1
00:00:09,209 --> 00:00:11,144
Hi, I'm Marlene
Martinez Sundgaard,

2
00:00:11,177 --> 00:00:15,715
the surface test bed lead for
the Mars InSight mission.

3
00:00:15,748 --> 00:00:17,717
We're in the In-Situ
Instrument Lab at the

4
00:00:17,750 --> 00:00:21,588
NASA Jet Propulsion Laboratory
in Pasadena, California.

5
00:00:22,822 --> 00:00:24,757
This is a very unique lab.

6
00:00:24,790 --> 00:00:26,893
We have recreated some of
the conditions on Mars

7
00:00:26,926 --> 00:00:28,628
like the sandy terrain.

8
00:00:28,661 --> 00:00:30,963
Here, we are using
crushed garnet.

9
00:00:30,996 --> 00:00:32,498
It simulates the
Martian surface

10
00:00:32,531 --> 00:00:35,268
but has the benefit
of being dust free.

11
00:00:35,301 --> 00:00:37,837

Special lights are use to
calibrate InSight's cameras

12
00:00:37,870 --> 00:00:41,007
to the brightness and
color of Martian sunlight.

13
00:00:43,008 --> 00:00:45,211
That's me right there.

14
00:00:45,244 --> 00:00:47,246
InSight will be the first
mission to study

15
00:00:47,279 --> 00:00:49,248
the deep interior of Mars.

16
00:00:49,281 --> 00:00:51,017
That includes using
a seismometer

17
00:00:51,050 --> 00:00:53,019
to detect quakes on Mars,

18
00:00:53,052 --> 00:00:55,354
measuring the planet's
internal temperature,

19
00:00:55,387 --> 00:00:57,490
and tracking the way
the planet wobbles

20
00:00:57,523 --> 00:00:59,659
in its orbit
around the Sun.

21
00:00:59,692 --> 00:01:02,028
This information will help
scientists understand

22
00:01:02,061 --> 00:01:05,064
the planet's history, its
interior structure,

23
00:01:05,097 --> 00:01:08,701
and how rocky planets formed and
evolved in our solar system.

24
00:01:08,734 --> 00:01:09,936
So while it's
going to Mars,

25
00:01:09,969 --> 00:01:11,938
Insight is more
than a Mars mission.

26
00:01:14,807 --> 00:01:17,543
Today, we are testing the
deployment of our instruments

27
00:01:17,576 --> 00:01:20,379
on the engineering model of
the InSight lander.

28
00:01:20,412 --> 00:01:22,415
The actual lander will
launch in the spring

29
00:01:22,448 --> 00:01:24,584
and land on Mars
in November.

30
00:01:24,617 --> 00:01:26,652
Right now, we're using
this model to test

31
00:01:26,685 --> 00:01:28,221
many different
sequences that will

32
00:01:28,254 --> 00:01:31,757
eventually be used on
the surface of Mars.

33
00:01:31,790 --> 00:01:34,293
Here's a time-lapse
of one of our tests.

34
00:01:34,326 --> 00:01:35,628
Unlike what you
see in the movies,

35
00:01:35,661 --> 00:01:37,597
our robots move
really slowly.

36
00:01:37,630 --> 00:01:40,233
Deployment testing
is a lengthy process

37
00:01:40,266 --> 00:01:42,669
that takes a lot
precision and patience.

38
00:01:45,571 --> 00:01:47,907
We use engineering models
to practice maneuvers

39
00:01:47,940 --> 00:01:51,210
and troubleshoot problems
before we try them on Mars.

40
00:01:51,243 --> 00:01:52,845
The actual InSight
flight hardware

41
00:01:52,878 --> 00:01:55,248
was built by engineers at
Lockheed Martin Space

42
00:01:55,281 --> 00:01:56,216
in Colorado.

43
00:02:00,986 --> 00:02:02,955
Over here you can see
the replica of the

44
00:02:02,988 --> 00:02:05,424
Mars Exploration Rover,
Opportunity,

45
00:02:05,457 --> 00:02:09,395
that is in its 14th year
of operation on Mars.

46
00:02:09,428 --> 00:02:11,097
Like the Opportunity
rover model,

47
00:02:11,130 --> 00:02:13,199
we'll continue to use
this engineering model

48
00:02:13,232 --> 00:02:15,969
after InSight lands
on Mars in November.

49
00:02:19,572 --> 00:02:21,040
One of the instruments
on InSight

50
00:02:21,073 --> 00:02:22,675
is a high-precision
seismometer,

51
00:02:22,708 --> 00:02:24,944
which will help
us analyze marsquakes

52

00:02:24,977 --> 00:02:27,280
which may be caused
by meteorite strikes

53
00:02:27,313 --> 00:02:30,983
or by hot magma
churning deep below.

54
00:02:31,016 --> 00:02:33,319
When a marsquake occurs,
the seismic waves

55
00:02:33,352 --> 00:02:36,789
provide clues to the structure
of the planet's interior.

56
00:02:38,090 --> 00:02:40,560
Another instrument taking a
flight to the Martian surface

57
00:02:40,593 --> 00:02:43,262
is a heat flow probe that will
burrow up to five meters

58
00:02:43,295 --> 00:02:45,531
underground to measure the
amount of heat escaping

59
00:02:45,564 --> 00:02:47,366
from the planet's interior.

60
00:02:47,399 --> 00:02:49,669
These measurements tell us how
much heat is still flowing

61
00:02:49,702 --> 00:02:53,439
out of Mars, so we can
understand how Mars evolved.

62
00:02:53,472 --> 00:02:54,974

When InSight
launches from Earth,

63
00:02:55,007 --> 00:02:57,343
it will weigh 800
pounds at liftoff.

64
00:02:57,376 --> 00:03:00,046
Once it lands, it will only
weigh about 300 lbs.

65
00:03:00,079 --> 00:03:02,381
due to the lower
gravity of Mars.

66
00:03:02,414 --> 00:03:04,951
Insight will then deploy two
large solar panels that will

67
00:03:04,984 --> 00:03:08,187
power it over the course of
its two year planned mission.

68
00:03:08,220 --> 00:03:12,325
When fully deployed,
InSight is 19' 8” long,

69
00:03:12,358 --> 00:03:14,227
and will generate about
the same amount of power

70
00:03:14,260 --> 00:03:16,229
as a household blender.