1
00:00:17,750 --> 00:00:15,030
in august of 2004 there was a 5 volt

2
00:00:20,230 --> 00:00:17,760
power supply that drives the mechanisms

3
00:00:22,070 --> 00:00:20,240
on stiffs and it failed

4
00:00:23,750 --> 00:00:22,080
when that happened it basically meant

5
00:00:27,269 --> 00:00:23,760
that stis could not

6
00:00:31,669 --> 00:00:30,310
this was our first black hole hunter it

7
00:00:33,590 --> 00:00:31,679
confirmed for the first time the

8
00:00:36,470 --> 00:00:33,600
existence of a supermassive black hole

9
00:00:38,869 --> 00:00:36,480
in the center of a galaxy

10
00:00:41,350 --> 00:00:38,879
and it went on to make the first

11
00:00:43,670 --> 00:00:41,360
detection and chemical analysis of the

12
00:00:45,110 --> 00:00:43,680
atmospherical planet around another star

13
00:00:45,990 --> 00:00:45,120

we want to keep on doing that kind of

14
00:00:47,910 --> 00:00:46,000
work

15
00:00:50,630 --> 00:00:47,920
this is what's called a spectrograph

16
00:00:52,709 --> 00:00:50,640
what it does is spreads the light out

17
00:00:54,470 --> 00:00:52,719
into its different wavelengths

18
00:00:57,110 --> 00:00:54,480
that's really important if we want to

19
00:00:59,990 --> 00:00:57,120
learn about how fast an object is moving

20
00:01:01,910 --> 00:01:00,000
what it's made of what the the pressure

21
00:01:04,310 --> 00:01:01,920
and temperature it's getting at the

22
00:01:05,910 --> 00:01:04,320
physics of what's going on up there in

23
00:01:07,510 --> 00:01:05,920
the universe

24
00:01:09,350 --> 00:01:07,520
you might well ask if we're going to fly

25
00:01:11,190 --> 00:01:09,360
a cosmic origin spectrograph that's the

26
00:01:14,070 --> 00:01:11,200
most sensitive spectrographic earthquake

27
00:01:16,149 --> 00:01:14,080
hubble why do we need to bother to to

28
00:01:17,590 --> 00:01:16,159
repair the space telescope imaging

29
00:01:21,990 --> 00:01:17,600
spectrograph

30
00:01:24,149 --> 00:01:22,000
do a number of things that cos can't do

31
00:01:25,990 --> 00:01:24,159
and conversely between the cosmic origin

32
00:01:27,030 --> 00:01:26,000
spectrograph that's very fast and very

33
00:01:28,390 --> 00:01:27,040
efficient

34
00:01:30,069 --> 00:01:28,400
and the space telescope imaging

35
00:01:33,109 --> 00:01:30,079
spectrograph that provides finer

36
00:01:34,550 --> 00:01:33,119
resolution and a smoother cut as it were

37
00:01:36,950 --> 00:01:34,560
through the light from the star or

38
00:01:38,950 --> 00:01:36,960

galaxy and you have a much more complete

39
00:01:43,429 --> 00:01:38,960
set of tools to use for a variety of

40
00:01:48,310 --> 00:01:46,310
it was huge motivation to recover stiffs

41
00:01:50,789 --> 00:01:48,320
so our engineers embarked on one of

42
00:01:53,030 --> 00:01:50,799
these rapid development programs and

43
00:01:56,149 --> 00:01:53,040
this this failure was

44
00:01:58,230 --> 00:01:56,159
very easily characterized we knew

45
00:02:00,870 --> 00:01:58,240
exactly what happened we knew exactly

46
00:02:03,910 --> 00:02:00,880
what card we knew exactly what component

47
00:02:05,670 --> 00:02:03,920
and the challenge became can we get to

48
00:02:06,469 --> 00:02:05,680
it

49
00:02:08,389 --> 00:02:06,479
this

50
00:02:10,630 --> 00:02:08,399
particular activity that we're going to

51
00:02:12,229 --> 00:02:10,640
do to try to fix stis

52
00:02:13,430 --> 00:02:12,239
wasn't meant to be done in space it was

53
00:02:15,990 --> 00:02:13,440
meant to be done

54
00:02:17,670 --> 00:02:16,000
here on earth in a clean room now since

55
00:02:19,910 --> 00:02:17,680
no one ever expected this to happen when

56
00:02:23,190 --> 00:02:19,920
they sealed up this this instrument they

57
00:02:25,350 --> 00:02:23,200
sealed it up so it was nice and secure

58
00:02:27,430 --> 00:02:25,360
in fact there's 110 of these very small

59
00:02:28,869 --> 00:02:27,440
screws that we need to remove from the

60
00:02:31,110 --> 00:02:28,879
instrument in order to gain access to

61
00:02:33,509 --> 00:02:31,120
the board we need to replace

62
00:02:35,509 --> 00:02:33,519
and these screws are not what we call

63
00:02:37,270 --> 00:02:35,519

captive in other words as you take the

64
00:02:38,949 --> 00:02:37,280
screw out

65
00:02:40,790 --> 00:02:38,959
it's loose

66
00:02:43,110 --> 00:02:40,800
there's nothing holding it to the board

67
00:02:45,430 --> 00:02:43,120
the engineers here at goddard have been

68
00:02:47,270 --> 00:02:45,440
very creative in designing

69
00:02:48,470 --> 00:02:47,280
a cover plate that we can put on over

70
00:02:50,229 --> 00:02:48,480
top

71
00:02:53,589 --> 00:02:50,239
that as we take the screws out they'll

72
00:02:55,030 --> 00:02:53,599
be captured by this plexiglas cover we

73
00:02:56,790 --> 00:02:55,040
designed what's called the fastener

74
00:02:59,190 --> 00:02:56,800
capture plate

75
00:03:01,110 --> 00:02:59,200
it attaches onto the instrument

76
00:03:03,430 --> 00:03:01,120
it's got holes that the astronauts can

77
00:03:05,589 --> 00:03:03,440
access their tool into they're small

78
00:03:09,750 --> 00:03:05,599
enough for the tool bit but not large

79
00:03:12,630 --> 00:03:11,350
my job is going to be to drive each one

80
00:03:14,309 --> 00:03:12,640
of these screws

81
00:03:16,229 --> 00:03:14,319
remove that plate get inside of it and

82
00:03:18,070 --> 00:03:16,239
then remove a board much like you would

83
00:03:20,630 --> 00:03:18,080
remove a board in a computer in your

84
00:03:22,470 --> 00:03:20,640
house except wearing these fancy clothes

85
00:03:23,750 --> 00:03:22,480
a big fancy spacesuit we're using fancy

86
00:03:26,550 --> 00:03:23,760
tools to do it

87
00:03:29,589 --> 00:03:26,560
we want to make sure we do it right

88
00:03:31,430 --> 00:03:29,599

if we are going to go do exploration

89
00:03:33,110 --> 00:03:31,440
and continue with

90
00:03:35,110 --> 00:03:33,120
on-orbit assembly and test the

91
00:03:36,710 --> 00:03:35,120
spacecraft we've got to learn how to do

92
00:03:40,470 --> 00:03:36,720
that we've got to learn how to pull

93
00:03:42,789 --> 00:03:40,480
boards out and put boards in