

A wide-angle photograph of the interior of the Hubble Space Telescope's service module. Two astronauts, wearing blue floral shirts, are seated at a control console. The man in the foreground is wearing safety glasses and looking upwards. The background shows various equipment, cables, and a large window. The text 'SERVICING MISSION 3A' is overlaid in large white letters, and 'HUBBLE SPACE TELESCOPE' is overlaid in white letters on a red rectangular background below it.

SERVICING MISSION 3A

HUBBLE SPACE TELESCOPE

1
00:00:01,990 --> 00:00:00,310

[Music]

2
00:00:04,309 --> 00:00:02,000

by the time the hubble space telescope

3
00:00:06,470 --> 00:00:04,319

was nearing its 10th anniversary in

4
00:00:09,270 --> 00:00:06,480

space it had already become the gold

5
00:00:11,509 --> 00:00:09,280

standard for modern day astronomy

6
00:00:13,830 --> 00:00:11,519

hubble had grown into an indispensable

7
00:00:15,990 --> 00:00:13,840

tool used by scientists all around the

8
00:00:17,910 --> 00:00:16,000

globe to take an inside look into the

9
00:00:21,269 --> 00:00:17,920

universe around us

10
00:00:23,269 --> 00:00:21,279

everything was great flawless even until

11
00:00:25,910 --> 00:00:23,279

something unexpected started to creep

12
00:00:28,710 --> 00:00:25,920

its way into the picture

13
00:00:31,750 --> 00:00:28,720

in the last month namely in in november

14

00:00:33,830 --> 00:00:31,760

13th the fourth of six gyros that are on

15

00:00:35,030 --> 00:00:33,840

board hubble failed

16

00:00:37,510 --> 00:00:35,040

and that

17

00:00:39,990 --> 00:00:37,520

left only two operational gyros

18

00:00:42,470 --> 00:00:40,000

lights out hubble's gyros which are

19

00:00:45,029 --> 00:00:42,480

needed to accurately point the telescope

20

00:00:46,150 --> 00:00:45,039

were failing what was nasa supposed to

21

00:00:49,110 --> 00:00:46,160

do

22

00:00:50,950 --> 00:00:49,120

q servicing mission three a

23

00:00:55,010 --> 00:00:50,960

christmas discovery houston go outside

24

00:01:03,430 --> 00:01:01,270

[Music]

25

00:01:06,550 --> 00:01:03,440

by 1999 hubble was about to make its

26

00:01:08,230 --> 00:01:06,560

mark in the 21st century

27

00:01:10,070 --> 00:01:08,240

[Music]

28

00:01:11,510 --> 00:01:10,080

and as that turn of the century neared

29

00:01:15,109 --> 00:01:11,520

hubble was also due for another

30

00:01:18,789 --> 00:01:16,550

just like the previous two missions to

31

00:01:21,190 --> 00:01:18,799

hubble servicing mission 3 planned for

32

00:01:24,310 --> 00:01:21,200

the year 2000 was going to upgrade and

33

00:01:25,749 --> 00:01:24,320

refurbish the telescope

34

00:01:26,789 --> 00:01:25,759

what do you think about you putting your

35

00:01:28,950 --> 00:01:26,799

tether on

36

00:01:31,109 --> 00:01:28,960

however without warning hubble's

37

00:01:32,950 --> 00:01:31,119

gyroscopes began to fail over a year

38

00:01:35,749 --> 00:01:32,960

before servicing mission astronauts were

39

00:01:37,990 --> 00:01:35,759

scheduled to launch the gyros of course

40

00:01:39,830 --> 00:01:38,000

are are required for the science mission

41

00:01:43,190 --> 00:01:39,840

they're required for the extremely

42

00:01:45,990 --> 00:01:43,200

accurate pointing we've honed in onto a

43

00:01:48,950 --> 00:01:46,000

wire there that is broken and we think

44

00:01:49,990 --> 00:01:48,960

that is the reason why the gyros have

45

00:01:52,069 --> 00:01:50,000

failed

46

00:01:54,910 --> 00:01:52,079

so hubble needed three gyroscopes to

47

00:01:59,270 --> 00:01:54,920

continue to do science and by april 20th

48

00:02:01,590 --> 00:01:59,280

1999 that's all hubble had

49

00:02:03,350 --> 00:02:01,600

swiftly nasa declared a hubble emergency

50

00:02:05,990 --> 00:02:03,360

and split the upcoming servicing mission

51
00:02:07,670 --> 00:02:06,000
into two parts servicing mission 3a

52
00:02:10,309 --> 00:02:07,680
would mainly tackle the gyroscope

53
00:02:11,990 --> 00:02:10,319
failures and servicing mission 3b would

54
00:02:15,110 --> 00:02:12,000
encompass the rest of the maintenance

55
00:02:17,030 --> 00:02:15,120
that hubble didn't need right away

56
00:02:18,710 --> 00:02:17,040
it was now crunch time

57
00:02:20,710 --> 00:02:18,720
not only did nasa have to prepare an

58
00:02:22,869 --> 00:02:20,720
extra shuttle mission but the astronauts

59
00:02:24,949 --> 00:02:22,879
now had to go into overdrive to prepare

60
00:02:25,850 --> 00:02:24,959
for the upcoming mission now scheduled

61
00:02:30,710 --> 00:02:25,860
for october

62
00:02:32,390 --> 00:02:30,720
[Music]

63
00:02:35,509 --> 00:02:32,400

and then when everything seemed to be

64

00:02:39,110 --> 00:02:35,519

more under control news broke the fourth

65

00:02:40,390 --> 00:02:39,120

gyro failed today it's sitting up there

66

00:02:42,309 --> 00:02:40,400

with its

67

00:02:43,589 --> 00:02:42,319

self in safe mode

68

00:02:46,550 --> 00:02:43,599

and

69

00:02:49,589 --> 00:02:46,560

that again shows how important the

70

00:02:51,270 --> 00:02:49,599

serviceability is to this facility

71

00:02:52,869 --> 00:02:51,280

hubble was now in safe mode which meant

72

00:02:55,910 --> 00:02:52,879

that the telescope's eyes were

73

00:02:57,509 --> 00:02:55,920

temporarily closed to science

74

00:03:01,910 --> 00:02:57,519

the servicing mission was more critical

75

00:03:05,350 --> 00:03:03,350

and after multiple maintenance and

76
00:03:08,550 --> 00:03:05,360
wiring checks delayed the shuttle launch

77
00:03:11,110 --> 00:03:08,560
on december 19 1999 the team of

78
00:03:14,630 --> 00:03:11,120
servicing mission 3a was finally able to

79
00:03:16,149 --> 00:03:14,640
make their mark on history

80
00:03:18,229 --> 00:03:16,159
and liftoff of the space shuttle

81
00:03:20,070 --> 00:03:18,239
discovery on a mission to repair the

82
00:03:21,790 --> 00:03:20,080
hubble space telescope as we venture

83
00:03:26,949 --> 00:03:21,800
into the 21st century

84
00:03:29,670 --> 00:03:26,959
[Music]

85
00:03:31,110 --> 00:03:29,680
roger roll discovery

86
00:03:33,030 --> 00:03:31,120
houston is now controlling a real

87
00:03:35,270 --> 00:03:33,040
maneuver is complete discovery is now in

88
00:03:44,430 --> 00:03:35,280

a heads down position on course for a

89

00:03:53,750 --> 00:03:51,270

[Music]

90

00:03:55,990 --> 00:03:53,760

right away the team of seven astronauts

91

00:04:00,070 --> 00:03:56,000

went to work this eight-day mission

92

00:04:01,990 --> 00:04:00,080

included three spacewalks to hubble

93

00:04:03,750 --> 00:04:02,000

the first of which replaced all of the

94

00:04:05,509 --> 00:04:03,760

gyroscopes

95

00:04:07,509 --> 00:04:05,519

now hubble was able to be accurately

96

00:04:09,750 --> 00:04:07,519

positioned and stayed locked on to its

97

00:04:11,670 --> 00:04:09,760

celestial targets

98

00:04:13,910 --> 00:04:11,680

not only that the team behind servicing

99

00:04:16,069 --> 00:04:13,920

mission 3a refurbished hubble's fine

100

00:04:18,789 --> 00:04:16,079

guidance sensor for even greater

101
00:04:20,469 --> 00:04:18,799
precision in pointing the telescope

102
00:04:22,550 --> 00:04:20,479
fixed damaged thermal blankets that

103
00:04:24,790 --> 00:04:22,560
protect the electronics housed inside of

104
00:04:27,430 --> 00:04:24,800
hubble

105
00:04:30,390 --> 00:04:27,440
installed a new computer 20 times faster

106
00:04:32,550 --> 00:04:30,400
than hubble's original computer

107
00:04:34,550 --> 00:04:32,560
replaced old tape recorders with a new

108
00:04:38,710 --> 00:04:34,560
solid state recorder for a greater

109
00:04:40,790 --> 00:04:38,720
efficiency in hubble's data management

110
00:04:43,350 --> 00:04:40,800
and fixed the spacecraft's s-band

111
00:04:46,150 --> 00:04:43,360
transmitter to continue to relay data to

112
00:04:49,350 --> 00:04:46,160
the scientists on the ground

113
00:04:51,510 --> 00:04:49,360

and on christmas day 1999

114

00:04:53,749 --> 00:04:51,520

hubble was released back into the stars

115

00:04:56,629 --> 00:04:53,759

ready to uncover new discoveries that

116

00:04:58,790 --> 00:04:56,639

lie ahead

117

00:05:00,790 --> 00:04:58,800

servicing mission 3a proved that nasa

118

00:05:03,909 --> 00:05:00,800

could not only be quick on its feet in

119

00:05:06,390 --> 00:05:03,919

dire circumstances but perform as a team

120

00:05:09,270 --> 00:05:06,400

that is united around keeping our eyes

121

00:05:11,230 --> 00:05:09,280

open to the universe for many years to