

How Perseverance Drives on Mars



Jet Propulsion Laboratory
California Institute of Technology

animation

1
00:00:02,950 --> 00:00:01,270

[Music]

2
00:00:05,349 --> 00:00:02,960

the perseverance rover is currently

3
00:00:08,070 --> 00:00:05,359

driving a three mile journey to get to

4
00:00:10,230 --> 00:00:08,080

the jezreel river delta i'm tyler del

5
00:00:12,150 --> 00:00:10,240

sesto i'm a rover driver for nasa's

6
00:00:13,910 --> 00:00:12,160

perseverance rover

7
00:00:15,990 --> 00:00:13,920

we're here at nasa's jet propulsion

8
00:00:17,510 --> 00:00:16,000

laboratory where the rover drivers are

9
00:00:20,150 --> 00:00:17,520

planning the drive

10
00:00:22,390 --> 00:00:20,160

we use 3d monitors and 3d glasses to

11
00:00:24,310 --> 00:00:22,400

look at the terrain around the rover and

12
00:00:27,109 --> 00:00:24,320

that 3d environment is created from

13
00:00:29,349 --> 00:00:27,119

images taken on the previous day on mars

14

00:00:31,109 --> 00:00:29,359

over the past year the rover drivers

15

00:00:33,190 --> 00:00:31,119

have taken a very active role in

16

00:00:34,549 --> 00:00:33,200

perseverance's drives

17

00:00:36,870 --> 00:00:34,559

currently though we're just trying to

18

00:00:39,510 --> 00:00:36,880

drive as far as we can every day so

19

00:00:41,910 --> 00:00:39,520

we're relying more on perseverance's

20

00:00:43,750 --> 00:00:41,920

self-driving capabilities that means

21

00:00:45,750 --> 00:00:43,760

instead of the rover drivers choosing

22

00:00:48,069 --> 00:00:45,760

exactly where to turn and what rocks to

23

00:00:50,470 --> 00:00:48,079

avoid we're letting perseverance choose

24

00:00:52,549 --> 00:00:50,480

on its own we give it specific stops

25

00:00:54,470 --> 00:00:52,559

along the route but it chooses how to

26

00:00:56,310 --> 00:00:54,480

get there and we trust it to avoid the

27

00:00:58,470 --> 00:00:56,320

hazards along that path

28

00:01:00,709 --> 00:00:58,480

the rover is self-driving ability is

29

00:01:03,029 --> 00:01:00,719

very similar to self-driving cars on

30

00:01:06,149 --> 00:01:03,039

earth but there are different challenges

31

00:01:08,469 --> 00:01:06,159

perseverance needs to look at rocks sand

32

00:01:10,149 --> 00:01:08,479

and other types of hazards like craters

33

00:01:12,950 --> 00:01:10,159

and large things like cliffs and it

34

00:01:15,030 --> 00:01:12,960

needs to avoid these to keep itself safe

35

00:01:17,510 --> 00:01:15,040

this is one of our tools to look at how

36

00:01:19,990 --> 00:01:17,520

drives performed on mars

37

00:01:23,270 --> 00:01:20,000

this is the actual map the rover created

38

00:01:25,429 --> 00:01:23,280

onboard using its left and right cameras

39

00:01:28,070 --> 00:01:25,439

as the rover drives this path it's using

40

00:01:30,390 --> 00:01:28,080

this map to identify which paths are

41

00:01:32,630 --> 00:01:30,400

safe to drive

42

00:01:34,870 --> 00:01:32,640

perseverance's self-driving software is

43

00:01:37,270 --> 00:01:34,880

a big improvement over previous rovers

44

00:01:39,910 --> 00:01:37,280

which also had self-driving capabilities

45

00:01:42,149 --> 00:01:39,920

perseverance is able to process and

46

00:01:44,230 --> 00:01:42,159

analyze images while the wheels are

47

00:01:47,109 --> 00:01:44,240

still in motion previous rovers like

48

00:01:49,270 --> 00:01:47,119

curiosity needed to stop then take

49

00:01:51,749 --> 00:01:49,280

images and then process those images

50

00:01:54,069 --> 00:01:51,759

before choosing a safe path perseverance

51
00:01:55,749 --> 00:01:54,079
is able to do all this while driving we

52
00:01:57,190 --> 00:01:55,759
call this a thinking while driving

53
00:01:59,030 --> 00:01:57,200
capability

54
00:02:00,950 --> 00:01:59,040
the perseverance rover has already

55
00:02:02,709 --> 00:02:00,960
broken all of the driving records from

56
00:02:04,789 --> 00:02:02,719
previous rovers

57
00:02:07,030 --> 00:02:04,799
this means we're able to drive farther

58
00:02:08,389 --> 00:02:07,040
every day than the previous rovers ever

59
00:02:10,869 --> 00:02:08,399
were able to

60
00:02:14,470 --> 00:02:10,879
the perseverance rover has a top speed

61
00:02:16,790 --> 00:02:14,480
of 0.1 miles per hour now that doesn't

62
00:02:19,670 --> 00:02:16,800
sound very fast but that does enable us

63
00:02:21,510 --> 00:02:19,680

to drive over 300 yards every day and

64

00:02:24,070 --> 00:02:21,520

keep the rover safe

65

00:02:26,550 --> 00:02:24,080

perseverance's self-driving ability is

66

00:02:28,470 --> 00:02:26,560

very important to this mission it allows

67

00:02:30,309 --> 00:02:28,480

us to get to the jezreel river delta as

68

00:02:32,470 --> 00:02:30,319

fast as possible and that gives the

69

00:02:34,630 --> 00:02:32,480

science team as much time there to study