



1
00:00:30,740 --> 00:00:27,259
vehicle that could launch into space as

2
00:00:32,900 --> 00:00:30,750
a rocket put 25 tons of cargo into orbit

3
00:00:37,040 --> 00:00:32,910
and land on a runway like an airplane

4
00:00:41,330 --> 00:00:37,050
not just once but over and over again in

5
00:00:43,190 --> 00:00:41,340
the 1980s NASA would rip this concept

6
00:00:45,830 --> 00:00:43,200
from the pages of science fiction and

7
00:00:53,299 --> 00:00:45,840
place it squarely on the cutting edge of

8
00:00:59,660 --> 00:00:55,790
going up the launchpad and looking up

9
00:01:02,869 --> 00:00:59,670
and seeing you know this huge rocket

10
00:01:04,579 --> 00:01:02,879
that kind of sounds like an animal you

11
00:01:06,680 --> 00:01:04,589
can kind of hear the gurgling and the

12
00:01:11,020 --> 00:01:06,690
hissing and you know it sounds like it's

13
00:01:16,359 --> 00:01:13,870

a few seconds right before liftoff every

14

00:01:18,700 --> 00:01:16,369

time I've done this has been a little

15

00:01:21,010 --> 00:01:18,710

bit of fright about whether I really

16

00:01:22,990 --> 00:01:21,020

want to be doing this or not we have

17

00:01:26,289 --> 00:01:23,000

built a mansion start I was really just

18

00:01:28,899 --> 00:01:26,299

focusing right on the tasks at hand and

19

00:01:30,790 --> 00:01:28,909

trying not to think about you know the

20

00:01:32,230 --> 00:01:30,800

fact that tons and tons and tons of

21

00:01:39,060 --> 00:01:32,240

rocket fuel we're about to explode

22

00:01:39,070 --> 00:01:42,490

Roger roll discovery

23

00:01:42,500 --> 00:01:52,109

discovery up

24

00:01:57,530 --> 00:01:54,719

six seconds into the flight that forces

25

00:02:00,179 --> 00:01:57,540

and sensations are just powerful beyond

26
00:02:02,460 --> 00:02:00,189
imagination they shake you so much that

27
00:02:06,590 --> 00:02:02,470
you can hardly see the displays in front

28
00:02:12,380 --> 00:02:09,050
right after that solid rocket boosters

29
00:02:14,060 --> 00:02:12,390
are jettisoned at two minutes it's a

30
00:02:17,180 --> 00:02:14,070
very smooth ride the acceleration is

31
00:02:22,809 --> 00:02:17,190
very powerful and you're on the way to

32
00:02:28,989 --> 00:02:24,970
as soon as you achieved orbit the

33
00:02:31,599 --> 00:02:28,999
engines cut off just instantaneously you

34
00:02:33,729 --> 00:02:31,609
go from being pressed in the seat to

35
00:02:41,440 --> 00:02:33,739
hanging in your straps and sort of

36
00:02:42,640 --> 00:02:41,450
floating in the cockpit the fact that I

37
00:02:45,610 --> 00:02:42,650
was going to be the first American woman

38
00:02:48,280 --> 00:02:45,620

to go into space carried huge

39

00:02:50,679 --> 00:02:48,290

expectations along with it and of course

40

00:02:53,050 --> 00:02:50,689

it was very important to me that I

41

00:02:54,879 --> 00:02:53,060

understood my role really well and that

42

00:02:57,129 --> 00:02:54,889

I was really well prepared for the

43

00:02:58,990 --> 00:02:57,139

mission because the last thing that I

44

00:03:01,240 --> 00:02:59,000

wanted to do was get into space and make

45

00:03:03,369 --> 00:03:01,250

a mistake so I wanted to be very very

46

00:03:18,659 --> 00:03:03,379

sure that I was able to meet the

47

00:03:21,159 --> 00:03:18,669

expectations but it wasn't from the

48

00:03:24,099 --> 00:03:21,169

desire to be the first African American

49

00:03:26,020 --> 00:03:24,109

in space my desire was to make a

50

00:03:30,610 --> 00:03:26,030

contribution just to make a contribution

51
00:03:32,860 --> 00:03:30,620
and I think I probably told people that

52
00:03:34,599 --> 00:03:32,870
I would probably prefer not being in

53
00:03:36,429 --> 00:03:34,609
that role versus being in their world

54
00:03:46,800 --> 00:03:36,439
because I figured being a number two

55
00:03:52,090 --> 00:03:49,660
see you were having a lot of fun up here

56
00:03:59,770 --> 00:03:52,100
trying to figure out what happens to the

57
00:04:05,040 --> 00:04:02,650
it feels like your way twice as much as

58
00:04:08,800 --> 00:04:05,050
you normally do during the entry portion

59
00:04:11,920 --> 00:04:08,810
once you get on final all the emotions

60
00:04:14,440 --> 00:04:11,930
and sin in focus or just on that last

61
00:04:16,599 --> 00:04:14,450
little bit of landing and it's a it's a

62
00:04:17,590 --> 00:04:16,609
neat way to end a fight when you

63
00:04:26,800 --> 00:04:17,600

actually get to put your hands on the

64

00:04:28,360 --> 00:04:26,810

stick and fly it yourself engines

65

00:04:39,990 --> 00:04:28,370

throttling up three hundred and hundred

66

00:04:47,220 --> 00:04:42,540

we come together today to mourn the loss

67

00:04:50,880 --> 00:04:47,230

of seven brave Americans to share the

68

00:04:53,610 --> 00:04:50,890

grief that we all feel and perhaps in

69

00:04:57,480 --> 00:04:53,620

that sharing to find the strength to

70

00:05:00,660 --> 00:04:57,490

bear our sorrow and the courage to look

71

00:05:03,090 --> 00:05:00,670

for the seeds of hope risk is something

72

00:05:06,360 --> 00:05:03,100

we have to just really consider as part

73

00:05:09,060 --> 00:05:06,370

of our life especially an exploration I

74

00:05:10,500 --> 00:05:09,070

know we've had some tragedies and we'll

75

00:05:12,600 --> 00:05:10,510

probably have tragedies in the future

76

00:05:14,160 --> 00:05:12,610

but you know the ones that we've lost

77

00:05:16,560 --> 00:05:14,170

were probably the first ones to tell you

78

00:05:32,310 --> 00:05:16,570

keep pressing on don't stop because of

79

00:05:35,400 --> 00:05:32,320

us my role as a mechanical engineer was

80

00:05:37,590 --> 00:05:35,410

to find out you know what fell apart or

81

00:05:40,350 --> 00:05:37,600

what happened and we finally found that

82

00:05:43,440 --> 00:05:40,360

the whole ring supposed to be designed

83

00:05:48,270 --> 00:05:43,450

so the pressure on one side pushes them

84

00:05:50,580 --> 00:05:48,280

more securely into place the the housing

85

00:05:53,310 --> 00:05:50,590

for that big old ring was just the

86

00:05:56,159 --> 00:05:53,320

opposite the pressure actually pushed it

87

00:05:59,159 --> 00:05:56,169

out finally of course when the thing

88

00:06:02,550 --> 00:05:59,169

burned through and actually burned the

89

00:06:05,970 --> 00:06:02,560

nozzle through it's pretty obvious to

90

00:06:14,850 --> 00:06:05,980

see what what the problem so with we got

91

00:06:14,860 --> 00:06:26,590

clears the tower Roger roll discovery

92

00:06:32,720 --> 00:06:29,300

good morning discovery and you gotta go

93

00:06:35,630 --> 00:06:32,730

for HST deploy ops NASA opened the

94

00:06:39,170 --> 00:06:35,640

decade of the 90s by placing the Hubble

95

00:06:41,690 --> 00:06:39,180

Space Telescope into orbit it would peer

96

00:06:45,080 --> 00:06:41,700

farther into space and further back in

97

00:06:47,120 --> 00:06:45,090

time than any other telescope and in the

98

00:06:49,310 --> 00:06:47,130

closing decade of the 20th century

99

00:06:52,100 --> 00:06:49,320

Hubble and a host of other robotic

100

00:07:04,940 --> 00:06:52,110

explorers would provide astonishing new

101
00:07:06,740 --> 00:07:04,950
views and perspectives everybody was up

102
00:07:10,040 --> 00:07:06,750
we were off to discover the secrets of

103
00:07:14,390 --> 00:07:10,050
the universe it was it was great and

104
00:07:15,980 --> 00:07:14,400
then things started to be sort of

105
00:07:18,050 --> 00:07:15,990
scratch your head why is it taking so

106
00:07:20,360 --> 00:07:18,060
long why can't we focus the telescope

107
00:07:22,430 --> 00:07:20,370
what's going on what was wrong with

108
00:07:24,080 --> 00:07:22,440
Hubble is the kind of the same thing

109
00:07:26,420 --> 00:07:24,090
that's wrong with your eyes when you

110
00:07:29,210 --> 00:07:26,430
need glasses basically the shape of the

111
00:07:31,340 --> 00:07:29,220
lens was wrong so in essence the

112
00:07:34,600 --> 00:07:31,350
telescope was nearsighted and it needed

113
00:07:37,400 --> 00:07:34,610

some glasses I was taking a shower in

114

00:07:39,290 --> 00:07:37,410

the hotel in Germany and had these

115

00:07:40,910 --> 00:07:39,300

really funny shower heads where the

116

00:07:42,950 --> 00:07:40,920

shower head will kind of move up and

117

00:07:45,440 --> 00:07:42,960

down and back and forth and that's when

118

00:07:48,980 --> 00:07:45,450

it dawned on me we can have this

119

00:07:51,410 --> 00:07:48,990

instrument robotically raise up the

120

00:07:53,210 --> 00:07:51,420

corrective lens clip out if you will

121

00:07:55,400 --> 00:07:53,220

just like that shower head these other

122

00:07:57,560 --> 00:07:55,410

corrective optics to correct the

123

00:07:59,210 --> 00:07:57,570

aberration for all the instruments all

124

00:08:00,650 --> 00:07:59,220

of the work leading up to the first

125

00:08:12,459 --> 00:08:00,660

servicing mission is probably the most

126

00:08:18,320 --> 00:08:15,260

the NASA program changed the nature of

127

00:08:22,040 --> 00:08:18,330

astronomy we need some extravagant

128

00:08:25,159 --> 00:08:22,050

promises on Hubble we under sold the

129

00:08:28,010 --> 00:08:25,169

program whatever we said what we'll did

130

00:08:31,159 --> 00:08:28,020

better I think it really changed the

131

00:08:32,959 --> 00:08:31,169

nature of what we know the Hubble is one

132

00:08:35,600 --> 00:08:32,969

of the most phenomenal things we've ever

133

00:08:37,759 --> 00:08:35,610

done in space data that we get from

134

00:08:40,100 --> 00:08:37,769

Hubble will continue to change the way

135

00:08:43,399 --> 00:08:40,110

we think about ourselves about the

136

00:08:46,970 --> 00:08:43,409

universe and our place in it you know

137

00:08:49,129 --> 00:08:46,980

the pictures from Hubble are iconic you

138

00:08:51,710 --> 00:08:49,139

see them everywhere the fingers of God

139

00:08:54,860 --> 00:08:51,720

this is the gas pillars that are

140

00:08:57,530 --> 00:08:54,870

actually many many many light-years

141

00:08:59,629 --> 00:08:57,540

across so the scale of these things is

142

00:09:03,050 --> 00:08:59,639

enormous and you can actually seeing the

143

00:09:05,240 --> 00:09:03,060

birth of stars there's a star nursery it

144

00:09:07,879 --> 00:09:05,250

starts to give you a sense of how small