1
00:00:22,630 --> 00:00:20,390
it's our last shot it's the fifth and

2
00:00:24,070 --> 00:00:22,640
final time it's our last shot to extend

3
00:00:25,830 --> 00:00:24,080
hubble's life and

4
00:00:28,630 --> 00:00:25,840
bring it to the apex of its scientific

5
00:00:32,470 --> 00:00:30,310
and we just have lots of things we want

6
00:00:35,030 --> 00:00:32,480
to repair on hubble and upgrade on

7
00:00:36,389 --> 00:00:35,040
hubble and not a lot of time to do it

8
00:00:38,069 --> 00:00:36,399
and we're going to take up everything we

9
00:00:40,790 --> 00:00:38,079
can take up and on this flight it's

10
00:00:42,790 --> 00:00:40,800
about 23 000 pounds of hardware

11
00:00:46,229 --> 00:00:42,800
this is going to be a very exciting

12
00:00:48,069 --> 00:00:46,239
complicated and challenging mission

13
00:00:50,310 --> 00:00:48,079

we have seven brave astronauts who made

14
00:00:52,150 --> 00:00:50,320
a conscious decision to risk their lives

15
00:00:54,229 --> 00:00:52,160
in order to continue the advancement of

16
00:00:55,990 --> 00:00:54,239
science that hubble has begun

17
00:00:57,590 --> 00:00:56,000
they're gonna buy another five perhaps

18
00:01:01,670 --> 00:00:57,600
ten more years of lifetime for this

19
00:01:05,429 --> 00:01:03,830
we've got a full plate of things to do

20
00:01:06,630 --> 00:01:05,439
we've got major science upgrades that

21
00:01:08,950 --> 00:01:06,640
we're going to do so we have two new

22
00:01:09,990 --> 00:01:08,960
science instruments that we're going to

23
00:01:11,350 --> 00:01:10,000
install

24
00:01:12,550 --> 00:01:11,360
we're going to put in the cosmic origin

25
00:01:14,230 --> 00:01:12,560
spectrograph

26
00:01:15,749 --> 00:01:14,240
and this is you know the fanciest

27
00:01:16,950 --> 00:01:15,759
spectrograph that's ever been put into

28
00:01:21,830 --> 00:01:16,960
hubble

29
00:01:23,429 --> 00:01:21,840
to observe deeper across the universe

30
00:01:25,350 --> 00:01:23,439
than any other

31
00:01:26,390 --> 00:01:25,360
instrument of this kind has ever done

32
00:01:27,270 --> 00:01:26,400
before

33
00:01:30,710 --> 00:01:27,280
well we're going to install the

34
00:01:33,270 --> 00:01:30,720
whitefield camera 3 hubble's new imager

35
00:01:35,350 --> 00:01:33,280
wide field camera 3's discovery factor

36
00:01:36,710 --> 00:01:35,360
is about 10 times better

37
00:01:37,670 --> 00:01:36,720
than the current instruments that we

38
00:01:38,870 --> 00:01:37,680

have

39
00:01:40,390 --> 00:01:38,880
on hubble

40
00:01:42,870 --> 00:01:40,400
one of the beautiful things about our

41
00:01:45,270 --> 00:01:42,880
new camera the whitefield camera 3 is it

42
00:01:47,270 --> 00:01:45,280
will be capable of looking farther out

43
00:01:50,149 --> 00:01:47,280
across the universe and farther back in

44
00:01:52,069 --> 00:01:50,159
time and closer to the big bang than any

45
00:01:57,270 --> 00:01:52,079
other camera we've ever had on hubble

46
00:02:00,950 --> 00:01:59,109
we're also going to attempt two repairs

47
00:02:03,030 --> 00:02:00,960
of the two failed instruments on board

48
00:02:05,590 --> 00:02:03,040
hubble the advanced gamer for surveys

49
00:02:08,869 --> 00:02:05,600
and stis

50
00:02:11,029 --> 00:02:08,879
acs was inserted on hubble in 2002

51
00:02:12,790 --> 00:02:11,039
before it died it was the most heavily

52
00:02:15,510 --> 00:02:12,800
used instrument on hubble

53
00:02:18,070 --> 00:02:15,520
and this was our first black hole hunter

54
00:02:20,390 --> 00:02:18,080
and it went on to do the first detection

55
00:02:22,470 --> 00:02:20,400
and chemical analysis of the atmosphere

56
00:02:24,070 --> 00:02:22,480
of a planet around another star we want

57
00:02:26,229 --> 00:02:24,080
to keep on doing that kind of work once

58
00:02:28,070 --> 00:02:26,239
this comes back online it must be the

59
00:02:31,030 --> 00:02:28,080
first time that we've ever done an

60
00:02:35,509 --> 00:02:31,040
in-situ repair of science instruments so

61
00:02:38,869 --> 00:02:37,430
of these challenge small screws that we

62
00:02:40,470 --> 00:02:38,879
need to remove from the instrument in

63
00:02:41,990 --> 00:02:40,480

order to gain access to the board we

64
00:02:44,710 --> 00:02:42,000
need to replace

65
00:02:47,910 --> 00:02:44,720
and in space things float and debris is

66
00:02:51,350 --> 00:02:49,830
if we're successful in repairing these

67
00:02:53,350 --> 00:02:51,360
two scientific instruments that have

68
00:02:55,430 --> 00:02:53,360
failed it will be a real triumph for

69
00:02:57,430 --> 00:02:55,440
nasa engineering and will point the way

70
00:03:01,509 --> 00:02:57,440
toward our ability in the future to

71
00:03:06,630 --> 00:03:03,990
we want hubble to last a while longer as

72
00:03:08,869 --> 00:03:06,640
a spacecraft and since this will be our

73
00:03:10,550 --> 00:03:08,879
last opportunity to go service it we're

74
00:03:12,710 --> 00:03:10,560
going to do things like

75
00:03:14,149 --> 00:03:12,720
change out all the gyroscopes that help

76
00:03:15,750 --> 00:03:14,159
hubble point

77
00:03:17,190 --> 00:03:15,760
we're going to put in a new fine

78
00:03:20,949 --> 00:03:17,200
guidance sensor

79
00:03:22,949 --> 00:03:20,959
it's a refurbished fine guide sensor

80
00:03:24,630 --> 00:03:22,959
it's one that's been on hubble before

81
00:03:26,789 --> 00:03:24,640
and been brought back to earth

82
00:03:28,229 --> 00:03:26,799
refurbished it so it's a used fine

83
00:03:32,229 --> 00:03:28,239
guidance sensor but

84
00:03:36,390 --> 00:03:34,630
we're going to change out our batteries

85
00:03:38,869 --> 00:03:36,400
never put in new batteries since someone

86
00:03:40,710 --> 00:03:38,879
was launched

87
00:03:42,070 --> 00:03:40,720
we have some insulation repair work that

88
00:03:45,030 --> 00:03:42,080

needs to be done

89
00:03:47,830 --> 00:03:45,040
we're going to install a new outer

90
00:03:50,470 --> 00:03:47,840
blanket layer called a noble which is a

91
00:03:52,550 --> 00:03:50,480
solid it's not a blanket anymore it's a

92
00:03:54,229 --> 00:03:52,560
solid sheet that will go over the

93
00:03:56,229 --> 00:03:54,239
blanket

94
00:03:58,550 --> 00:03:56,239
and we'll also be installing a soft

95
00:04:00,390 --> 00:03:58,560
capture mechanism on the af bulkhead of

96
00:04:02,710 --> 00:04:00,400
hubble that will help facilitate a

97
00:04:04,550 --> 00:04:02,720
future mission to hubble

98
00:04:08,390 --> 00:04:04,560
primarily for the purpose of de-orbiting

99
00:04:10,390 --> 00:04:08,400
it at the end of its useful life

100
00:04:12,070 --> 00:04:10,400
the two repaired scientific instruments

101
00:04:13,910 --> 00:04:12,080
working in tandem with the two new

102
00:04:16,469 --> 00:04:13,920
instruments that we're going to put on

103
00:04:18,390 --> 00:04:16,479
board hubble in this mission will enable

104
00:04:21,749 --> 00:04:18,400
scientists to tackle some of the most

105
00:04:25,749 --> 00:04:21,759
profound issues facing modern science

106
00:04:30,150 --> 00:04:27,830
this in my mind means that when the

107
00:04:32,310 --> 00:04:30,160
astronauts leave hubble after servicing

108
00:04:36,950 --> 00:04:32,320
mission four it will be at the absolute