510 --> 00:06:30,319
efficient way

174
00:06:33,189 --> 00:06:31,520
and that is

175
00:06:36,070 --> 00:06:33,199
to measure

176
00:06:38,710 --> 00:06:36,080
the properties of the material between

177
00:06:39,830 --> 00:06:38,720
the galaxies looking back into the

178
00:06:42,150 --> 00:06:39,840
universe

179
00:06:44,550 --> 00:06:42,160
as the galaxies form there's a lot of

180
00:06:47,590 --> 00:06:44,560
material that does not collapse into the

181
00:06:49,990 --> 00:06:47,600
galaxies and there's other material that

182
00:06:51,830 --> 00:06:50,000
is ejected from galaxies by supernova

183
00:06:53,430 --> 00:06:51,840
explosions and so on and so that

184
00:06:55,350 --> 00:06:53,440
intergalactic gas the so-called

185
00:06:57,110 --> 00:06:55,360
intergalactic medium

186
00:06:58,710 --> 00:06:57,120
carries a lot of information about the

187
00:07:01,110 --> 00:06:58,720
history of the universe

188
00:07:04,070 --> 00:07:01,120

when you couple that story sort of the

189
00:07:06,230 --> 00:07:04,080
global cosmic process of how you form

190
00:07:08,230 --> 00:07:06,240
the large-scale structure of of how

191
00:07:10,150 --> 00:07:08,240
material is distributed in the universe

192
00:07:12,629 --> 00:07:10,160
and what role that played in forming new

193
00:07:14,710 --> 00:07:12,639
galaxies and then you use wifi camera

194
00:07:17,029 --> 00:07:14,720
three to investigate

195
00:07:19,510 --> 00:07:17,039
how did the galaxies themselves change

196
00:07:21,589 --> 00:07:19,520
internally with time

197
00:07:23,510 --> 00:07:21,599
and over space you know looking back

198
00:07:25,749 --> 00:07:23,520
through the history of the universe all

199
00:07:27,990 --> 00:07:25,759
that kind of ties together

200
00:07:31,990 --> 00:07:28,000
into the full story

201
00:07:35,990 --> 00:07:34,870
it's going into the costar

202
00:07:38,710 --> 00:07:36,000
slot

203
00:07:40,550 --> 00:07:38,720
and so there is nothing whatsoever lost

204
00:07:43,350 --> 00:07:40,560
in doing that because costar is not

205
00:07:46,150 --> 00:07:43,360
needed anymore costar was put up in the

206
00:07:49,029 --> 00:07:46,160
first servicing mission and it was used

207
00:07:50,950 --> 00:07:49,039
to deploy correcting optics in front of

208
00:07:52,710 --> 00:07:50,960
some of the first generation instruments

209
00:07:55,110 --> 00:07:52,720
the the first generation spectrographs

210
00:07:56,629 --> 00:07:55,120
for example correcting optics to correct

211
00:07:59,110 --> 00:07:56,639
for the spherical aberration that had

212
00:08:00,869 --> 00:07:59,120
been inadvertently built into the hst

213
00:08:03,350 --> 00:08:00,879

primary mirror

214
00:08:05,350 --> 00:08:03,360
all the more recent instruments include

215
00:08:07,430 --> 00:08:05,360
that correction within the new

216
00:08:09,350 --> 00:08:07,440
instrument itself so right now costar

217
00:08:11,350 --> 00:08:09,360
doesn't have anything to do all the

218
00:08:13,670 --> 00:08:11,360
other instruments in the so-called axial

219
00:08:16,309 --> 00:08:13,680
bays of hst have their own internal

220
00:08:18,790 --> 00:08:16,319
correction and so the costar space is

221
00:08:20,950 --> 00:08:18,800
freely available and they'll pull that

222
00:08:22,869 --> 00:08:20,960
out at no loss of science to hst

223
00:08:29,990 --> 00:08:22,879
whatsoever and replace it with this

224
00:08:33,430 --> 00:08:31,589
the other major activity during the

225
00:08:35,110 --> 00:08:33,440
third spacewalk of the mission is an

226
00:08:36,070 --> 00:08:35,120
activity that has never been attempted

227
00:08:38,550 --> 00:08:36,080
before

228
00:08:40,949 --> 00:08:38,560
getting access to and making repairs to

229
00:08:43,029 --> 00:08:40,959
specific components of a non-working

230
00:08:45,509 --> 00:08:43,039
science instrument in this case the

231
00:09:00,470 --> 00:08:45,519
advanced camera for surveys or acs

232
00:09:05,590 --> 00:09:03,829
we are going to add a shuttle servicing

233
00:09:08,070 --> 00:09:05,600
mission to the hubble space telescope to

234
00:09:18,870 --> 00:09:08,080
the shuttles manifest to be flown before

235
00:09:25,430 --> 00:09:22,470
about 7 35 eastern standard time

236
00:09:28,150 --> 00:09:25,440
hubble entered into inertial hole safe

237
00:09:31,269 --> 00:09:28,160
modes we noticed spikes on the structure

238
00:09:32,870 --> 00:09:31,279

current and the main bus current we

239
00:09:34,790 --> 00:09:32,880
believe that this is indicative of a

240
00:09:42,710 --> 00:09:34,800
short circuit that occurred in the

241
00:09:48,150 --> 00:09:45,910
acs was inserted on hubble in 2002

242
00:09:51,030 --> 00:09:48,160
before it died it was the most heavily

243
00:09:54,470 --> 00:09:51,040
used instrument on hubble acs was our

244
00:09:56,870 --> 00:09:54,480
best survey camera so it was able to

245
00:09:58,630 --> 00:09:56,880
for example map the distribution of dark

246
00:10:00,150 --> 00:09:58,640
matter and space no one had ever done

247
00:10:02,389 --> 00:10:00,160
that before

248
00:10:04,710 --> 00:10:02,399
acs was critical to our study of dark

249
00:10:07,030 --> 00:10:04,720
energy surveying the

250
00:10:08,949 --> 00:10:07,040
the galaxies out across space for

251
00:10:10,790 --> 00:10:08,959
exploding stars supernovae that would

252
00:10:12,790 --> 00:10:10,800
indicate how far away those galaxies

253
00:10:20,150 --> 00:10:12,800
were and how fast they're moving away

254
00:10:26,069 --> 00:10:23,590
so we were pretty far along on stis

255
00:10:27,670 --> 00:10:26,079
and then acs failed and that was really

256
00:10:29,990 --> 00:10:27,680
late in the game

257
00:10:31,670 --> 00:10:30,000
what failed as a power supply and in

258
00:10:33,350 --> 00:10:31,680
fact in the acs there were two power

259
00:10:35,190 --> 00:10:33,360
supplies one

260
00:10:37,030 --> 00:10:35,200
redundant set of power supplies so one

261
00:10:40,470 --> 00:10:37,040
of them failed and they switched to the

262
00:10:43,030 --> 00:10:40,480
other side and the other one then failed

263
00:10:44,710 --> 00:10:43,040

so there was not much time but it was

264
00:10:47,350 --> 00:10:44,720
decided to see if we could come up with

265
00:10:49,030 --> 00:10:47,360
a fix for it

266
00:10:51,590 --> 00:10:49,040
we leveraged what we learned on this

267
00:10:53,750 --> 00:10:51,600
disk job you know how to get to those

268
00:10:55,670 --> 00:10:53,760
components how to remove large numbers

269
00:10:57,990 --> 00:10:55,680
of fasteners with fastener capture

270
00:11:00,949 --> 00:10:58,000
plates how to build special tools for

271
00:11:04,069 --> 00:11:00,959
the astronauts to do the job

272
00:11:05,829 --> 00:11:04,079
just getting the thing to work in this

273
00:11:07,590 --> 00:11:05,839
amount of time

274
00:11:09,829 --> 00:11:07,600
has been difficult we're running

275
00:11:12,230 --> 00:11:09,839
probably two to three times faster than

276
00:11:14,790 --> 00:11:12,240
a typical program getting things from

277
00:11:16,870 --> 00:11:14,800
concept to design to actual

278
00:11:19,350 --> 00:11:16,880
cutting metal and building things

279
00:11:20,470 --> 00:11:19,360
it has become one of the fortes of our

280
00:11:22,710 --> 00:11:20,480
program

281
00:11:28,470 --> 00:11:22,720
that our people are really really good

282
00:11:32,630 --> 00:11:30,470
removing the card the the cards that

283
00:11:34,389 --> 00:11:32,640
we're taking out are very similar to the

284
00:11:36,470 --> 00:11:34,399
card that's being removed in this disc

285
00:11:38,470 --> 00:11:36,480
repair and in this disk repair they are

286
00:11:39,990 --> 00:11:38,480
going into where the power supply is

287
00:11:40,949 --> 00:11:40,000
because that was also a power supply

288
00:11:43,430 --> 00:11:40,959

failure

289
00:11:45,269 --> 00:11:43,440
so they're taking off 111 screws for

290
00:11:47,190 --> 00:11:45,279
stis and it's

291
00:11:50,310 --> 00:11:47,200
32 for us

292
00:11:52,310 --> 00:11:50,320
we had learned an awful lot on stis we

293
00:11:54,470 --> 00:11:52,320
knew how to get to these places we knew

294
00:11:56,790 --> 00:11:54,480
how to pull covers off we knew how to

295
00:11:59,430 --> 00:11:56,800
pull cards out now the problem was could

296
00:12:07,509 --> 00:11:59,440
we do it where acs

297
00:12:10,470 --> 00:12:09,110
these instruments were never designed to

298
00:12:12,710 --> 00:12:10,480
be opened up

299
00:12:14,389 --> 00:12:12,720
by astronauts in space and certainly not

300
00:12:16,790 --> 00:12:14,399
by astronauts in space working in big

301
00:12:18,949 --> 00:12:16,800
bulky spacesuits

302
00:12:20,230 --> 00:12:18,959
so we needed to make sure that what we

303
00:12:22,629 --> 00:12:20,240
were doing was something that could be

304
00:12:24,230 --> 00:12:22,639
done by an astronaut in zero gravity

305
00:12:25,750 --> 00:12:24,240
with this big puffy suit around them

306
00:12:27,990 --> 00:12:25,760
constraining their movements and not

307
00:12:29,750 --> 00:12:28,000
only that but it's inside what's called

308
00:12:32,230 --> 00:12:29,760
the aft shroud of the hubble space

309
00:12:33,829 --> 00:12:32,240
telescope so there's the space is kind

310
00:12:36,389 --> 00:12:33,839
of confined they have these doors that

311
00:12:38,629 --> 00:12:36,399
they open up and can get in

312
00:12:40,230 --> 00:12:38,639
but where we're actually going in is

313
00:12:41,190 --> 00:12:40,240

kind of they kind of have to reach

314
00:12:42,470 --> 00:12:41,200
around

315
00:12:43,829 --> 00:12:42,480
some of the stuff

316
00:12:45,269 --> 00:12:43,839
and not work right in front of their

317
00:12:47,670 --> 00:12:45,279
faces

318
00:12:49,829 --> 00:12:47,680
the primary detector of the acs what's

319
00:12:51,829 --> 00:12:49,839
known as the wide field channel is a ccd

320
00:12:52,870 --> 00:12:51,839
just like in your digital camera

321
00:12:55,590 --> 00:12:52,880
only it's

322
00:12:57,829 --> 00:12:55,600
16 megapixels so there's a box that

323
00:12:59,750 --> 00:12:57,839
controls that the ceb and that's what

324
00:13:01,590 --> 00:12:59,760
we're taking out and it's probably fine

325
00:13:03,910 --> 00:13:01,600
it actually is probably still working

326
00:13:06,470 --> 00:13:03,920
but that's the easiest way to get in and

327
00:13:08,310 --> 00:13:06,480
get new power into the system

328
00:13:09,910 --> 00:13:08,320
we had to design a

329
00:13:11,670 --> 00:13:09,920
plate that goes on top of where we're

330
00:13:14,069 --> 00:13:11,680
taking off the screws sort of clips on

331
00:13:16,710 --> 00:13:14,079
there and has little holes in them for

332
00:13:17,509 --> 00:13:16,720
the screwdriver to go through the bit

333
00:13:18,949 --> 00:13:17,519
and

334
00:13:21,110 --> 00:13:18,959
those are too small for the screws to

335
00:13:22,710 --> 00:13:21,120
pass through and that was designed for

336
00:13:24,389 --> 00:13:22,720
the stis repair

337
00:13:25,990 --> 00:13:24,399
and they had a very large one with lots

338
00:13:27,990 --> 00:13:26,000

of different types of screws and we were

339
00:13:30,870 --> 00:13:28,000
fortunate that we are in the end only

340
00:13:32,310 --> 00:13:30,880
taking out one size of screw

341
00:13:35,509 --> 00:13:32,320
work we're going in through the top of

342
00:13:37,430 --> 00:13:35,519
this box and there are four circuit

343
00:13:39,670 --> 00:13:37,440
cards in there we'll pull those out and

344
00:13:41,670 --> 00:13:39,680
that leaves us a hole with connectors at

345
00:13:43,350 --> 00:13:41,680
the bottom and those connectors are what

346
00:13:45,189 --> 00:13:43,360
connect to the detector and what used to

347
00:13:46,389 --> 00:13:45,199
supply power to it

348
00:13:47,829 --> 00:13:46,399
and then we'll have a little cartridge

349
00:13:49,509 --> 00:13:47,839
with four new cards in it that will

350
00:13:51,590 --> 00:13:49,519
slide into that space

351
00:13:53,509 --> 00:13:51,600
and that will

352
00:13:55,110 --> 00:13:53,519
allow us to make connections there with

353
00:13:57,110 --> 00:13:55,120
the new cards

354
00:13:58,949 --> 00:13:57,120
but also the power now will come in from

355
00:14:00,710 --> 00:13:58,959
the outside through our external power

356
00:14:05,990 --> 00:14:00,720
supply

357
00:14:08,790 --> 00:14:07,590
it's particularly important to repair

358
00:14:11,430 --> 00:14:08,800
acs

359
00:14:13,269 --> 00:14:11,440
because it together with the new camera

360
00:14:15,670 --> 00:14:13,279
the whitefield camera 3 make a

361
00:14:17,990 --> 00:14:15,680
complimentary set they have a full set

362
00:14:20,629 --> 00:14:18,000
of capabilities that astronomers need in

363
00:14:21,590 --> 00:14:20,639

cameras operating together it's very

364
00:14:23,750 --> 00:14:21,600
clear

365
00:14:25,430 --> 00:14:23,760
that after the servicing mission is over

366
00:14:27,829 --> 00:14:25,440
astronomers will be using this

367
00:14:29,509 --> 00:14:27,839
combination of wide field camera 3 and

368
00:14:35,189 --> 00:14:29,519
advanced camera for surveys about

369
00:14:39,750 --> 00:14:37,110
so recapping the activities for flight

370
00:14:41,829 --> 00:14:39,760
day five the spacewalk completed by mike

371
00:14:43,670 --> 00:14:41,839
massimino and mike good was the second

372
00:14:46,310 --> 00:14:43,680
of the flight and the 20th in the

373
00:14:48,790 --> 00:14:46,320
history of hubble service emissions

374
00:14:50,230 --> 00:14:48,800
on deck for tomorrow installing a new

375
00:14:52,550 --> 00:14:50,240
instrument that will help put more

376
00:14:55,509 --> 00:14:52,560
muscle in the physics of astrophysics

377
00:14:57,350 --> 00:14:55,519
and an unprecedented on-orbit repair

378
00:14:59,269 --> 00:14:57,360
we will now return to mission control in

379
00:15:01,110 --> 00:14:59,279
houston for continuing nasa television

380
00:15:03,430 --> 00:15:01,120
coverage of the flight of atlantis on

381
00:15:05,910 --> 00:15:03,440
the sts-125 mission

382
00:15:07,670 --> 00:15:05,920
up next on nasa tv will be the first