

1
00:00:05,240 --> 00:00:02,690
scientists expected the Mars rovers

2
00:00:08,210 --> 00:00:05,250
spirit and opportunity to run for three

3
00:00:10,730 --> 00:00:08,220
months three years later the hardy

4
00:00:14,480 --> 00:00:10,740
Rovers are still operating on opposite

5
00:00:17,000 --> 00:00:14,490
sides of the Red Planet this is spirit

6
00:00:18,769 --> 00:00:17,010
story opportunity is is very much the

7
00:00:20,450 --> 00:00:18,779
glamour girl she just lands right where

8
00:00:21,769 --> 00:00:20,460
there's evidence for water and that

9
00:00:23,210 --> 00:00:21,779
sphere is a little more you know a

10
00:00:24,529 --> 00:00:23,220
little more of the serious sister and

11
00:00:25,910 --> 00:00:24,539
has to kind of you know she really had

12
00:00:31,040 --> 00:00:25,920
to work a little more for everything she

13
00:00:33,709 --> 00:00:31,050

accomplished scientists realized these

14

00:00:35,959 --> 00:00:33,719

planes of Gusev crater didn't have the

15

00:00:38,330 --> 00:00:35,969

water story everyone was looking for and

16

00:00:41,119 --> 00:00:38,340

they wondered could the Columbia Hills

17

00:00:42,770 --> 00:00:41,129

Harbor the pot of gold they basically

18

00:00:44,750 --> 00:00:42,780

just gave us the keys for a couple

19

00:00:49,549 --> 00:00:44,760

months and said get the rover to the

20

00:00:52,310 --> 00:00:49,559

Columbia Hills by saw 160 as we started

21

00:00:55,760 --> 00:00:52,320

to find the water story in the Columbia

22

00:00:58,700 --> 00:00:55,770

Hills we have made very important

23

00:01:00,020 --> 00:00:58,710

discoveries within the rocks you know

24

00:01:02,660 --> 00:01:00,030

mineral types that we believe that

25

00:01:05,450 --> 00:01:02,670

formed in water and both Spirit and

26
00:01:10,340 --> 00:01:05,460
Opportunity have done that through their

27
00:01:13,219 --> 00:01:10,350
their mission the discoveries didn't

28
00:01:16,880 --> 00:01:13,229
come without challenges we design all

29
00:01:19,789 --> 00:01:16,890
this rovers so go and do signs on flat

30
00:01:22,910 --> 00:01:19,799
terrain but we go to Mars and we find

31
00:01:27,260 --> 00:01:22,920
out that all the high prior to science

32
00:01:30,230 --> 00:01:27,270
targets on slopes and projects a climber

33
00:01:32,990 --> 00:01:30,240
himself Chris Lecce helped spirit with

34
00:01:34,999 --> 00:01:33,000
Martian mountaineering if you look at

35
00:01:36,610 --> 00:01:35,009
our map part first we started on the

36
00:01:38,590 --> 00:01:36,620
north side and

37
00:01:40,540 --> 00:01:38,600
and traversed all the way around and

38
00:01:50,280 --> 00:01:40,550

then approached it from from the west

39

00:01:55,960 --> 00:01:53,470

after scaling the summit spirits right

40

00:01:58,560 --> 00:01:55,970

front wheel stopped rolling and the

41

00:02:00,730 --> 00:01:58,570

rover was back sliding on nice Brown

42

00:02:03,220 --> 00:02:00,740

spirits life was definitely in jeopardy

43

00:02:04,720 --> 00:02:03,230

in a very short period of time we had to

44

00:02:06,100 --> 00:02:04,730

figure out how to drive her with five

45

00:02:07,900 --> 00:02:06,110

wheels how to get her out of the sand

46

00:02:10,540 --> 00:02:07,910

trap that she was in and had to get her

47

00:02:12,940 --> 00:02:10,550

up onto something dragging one wheel as

48

00:02:15,010 --> 00:02:12,950

she went that would enable her to point

49

00:02:16,390 --> 00:02:15,020

the the wheels at the point of solar

50

00:02:18,430 --> 00:02:16,400

panels at the Sun and we are watching

51
00:02:21,370 --> 00:02:18,440
the solar power curves go down and down

52
00:02:24,970 --> 00:02:21,380
every day and the heaters start to come

53
00:02:27,610 --> 00:02:24,980
on to keep the vehicle alive we're

54
00:02:30,520 --> 00:02:27,620
fortunate to be able to get spirit just

55
00:02:33,460 --> 00:02:30,530
in time so what we call low ridge which

56
00:02:35,530 --> 00:02:33,470
is about a 10 degree slope so we could

57
00:02:38,530 --> 00:02:35,540
point spirit 10 degrees towards the Sun

58
00:02:40,510 --> 00:02:38,540
it was just in the nick of time spirit

59
00:02:43,120 --> 00:02:40,520
hunkered down for the winter but still

60
00:02:45,190 --> 00:02:43,130
managed to do science the rover found

61
00:02:48,340 --> 00:02:45,200
evidence of ice clouds in the atmosphere

62
00:02:53,140 --> 00:02:48,350
and snapped the most detailed Martian

63
00:02:55,420 --> 00:02:53,150

panorama ever taken both of the rover's

64

00:02:56,710 --> 00:02:55,430

have had two brain transplants in the

65

00:02:58,930 --> 00:02:56,720

time they've been on the surface of Mars

66

00:03:01,300 --> 00:02:58,940

basically the rover software is called

67

00:03:02,680 --> 00:03:01,310

probably what you and I know as the Ten

68

00:03:05,350 --> 00:03:02,690

Commandments but it's got more like

69

00:03:10,150 --> 00:03:05,360

thousand Commandments thou shalt not go

70

00:03:12,940 --> 00:03:10,160

over rock 25 centimeters tall dash are

71

00:03:14,910 --> 00:03:12,950

not drive and get it so the more than 25

72

00:03:18,330 --> 00:03:14,920

degrees

73

00:03:21,420 --> 00:03:18,340

and thou shalt kill yourself with winter

74

00:03:23,790 --> 00:03:21,430

gone spirit ever the trooper is on the

75

00:03:26,430 --> 00:03:23,800

move again she's a stubborn old girl and

