SERVICING MISSION 1

HUBBLE SPACE TELESCOPE

1
00:00:10,950 --> 00:00:08,629
this is the hubble space telescope

2
00:00:12,150 --> 00:00:10,960
the hubble space telescope hubble space

3
00:00:15,829 --> 00:00:12,160
telescope

4
00:00:17,189 --> 00:00:15,839
universe

5
00:00:19,269 --> 00:00:17,199
it is a piece of engineering and

6
00:00:23,509 --> 00:00:19,279
astronomical majesty that is captured to

7
00:00:25,429 --> 00:00:23,519
the most astounding images of the cosmos

8
00:00:27,269 --> 00:00:25,439
i could only say there was one word to

9
00:00:31,109 --> 00:00:27,279
describe these images and that's just

10
00:00:34,790 --> 00:00:33,030
but hubble's journey didn't start out

11
00:00:36,870 --> 00:00:34,800
that way specialist kathy thornton

12
00:00:38,790 --> 00:00:36,880
they're making their way down

13
00:00:40,869 --> 00:00:38,800

and we have a debra houston for dolph

14
00:00:42,380 --> 00:00:40,879
getting us a leg up on the solar rate

15
00:00:46,549 --> 00:00:42,390
changeover the next day i'm just

16
00:00:50,069 --> 00:00:48,389
as hubble was being planned and built

17
00:00:53,430 --> 00:00:50,079
engineers designed the telescope to be

18
00:00:55,189 --> 00:00:53,440
worked on by astronauts in space

19
00:00:56,709 --> 00:00:55,199
it was equipped with handrails and its

20
00:01:02,470 --> 00:00:56,719
instruments were made to be easily

21
00:01:06,950 --> 00:01:04,710
nasa and astronomers wanted to upgrade

22
00:01:08,870 --> 00:01:06,960
hubble throughout its life

23
00:01:10,950 --> 00:01:08,880
they could install latest technologies

24
00:01:13,510 --> 00:01:10,960
and repair parts that broke or became

25
00:01:15,749 --> 00:01:13,520
damaged while in space

26
00:01:18,230 --> 00:01:15,759
liftoff of the space shuttle discovery

27
00:01:20,469 --> 00:01:18,240
with the hubble space telescope soon

28
00:01:23,670 --> 00:01:20,479
after hubble's launch and deployment in

29
00:01:30,149 --> 00:01:26,070
that ability to fix hubble became more

30
00:01:32,390 --> 00:01:30,159
critical than anyone had ever imagined

31
00:01:35,749 --> 00:01:32,400
when hubble's first images reached earth

32
00:01:37,590 --> 00:01:35,759
something seemed to not look quite right

33
00:01:39,190 --> 00:01:37,600
literally conclusion we've come to from

34
00:01:41,429 --> 00:01:39,200
that is that there's a significant

35
00:01:43,030 --> 00:01:41,439
spherical aberration appears to be

36
00:01:44,870 --> 00:01:43,040
present in the optics it was soon

37
00:01:46,870 --> 00:01:44,880
discovered that hubble's primary mirror

38
00:01:50,230 --> 00:01:46,880

was ground too flat and it caused the

39
00:01:54,310 --> 00:01:52,230
public apprehension soon began to rise

40
00:01:55,590 --> 00:01:54,320
and nasa's competency began to be called

41
00:01:57,270 --> 00:01:55,600
into question

42
00:01:59,429 --> 00:01:57,280
okay the bottom line is do we have a fix

43
00:02:00,950 --> 00:01:59,439
for this as i said the biggest impact

44
00:02:03,190 --> 00:02:00,960
right now is the loss of spatial

45
00:02:05,270 --> 00:02:03,200
resolution the wide field camera

46
00:02:07,270 --> 00:02:05,280
with the focusing issues of the primary

47
00:02:09,109 --> 00:02:07,280
mirror and two of hubble's gyroscopes

48
00:02:12,070 --> 00:02:09,119
failing the need for this servicing

49
00:02:14,710 --> 00:02:12,080
mission was urgent

50
00:02:16,309 --> 00:02:14,720
i know we're going to succeed at this

51
00:02:19,589 --> 00:02:16,319
and we're going to turn the hubble space

52
00:02:21,670 --> 00:02:19,599
telescope in all regards into the

53
00:02:23,190 --> 00:02:21,680
exciting scientific instrument that we

54
00:02:24,949 --> 00:02:23,200
expect it to be

55
00:02:26,550 --> 00:02:24,959
seven astronauts who began training for

56
00:02:28,229 --> 00:02:26,560
this all-important first servicing

57
00:02:33,670 --> 00:02:28,239
mission were more than prepared to

58
00:02:39,030 --> 00:02:37,190
when december 2nd 1993 finally came nasa

59
00:02:41,190 --> 00:02:39,040
was ready

60
00:02:43,110 --> 00:02:41,200
and we have liftoff lift off of the

61
00:02:44,869 --> 00:02:43,120
space shuttle endeavour on an ambitious

62
00:02:53,589 --> 00:02:44,879
mission to service the hubble space

63
00:02:57,509 --> 00:02:55,430

successfully they navigated installing

64
00:02:59,110 --> 00:02:57,519
new solar rays that would not expand and

65
00:03:01,030 --> 00:02:59,120
contract when they went in and out of

66
00:03:04,550 --> 00:03:01,040
sunlight allowing hubble to remain

67
00:03:06,390 --> 00:03:04,560
steady when taking photos

68
00:03:08,710 --> 00:03:06,400
they replaced failing gyroscopes and

69
00:03:10,470 --> 00:03:08,720
magnetometers enabling for more accurate

70
00:03:11,800 --> 00:03:10,480
manipulation of the telescope's

71
00:03:15,110 --> 00:03:11,810
orientation

72
00:03:17,110 --> 00:03:15,120
[Music]

73
00:03:19,910 --> 00:03:17,120
installed a wide field planetary camera

74
00:03:22,070 --> 00:03:19,920
2 which had 48 color filters covering a

75
00:03:24,630 --> 00:03:22,080
spectral range from ultraviolet to

76
00:03:26,470 --> 00:03:24,640
visible wavelengths and housed extra

77
00:03:30,789 --> 00:03:26,480
mirrors to correct for the flaw in

78
00:03:34,229 --> 00:03:32,550
and of course they adjusted the hubble

79
00:03:37,030 --> 00:03:34,239
space telescope's vision with a

80
00:03:39,990 --> 00:03:37,040
corrective optics space telescope axial

81
00:03:41,910 --> 00:03:40,000
replacement or costar that acted almost

82
00:03:44,550 --> 00:03:41,920
like a pair of glasses for the primary

83
00:03:48,949 --> 00:03:44,560
mirror fixing the spherical apparition

84
00:03:53,670 --> 00:03:51,430
after five days of intense repairs and

85
00:03:56,790 --> 00:03:53,680
maintenance the hubble space telescope

86
00:03:57,900 --> 00:03:56,800
was back up and running

87
00:04:06,949 --> 00:03:57,910
[Applause]

88
00:04:13,270 --> 00:04:10,309

pictures are remarkable the science that

89
00:04:15,750 --> 00:04:13,280
will come from the pictures are of

90
00:04:18,789 --> 00:04:15,760
historical significance

91
00:04:22,050 --> 00:04:18,799
and now we are able to clearly see

92
00:04:35,110 --> 00:04:33,590
[Music]

93
00:04:36,870 --> 00:04:35,120
the first servicing mission to hubble

94
00:04:40,230 --> 00:04:36,880
restored the telescope's original

95
00:04:42,390 --> 00:04:40,240
expectations and then so much more

96
00:04:44,070 --> 00:04:42,400
without it the hubble space telescope in

97
00:04:49,120 --> 00:04:44,080
nasa for that reason might not be where

98
00:04:49,130 --> 00:04:55,030
[Music]

99
00:04:59,590 --> 00:04:56,870
thanks to the hubble space telescope and

100
00:05:01,830 --> 00:04:59,600
the team behind servicing mission one

101
00:05:05,510 --> 00:05:01,840
we can now behold these amazing