



1
00:00:14,990 --> 00:00:12,980
spirit was never designed to last this

2
00:00:16,460 --> 00:00:15,000
long but you know it was Rover was never

3
00:00:18,499 --> 00:00:16,470
designed to go through Martian winter

4
00:00:21,260 --> 00:00:18,509
and she went through three winters

5
00:00:23,660 --> 00:00:21,270
successfully they were never designed to

6
00:00:26,750 --> 00:00:23,670
survive Rover killing dust storms and

7
00:00:28,910 --> 00:00:26,760
yet spirit survived several significant

8
00:00:30,800 --> 00:00:28,920
dust storms spear climbed the husband

9
00:00:32,570 --> 00:00:30,810
Hills it did Martian mountaineering yet

10
00:00:35,180 --> 00:00:32,580
another thing it was never designed to

11
00:00:38,479 --> 00:00:35,190
do so out of this Rover that had a very

12
00:00:41,119 --> 00:00:38,489
limited scope of mission to begin with

13
00:00:43,939 --> 00:00:41,129

we were able to do these magnificent

14

00:00:45,350 --> 00:00:43,949

adventures and the program was very

15

00:00:46,729 --> 00:00:45,360

successful in all that and it's a

16

00:00:48,560 --> 00:00:46,739

testament to the people that designed

17

00:00:50,360 --> 00:00:48,570

and built the rover and a testament to

18

00:00:52,670 --> 00:00:50,370

the people that operated the rover on

19

00:00:57,020 --> 00:00:52,680

the surface the whole mission has had a

20

00:00:59,000 --> 00:00:57,030

really amazing ability to turn what

21

00:01:01,640 --> 00:00:59,010

looks initially like it's going to be

22

00:01:05,810 --> 00:01:01,650

adversity into a great triumph and

23

00:01:08,090 --> 00:01:05,820

spirit in particular has really been

24

00:01:11,270 --> 00:01:08,100

known for this quality one of the things

25

00:01:14,570 --> 00:01:11,280

that characterize spirit on the surface

26
00:01:17,930 --> 00:01:14,580
of Mars was the ability of that Rover to

27
00:01:19,640 --> 00:01:17,940
turn lemons into lemonade a couple of

28
00:01:22,760 --> 00:01:19,650
years into the mission spirits right

29
00:01:24,590 --> 00:01:22,770
front wheel broke and we had to learn to

30
00:01:26,540 --> 00:01:24,600
drive the rover backwards in fact

31
00:01:29,180 --> 00:01:26,550
relearn how to drive the rover and we

32
00:01:31,040 --> 00:01:29,190
would drag that wheel but out of that

33
00:01:32,960 --> 00:01:31,050
adversity came perhaps the most

34
00:01:34,940 --> 00:01:32,970
significant scientific discovery on the

35
00:01:36,680 --> 00:01:34,950
surface of Mars we were hoping that

36
00:01:38,570 --> 00:01:36,690
spirit would find evidence of past water

37
00:01:40,190 --> 00:01:38,580
history at Mars and not only did Spirit

38
00:01:42,290 --> 00:01:40,200

find evidence of a past water history at

39

00:01:45,200 --> 00:01:42,300

Mars she found evidence of pH neutral

40

00:01:47,240 --> 00:01:45,210

water at comanche spur and she found

41

00:01:49,550 --> 00:01:47,250

evidence of hot water existing and kind

42

00:01:51,050 --> 00:01:49,560

of acting for long periods of time in

43

00:01:54,020 --> 00:01:51,060

the inner region near home plate that we

44

00:01:56,300 --> 00:01:54,030

call silica Valley so from a science

45

00:01:58,310 --> 00:01:56,310

perspective spirit smashed expectations

46

00:02:00,380 --> 00:01:58,320

right she did way better than we would

47

00:02:03,020 --> 00:02:00,390

ever possibly have hoped for what Spirit

48

00:02:05,330 --> 00:02:03,030

has told us is that Mars was one time

49

00:02:07,250 --> 00:02:05,340

like the earth some three-and-a-half to

50

00:02:08,749 --> 00:02:07,260

four billion years ago there was liquid

51
00:02:09,770 --> 00:02:08,759
water on the surface it was a thicker

52
00:02:11,539 --> 00:02:09,780
atmosphere there were warmer

53
00:02:13,670 --> 00:02:11,549
temperatures there were even sources of

54
00:02:15,680 --> 00:02:13,680
energy things like Hot Springs these are

55
00:02:17,930 --> 00:02:15,690
all discoveries that spirit has made and

56
00:02:20,540 --> 00:02:17,940
this completely changes are thinking

57
00:02:23,480 --> 00:02:20,550
about Mars that Mars was in fact

58
00:02:26,090 --> 00:02:23,490
time a place that could have supported

59
00:02:27,830 --> 00:02:26,100
life spirits legacy in terms of Mars

60
00:02:30,890 --> 00:02:27,840
exploration might be that she's making

61
00:02:32,600 --> 00:02:30,900
Mars a real place for us she has helped

62
00:02:35,600 --> 00:02:32,610
us to see what we would see if we were

63
00:02:39,290 --> 00:02:35,610

there I also hope that she again has a

64

00:02:42,080 --> 00:02:39,300

broader legacy and towards of continuing

65

00:02:44,330 --> 00:02:42,090

to inspire people to explore to reach

66

00:02:47,210 --> 00:02:44,340

out beyond what they think they can

67

00:02:49,850 --> 00:02:47,220

accomplish we always do there will come

68

00:02:51,770 --> 00:02:49,860

a time when one or the rover's wouldn't

69

00:02:54,710 --> 00:02:51,780

be there that's the interesting thing is

70

00:02:57,440 --> 00:02:54,720

that you do become very attached and you

71

00:02:59,780 --> 00:02:57,450

think of these Rovers really as part of

72

00:03:01,700 --> 00:02:59,790

your team and part of your family for

73

00:03:03,170 --> 00:03:01,710

years now then getting the question well

74

00:03:06,710 --> 00:03:03,180

how are you going to feel when she's

75

00:03:09,590 --> 00:03:06,720

gone and I've always had this image of

76

00:03:12,710 --> 00:03:09,600

sort of the New Orleans Jazz funeral

77

00:03:15,410 --> 00:03:12,720

procession where there's some sadness of

78

00:03:17,870 --> 00:03:15,420

course because spirit has been

79

00:03:20,120 --> 00:03:17,880

essentially my entire career at JPL

80

00:03:23,810 --> 00:03:20,130

working with these two Rovers there is

81

00:03:26,570 --> 00:03:23,820

just so much to celebrate a life if you

82

00:03:29,060 --> 00:03:26,580

will that lasted beyond any expectation

83

00:03:30,890 --> 00:03:29,070

discovered wonderful things so it's very

84

00:03:35,120 --> 00:03:30,900

bittersweet I'm always going to be

85

00:03:36,650 --> 00:03:35,130

really proud of spirit you know spirit

86

00:03:38,810 --> 00:03:36,660

was my first Mars rover and if you've

87

00:03:41,420 --> 00:03:38,820

ever had a first car you know a little

88

00:03:43,729 --> 00:03:41,430

bit about what that's like I have loved

89

00:03:45,530 --> 00:03:43,739

spirit from the early days when it

90

00:03:47,120 --> 00:03:45,540

seemed like nobody else did and I still

91

00:03:49,820 --> 00:03:47,130

do and she's always going to have a

92

00:03:51,440 --> 00:03:49,830

special place to me in my heart you know

93

00:03:55,460 --> 00:03:51,450

is there with her at the very beginning

94

00:03:58,490 --> 00:03:55,470

and she just took me and everybody on a

95

00:04:00,380 --> 00:03:58,500

terrific ride across the surface of Mars

96

00:04:02,360 --> 00:04:00,390

showed us things that nobody has ever

97

00:04:05,210 --> 00:04:02,370

seen before in the history of humanity

98

00:04:06,830 --> 00:04:05,220

opened up that other world for us and

99

00:04:08,690 --> 00:04:06,840

made it possible for us to see it from

100

00:04:11,240 --> 00:04:08,700

the first time as if we were there and

101

00:04:12,320 --> 00:04:11,250

I'm always going to just be you know

102

00:04:14,660 --> 00:04:12,330

it's the kind of thing that I grew up

103

00:04:17,630 --> 00:04:14,670

dreaming about when I was a kid and to

104

00:04:19,640 --> 00:04:17,640

get a chance to do that for real with my

105

00:04:21,440 --> 00:04:19,650

real life you know spirit made that