1
00:00:00,967 --> 00:00:02,168
[Energetic music]
Hi, I'm Raquel Villanueva,

2
00:00:02,201 --> 00:00:04,804
here at NASA's Jet
Propulsion Laboratory.

3
00:00:04,837 --> 00:00:08,307
Now, it has been a dream of
scientists for generations

4
00:00:08,340 --> 00:00:11,744
to bring back samples
from the surface of Mars.

5
00:00:11,777 --> 00:00:15,348
Right now, the Mars 2020 rover
is laying the groundwork

6
00:00:15,381 --> 00:00:16,649
for that to happen.

7
00:00:18,584 --> 00:00:21,654
And, that's why I'm in the
In-Situ Instrument Laboratory

8
00:00:21,687 --> 00:00:23,256
with Jessica Samuels.

9
00:00:23,289 --> 00:00:26,426
And, she's here to tell us
what's going on here.

10
00:00:26,459 --> 00:00:29,595
[Jessica Samuels] Well, we use
this facility to develop and

11
00:00:29,628 --> 00:00:32,632

design our hardware and software
systems for our Mars missions.

12
00:00:32,665 --> 00:00:34,467
[Raquel] And, how does the
sampling system work.

13
00:00:34,667 --> 00:00:38,304
[Jessica] So, we have a drill on
the end of our robotic arm.

14
00:00:38,337 --> 00:00:41,607
And, as we are drilling the
surface of Mars, we will be

15
00:00:41,640 --> 00:00:46,012
collecting pieces of Mars into
the sample tube at that time.

16
00:00:46,045 --> 00:00:48,181
We'll then transfer
that sample tube

17
00:00:48,214 --> 00:00:52,251
into the inside of the rover
and then seal it for storage

18
00:00:52,284 --> 00:00:54,620
as we continue to
explore the surface.

19
00:00:54,653 --> 00:00:57,056
After we've collected a
diverse set of samples,

20
00:00:57,089 --> 00:00:59,626
we will drop them off
onto the surface...

21
00:00:59,892 --> 00:01:00,693

[Raquel] Yeah.

22
00:01:00,727 --> 00:01:01,728
[Jessica]...and then
have them there

23
00:01:01,761 --> 00:01:04,864
for a future sample return
mission to continue.

24
00:01:04,897 --> 00:01:06,732
[Raquel] Well, I know you have
some tests to keep doing

25
00:01:06,765 --> 00:01:10,136
and I'm actually gonna go
check out the next phase

26
00:01:10,169 --> 00:01:11,438
at a different lab.

27
00:01:13,372 --> 00:01:16,008
We're in a testing lab
affectionately known as the

28
00:01:16,041 --> 00:01:18,644
"Sand Box" and I'm here
with Austin Nicholas.

29
00:01:18,677 --> 00:01:20,613
Now, can you explain how we are

30
00:01:20,646 --> 00:01:22,548
gonna bring back
samples from Mars?

31
00:01:22,581 --> 00:01:25,017
[Austin Nicholas] So,
starting from after 2020

32
00:01:25,050 --> 00:01:26,986
has deposited tubes
on the surface,

33
00:01:27,019 --> 00:01:28,421
there are two more
missions to go in

34
00:01:28,454 --> 00:01:30,022
bringing the tubes
back to Earth.

35
00:01:30,055 --> 00:01:31,624
The first is a lander mission.

36
00:01:31,657 --> 00:01:33,526
It carries three major elements:

37
00:01:33,559 --> 00:01:36,028
a Sample Fetch Rover and
a Sample Transfer Arm

38
00:01:36,061 --> 00:01:37,530
that lets you transfer
the samples from

39
00:01:37,563 --> 00:01:39,465
the Fetch Rover into the rocket,

40
00:01:39,498 --> 00:01:41,734
and a Mars Ascent
Vehicle which is a rocket

41
00:01:41,767 --> 00:01:44,270
that brings the samples
from Mars into space.

42
00:01:44,303 --> 00:01:47,540
Meanwhile, the orbiter has also

launched from Earth in 2026 and

43
00:01:47,573 --> 00:01:50,309
is making its way towards Mars
and it'll be in position

44
00:01:50,342 --> 00:01:52,145
by the time the
rocket's fully loaded.

45
00:01:52,178 --> 00:01:55,181
The orbiter will then go to the
sample container that the

46
00:01:55,214 --> 00:01:57,583
rocket's put into space
and then capture it,

47
00:01:57,616 --> 00:01:59,786
ultimately bringing
them to Earth in 2031.

48
00:02:00,119 --> 00:02:01,587
[Raquel] That sounds
complicated.

49
00:02:01,620 --> 00:02:02,555
[Austin] It is complicated

50
00:02:02,588 --> 00:02:04,090
but fortunately we're
not doing it alone.

51
00:02:04,123 --> 00:02:06,726
So, we have a great partnership
with the European Space Agency

52
00:02:06,759 --> 00:02:09,061
and they're providing some major
pieces of this mission.

53
00:02:09,094 --> 00:02:11,864
Within NASA, we've actually got
a number of centers working on

54
00:02:11,897 --> 00:02:13,199
all of the different pieces.

55
00:02:13,232 --> 00:02:15,234
So, we're partnering with
Marshall Space Flight Center

56
00:02:15,267 --> 00:02:16,402
for the Mars Ascent Vehicle,

57
00:02:16,435 --> 00:02:19,338
Langley and Ames for the
Earth Entry Vehicle,

58
00:02:19,371 --> 00:02:21,507
Glenn for the Sample
Fetch Rover wheels

59
00:02:21,540 --> 00:02:24,277
and we're partnering with
Goddard for the orbiter payload.

60
00:02:24,310 --> 00:02:26,412
And so there's really a...
it's a whole NASA effort

61
00:02:26,445 --> 00:02:27,947
to get Mars Sample Return done.

62
00:02:27,980 --> 00:02:29,882
[Raquel] Sounds like there is
a lot of work to be done,

63
00:02:29,915 --> 00:02:34,120

but this all kicks off with the
launch of Mars 2020 this summer

64
00:02:34,153 --> 00:02:35,788
in Cape Canaveral, Florida,

65
00:02:35,821 --> 00:02:37,089
and there's lots
of excitement here