
I&C
HD
High Definition
Space Telescope Operations Control Center
NASA Goddard Space Flight Center
NASA

1
00:00:04,789 --> 00:00:02,470
walk saw the successful addition of a

2
00:00:07,190 --> 00:00:04,799
new science instrument known as coss or

3
00:00:08,870 --> 00:00:07,200
cosmic origin spectrograph there was

4
00:00:11,430 --> 00:00:08,880
also complete success in an

5
00:00:13,350 --> 00:00:11,440
unprecedented on-orbit effort

6
00:00:15,030 --> 00:00:13,360
repair effort with the advanced camera

7
00:00:17,189 --> 00:00:15,040
for surveys

8
00:00:20,070 --> 00:00:17,199
both koss and acs have passed their

9
00:00:21,910 --> 00:00:20,080
aliveness test and cos has also passed

10
00:00:23,670 --> 00:00:21,920
its functional test

11
00:00:25,910 --> 00:00:23,680
a very pleased mission operations

12
00:00:27,750 --> 00:00:25,920
manager keith wallias shared his

13
00:00:32,229 --> 00:00:27,760

thoughts on the day shortly after his

14
00:00:36,069 --> 00:00:34,549
so today was the third eva day or third

15
00:00:37,110 --> 00:00:36,079
spacewalk day and this was what we

16
00:00:39,270 --> 00:00:37,120
thought was going to be our most

17
00:00:40,869 --> 00:00:39,280
challenging day especially with all the

18
00:00:42,069 --> 00:00:40,879
challenges the last few days we're

19
00:00:44,069 --> 00:00:42,079
really a little bit nervous you know the

20
00:00:46,069 --> 00:00:44,079
last few days it's been emotional

21
00:00:47,110 --> 00:00:46,079
because everything's been getting done

22
00:00:48,630 --> 00:00:47,120
but

23
00:00:49,910 --> 00:00:48,640
it's been tough you know we've had a

24
00:00:51,670 --> 00:00:49,920
problem with the rendezvous with the

25
00:00:53,510 --> 00:00:51,680
communication we had a problem with the

26
00:00:55,510 --> 00:00:53,520
wide field getting that camera out we

27
00:00:57,189 --> 00:00:55,520
had a problem getting the gyros in and

28
00:00:58,630 --> 00:00:57,199
these are things we've pretty much done

29
00:01:00,630 --> 00:00:58,640
before so we thought wow these are going

30
00:01:02,389 --> 00:01:00,640
to be pretty easy and here today had

31
00:01:03,349 --> 00:01:02,399
this amazingly challenging task so we

32
00:01:06,070 --> 00:01:03,359
were all

33
00:01:07,750 --> 00:01:06,080
cautious so then we started off cosmic

34
00:01:08,870 --> 00:01:07,760
origin spectrograph took out the old

35
00:01:10,310 --> 00:01:08,880
co-star

36
00:01:12,710 --> 00:01:10,320
and it was kind of a momentous point

37
00:01:14,630 --> 00:01:12,720
because this was the original fix for

38
00:01:16,550 --> 00:01:14,640

the aberration so even the astronaut

39
00:01:17,990 --> 00:01:16,560
john grunsfield he mentioned it he said

40
00:01:20,230 --> 00:01:18,000
wow this is kind of historic and he's

41
00:01:22,070 --> 00:01:20,240
right so this went perfectly they took

42
00:01:23,910 --> 00:01:22,080
it out put in the new instrument without

43
00:01:25,749 --> 00:01:23,920
a hitch we tested it we did our

44
00:01:27,429 --> 00:01:25,759
aliveness test everything worked

45
00:01:28,950 --> 00:01:27,439
perfectly right now actually in the

46
00:01:30,149 --> 00:01:28,960
middle of the functional test making

47
00:01:31,910 --> 00:01:30,159
sure that

48
00:01:34,550 --> 00:01:31,920
all of the detailed functions of this

49
00:01:36,469 --> 00:01:34,560
work but we know it has power the base

50
00:01:38,230 --> 00:01:36,479
functions work now let's just play with

51
00:01:39,510 --> 00:01:38,240
it and make sure it works right and the

52
00:01:41,830 --> 00:01:39,520
next was this advanced camera for

53
00:01:43,429 --> 00:01:41,840
surveys and this is complicated again

54
00:01:45,590 --> 00:01:43,439
it's not just going in and taking out

55
00:01:48,069 --> 00:01:45,600
one and putting another they had to go

56
00:01:49,990 --> 00:01:48,079
in they cut through a mesh grid they had

57
00:01:52,310 --> 00:01:50,000
to go inside they had to take out four

58
00:01:53,190 --> 00:01:52,320
different cards put in a replacement for

59
00:01:56,709 --> 00:01:53,200
it

60
00:01:59,030 --> 00:01:56,719
different tools to make this easier but

61
00:02:00,230 --> 00:01:59,040
they made it look easy

62
00:02:01,510 --> 00:02:00,240
we thought it was going to take a lot

63
00:02:04,149 --> 00:02:01,520

longer than it took they actually got

64
00:02:06,469 --> 00:02:04,159
done in less an hour less time than we

65
00:02:09,270 --> 00:02:06,479
expected he was so far ahead he was so

66
00:02:11,589 --> 00:02:09,280
well trained he did such a fantastic job

67
00:02:15,270 --> 00:02:11,599
it was just a feeling of euphoria in the

68
00:02:18,790 --> 00:02:16,710
when you think of where we were just

69
00:02:21,270 --> 00:02:18,800
three days ago to where we are now we

70
00:02:23,430 --> 00:02:21,280
have new batteries we have new gyros we

71
00:02:25,670 --> 00:02:23,440
have a new science handling computer we

72
00:02:28,229 --> 00:02:25,680
have a new wide field camera we have a

73
00:02:29,270 --> 00:02:28,239
new cause instrument we have a fixed acs

74
00:02:30,550 --> 00:02:29,280
camera

75
00:02:32,470 --> 00:02:30,560
it's just amazing the different

76
00:02:34,869 --> 00:02:32,480
telescope you have now from three days

77
00:02:36,869 --> 00:02:34,879
ago we still have two more days to go

78
00:02:38,229 --> 00:02:36,879
tomorrow another challenge if you had

79
00:02:40,710 --> 00:02:38,239
asked me before the mission obviously

80
00:02:42,550 --> 00:02:40,720
the two hardest days we had were today

81
00:02:43,910 --> 00:02:42,560
and then tomorrow because once again we

82
00:02:46,150 --> 00:02:43,920
have one of these instruments a space

83
00:02:48,470 --> 00:02:46,160
telescope imaging spectrograph this was

84
00:02:50,390 --> 00:02:48,480
installed back in 1997 on our second

85
00:02:51,910 --> 00:02:50,400
servicing mission and it too had a

86
00:02:54,630 --> 00:02:51,920
problem a few years back and had a

87
00:02:56,630 --> 00:02:54,640
failure on it so once again we're going

88
00:02:58,470 --> 00:02:56,640

to repair

89
00:02:59,990 --> 00:02:58,480
done this before this mission and the

90
00:03:01,910 --> 00:03:00,000
other thing we need to do is put on this

91
00:03:04,309 --> 00:03:01,920
new outer blanket layer

92
00:03:06,309 --> 00:03:04,319
the outside of the telescope there's a

93
00:03:07,589 --> 00:03:06,319
mli this multi-layer installation that's

94
00:03:09,589 --> 00:03:07,599
been there since launch and that

95
00:03:11,670 --> 00:03:09,599
protects it from the harsh environment

96
00:03:12,869 --> 00:03:11,680
of space well it doesn't do that great a

97
00:03:14,790 --> 00:03:12,879
job protecting it from the harsh

98
00:03:16,550 --> 00:03:14,800
environment space over 19 years so

99
00:03:18,149 --> 00:03:16,560
therefore what we're going to do we're

100
00:03:19,750 --> 00:03:18,159
going to go and put basically this new

101
00:03:21,990 --> 00:03:19,760
outer blanket layers basically a big

102
00:03:23,430 --> 00:03:22,000
stainless steel cover on top of it so

103
00:03:25,270 --> 00:03:23,440
we'll slap that on we've done this in

104
00:03:27,190 --> 00:03:25,280
the past mission too we've put them on

105
00:03:28,789 --> 00:03:27,200
in other missions and it's worked great

106
00:03:30,869 --> 00:03:28,799
and then that's going to protect us for

107
00:03:32,869 --> 00:03:30,879
a long time for the future so the two

108
00:03:34,949 --> 00:03:32,879
big tasks for tomorrow repair space

109
00:03:36,470 --> 00:03:34,959
telescope imaging spectrograph and put

110
00:03:37,670 --> 00:03:36,480
on this new outer blanket layer to give

111
00:03:43,030 --> 00:03:37,680
us that thermal protection for the

112
00:03:46,470 --> 00:03:44,949
as keith mentioned the fourth spacewalk

113
00:03:48,229 --> 00:03:46,480

of the mission will involve another

114
00:03:50,550 --> 00:03:48,239
repair effort when the other pair of

115
00:03:52,630 --> 00:03:50,560
spacewalking astronauts mike massimino

116
00:03:55,350 --> 00:03:52,640
and mike good make their second venture

117
00:03:57,670 --> 00:03:55,360
into atlantis payload bay to repair the

118
00:04:11,910 --> 00:03:57,680
space telescope imaging spectrograph

119
00:04:18,150 --> 00:04:15,350
in august of 2004 there was a five volt

120
00:04:19,430 --> 00:04:18,160
power supply that drives the mechanisms

121
00:04:21,749 --> 00:04:19,440
on stiffs

122
00:04:24,150 --> 00:04:21,759
and it failed when that happened it

123
00:04:27,670 --> 00:04:24,160
basically meant that stis could not

124
00:04:32,070 --> 00:04:30,710
this was our first black hole hunter it

125
00:04:33,990 --> 00:04:32,080
confirmed for the first time the

126
00:04:36,870 --> 00:04:34,000
existence of a supermassive black hole

127
00:04:39,270 --> 00:04:36,880
in the center of a galaxy

128
00:04:41,749 --> 00:04:39,280
and it went on to make the first

129
00:04:43,430 --> 00:04:41,759
detection and chemical analysis of the

130
00:04:45,430 --> 00:04:43,440
atmosphere of a planet around another

131
00:04:46,390 --> 00:04:45,440
star we want to keep on doing that kind

132
00:04:48,310 --> 00:04:46,400
of work

133
00:04:51,030 --> 00:04:48,320
this is what's called a spectrograph

134
00:04:53,110 --> 00:04:51,040
what it does is spreads the light out

135
00:04:54,870 --> 00:04:53,120
into its different wavelengths

136
00:04:57,510 --> 00:04:54,880
that's really important if we want to

137
00:04:59,990 --> 00:04:57,520
learn about how fast an object is moving

138
00:05:02,070 --> 00:05:00,000

what it's made of what the

139
00:05:04,629 --> 00:05:02,080
pressure and temperature it's getting at

140
00:05:06,310 --> 00:05:04,639
the physics of what's going on up there

141
00:05:07,909 --> 00:05:06,320
in the universe

142
00:05:09,749 --> 00:05:07,919
you might well ask if we're going to fly

143
00:05:11,670 --> 00:05:09,759
a cosmic origin spectrograph that's the

144
00:05:14,469 --> 00:05:11,680
most sensitive spectrographic earthquake

145
00:05:16,629 --> 00:05:14,479
hubble why do we need to bother to to

146
00:05:17,990 --> 00:05:16,639
repair the space telescope into the

147
00:05:22,390 --> 00:05:18,000
spectrograph

148
00:05:24,550 --> 00:05:22,400
do a number of things that cos can't do

149
00:05:26,390 --> 00:05:24,560
and conversely between the cosmic origin

150
00:05:27,430 --> 00:05:26,400
spectrograph that's very fast and very

151
00:05:28,790 --> 00:05:27,440
efficient

152
00:05:30,469 --> 00:05:28,800
and the space telescope imaging

153
00:05:33,510 --> 00:05:30,479
spectrograph that provides finer

154
00:05:34,950 --> 00:05:33,520
resolution and a smoother cut as it were

155
00:05:37,350 --> 00:05:34,960
through the light from the star or

156
00:05:39,350 --> 00:05:37,360
galaxy and you have a much more complete

157
00:05:43,830 --> 00:05:39,360
set of tools to use for a variety of

158
00:05:48,710 --> 00:05:46,710
it was huge motivation to recover stiffs

159
00:05:51,189 --> 00:05:48,720
so our engineers embarked on one of

160
00:05:53,430 --> 00:05:51,199
these rapid development programs and

161
00:05:56,550 --> 00:05:53,440
this this failure was

162
00:05:58,629 --> 00:05:56,560
very easily characterized we knew

163
00:06:01,270 --> 00:05:58,639

exactly what happened we knew exactly

164
00:06:04,230 --> 00:06:01,280
what card we knew exactly what compound

165
00:06:06,070 --> 00:06:04,240
and the challenge became can we get to

166
00:06:06,870 --> 00:06:06,080
it

167
00:06:08,790 --> 00:06:06,880
this

168
00:06:11,029 --> 00:06:08,800
particular activity that we're going to

169
00:06:12,629 --> 00:06:11,039
do to try to fix stis

170
00:06:13,749 --> 00:06:12,639
wasn't meant to be done in space it was

171
00:06:16,390 --> 00:06:13,759
meant to be done

172
00:06:18,070 --> 00:06:16,400
here on earth in a clean room now since

173
00:06:20,309 --> 00:06:18,080
no one ever expected this to happen when

174
00:06:23,590 --> 00:06:20,319
they sealed up this this instrument they

175
00:06:25,749 --> 00:06:23,600
sealed it up so it was nice and secure

176
00:06:27,830 --> 00:06:25,759
in fact there's 110 of these very small

177
00:06:29,270 --> 00:06:27,840
screws that we need to remove from the

178
00:06:31,510 --> 00:06:29,280
instrument in order to gain access to

179
00:06:33,909 --> 00:06:31,520
the board we need to replace

180
00:06:35,990 --> 00:06:33,919
and these screws are not what we call

181
00:06:37,670 --> 00:06:36,000
captive in other words as you take the

182
00:06:39,350 --> 00:06:37,680
screw out

183
00:06:41,189 --> 00:06:39,360
it's loose

184
00:06:43,510 --> 00:06:41,199
there's nothing holding it to the board

185
00:06:45,830 --> 00:06:43,520
the engineers here at goddard have been

186
00:06:47,590 --> 00:06:45,840
very creative in designing

187
00:06:48,870 --> 00:06:47,600
a cover plate that we can put on over

188
00:06:50,629 --> 00:06:48,880

top

189
00:06:53,990 --> 00:06:50,639
that as we take the screws out they'll

190
00:06:55,430 --> 00:06:54,000
be captured by this plexiglas cover we

191
00:06:57,189 --> 00:06:55,440
designed what's called the fastener

192
00:06:59,589 --> 00:06:57,199
capture plate

193
00:07:01,510 --> 00:06:59,599
it attaches onto the instrument

194
00:07:03,830 --> 00:07:01,520
it's got holes that the astronauts can

195
00:07:05,990 --> 00:07:03,840
access their tool into they're small

196
00:07:10,150 --> 00:07:06,000
enough for the tool bit but not large

197
00:07:13,029 --> 00:07:11,749
my job is going to be to drive each one

198
00:07:14,790 --> 00:07:13,039
of these screws

199
00:07:16,629 --> 00:07:14,800
remove that plate get inside of it and

200
00:07:18,469 --> 00:07:16,639
then remove a board much like you would

201
00:07:21,350 --> 00:07:18,479
remove a board in a computer in your

202
00:07:23,189 --> 00:07:21,360
house except for any fancy clothes a big

203
00:07:24,230 --> 00:07:23,199
fancy spacesuit we're using fancy tools

204
00:07:26,950 --> 00:07:24,240
to do it

205
00:07:28,830 --> 00:07:26,960
you want to make sure we do it right

206
00:07:31,830 --> 00:07:28,840
if we are going to go do

207
00:07:33,510 --> 00:07:31,840
exploration and continue with

208
00:07:35,510 --> 00:07:33,520
on-orbit assembly and test the

209
00:07:37,110 --> 00:07:35,520
spacecraft we've got to learn how to do

210
00:07:40,870 --> 00:07:37,120
that we've got to learn how to pull

211
00:07:43,189 --> 00:07:40,880
boards out and put boards in

212
00:07:51,749 --> 00:07:43,199
and so here we are you know hubble once

213
00:07:55,510 --> 00:07:53,430

the other planned activity during the

214
00:07:57,749 --> 00:07:55,520
fourth spacewalk is part of the effort

215
00:07:59,990 --> 00:07:57,759
of extending hubble's operational life

216
00:08:02,390 --> 00:08:00,000
in this case it is the installation of

217
00:08:08,390 --> 00:08:02,400
new thermal protection material known as

218
00:08:14,150 --> 00:08:11,430
we're going to install a new outer

219
00:08:16,869 --> 00:08:14,160
blanket layer called a noble which is a

220
00:08:18,550 --> 00:08:16,879
solid it's not a blanket anymore it's a

221
00:08:21,350 --> 00:08:18,560
solid sheet

222
00:08:24,230 --> 00:08:21,360
we designed a new outer blanket layer

223
00:08:25,749 --> 00:08:24,240
that can either lay on top of the

224
00:08:27,990 --> 00:08:25,759
degraded blankets

225
00:08:29,909 --> 00:08:28,000
just cover them up or we will take off

226
00:08:32,149 --> 00:08:29,919
the blanket in order to install a new

227
00:08:34,790 --> 00:08:32,159
radiator against the bay door and this

228
00:08:36,630 --> 00:08:34,800
is a very

229
00:08:38,230 --> 00:08:36,640
weather resistant new outer blanket

230
00:08:39,750 --> 00:08:38,240
layer that we have designed so it should

231
00:08:42,230 --> 00:08:39,760
not degrade

232
00:08:45,190 --> 00:08:42,240
appreciably for the next

233
00:08:47,110 --> 00:08:45,200
15-20 years

234
00:08:48,949 --> 00:08:47,120
so at the end of this servicing mission

235
00:08:51,430 --> 00:08:48,959
where we've installed new cameras and

236
00:08:52,949 --> 00:08:51,440
upgraded all of this infrastructure

237
00:08:54,870 --> 00:08:52,959
the whole point of this is that the

238
00:08:56,790 --> 00:08:54,880

hubble space telescope will be better

239
00:08:58,870 --> 00:08:56,800
than it's ever been in its history and

240
00:09:01,350 --> 00:08:58,880
will continue to produce this this

241
00:09:04,710 --> 00:09:01,360
breathtaking and amazing science well

242
00:09:09,230 --> 00:09:07,110
with almost 22 hours of space walking

243
00:09:11,430 --> 00:09:09,240
time already under their belt the

244
00:09:13,829 --> 00:09:11,440
sts-125 astronauts have already

245
00:09:15,590 --> 00:09:13,839
accomplished five of the top six mission

246
00:09:17,350 --> 00:09:15,600
science priorities

247
00:09:19,269 --> 00:09:17,360
we will now return to mission control in

248
00:09:21,269 --> 00:09:19,279
houston for continuing nasa television

249
00:09:23,590 --> 00:09:21,279
coverage of the flight of atlantis on

250
00:09:26,630 --> 00:09:23,600
the sts-125 mission

251
00:09:28,790 --> 00:09:26,640
up next on nasa tv will be the next