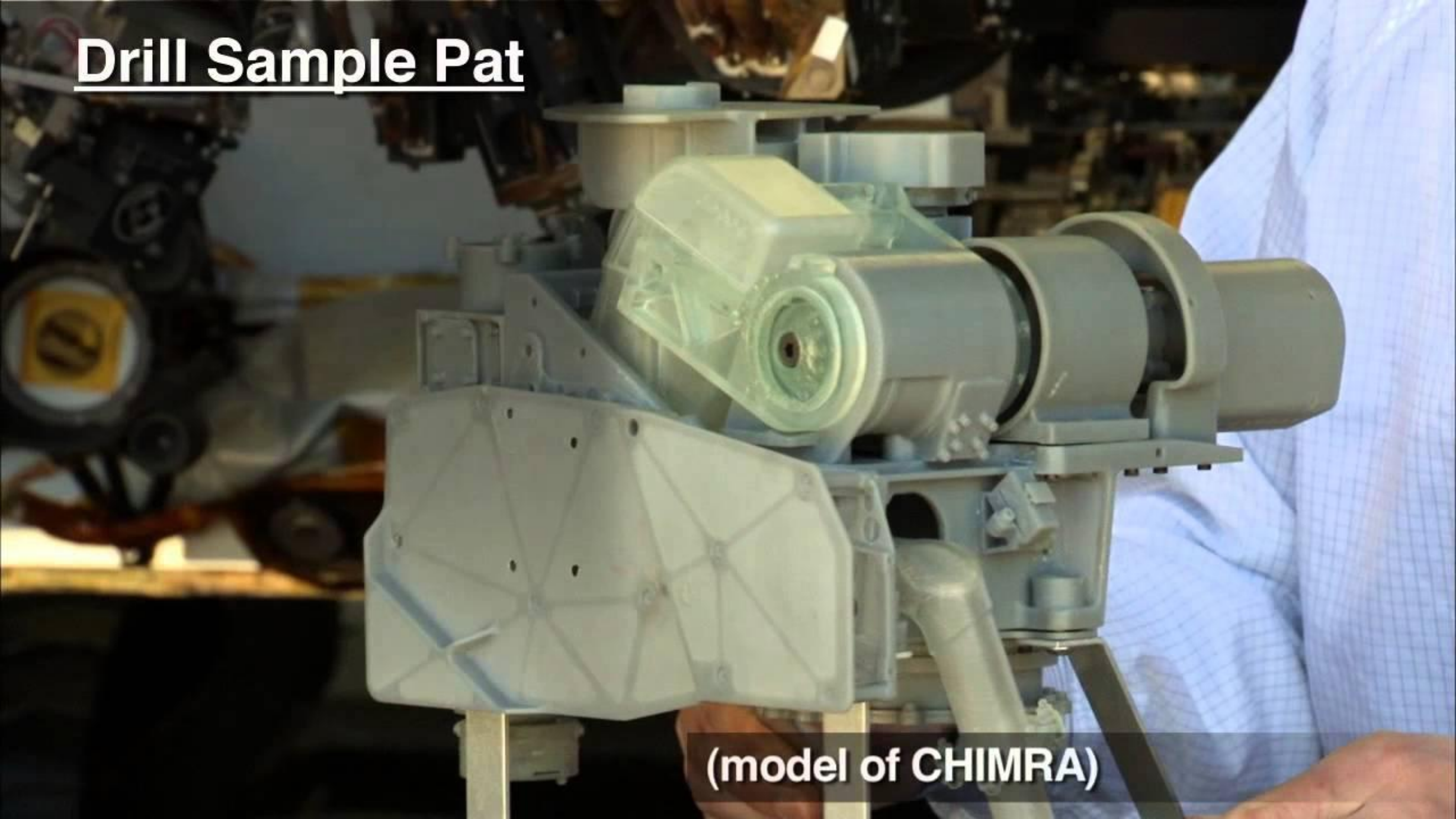
Drill Sample Pat



(model of CHIMRA)

1
00:00:00,000 --> 00:00:05,000
(Music)

2
00:00:05,000 --> 00:00:10,000
I'm Avi Okon, the lead hardware engineer for the drill, and this is your Curiosity Rover Report.

3
00:00:10,000 --> 00:00:16,000
Here we are with Curiosity's Earth-bound test double in the Mars Yard here at JPL.

4
00:00:16,000 --> 00:00:22,000
Curiosity has been repositioned to a second rock target. That's where she will sample it with her drill.

5
00:00:22,000 --> 00:00:26,000
This second sample is intended to confirm the results from her first drilling,

6
00:00:26,000 --> 00:00:30,000
which is where we found evidence of an ancient environment favorable to microbial life.

7
00:00:30,000 --> 00:00:37,000
After drilling, Curiosity will process and deliver the sample to her analytical instruments.

8
00:00:37,000 --> 00:00:40,000
A lot of you may have been wondering how we get sample from the drill

9
00:00:40,000 --> 00:00:43,000
or the scoop into the instruments back in the rover.

10
00:00:43,000 --> 00:00:46,000
So to collect the sample from the rock, we don't just pick up,

11
00:00:46,000 --> 00:00:51,000
drill into the rock and drop off the sample directly. It's a little more complicated than that.

12
00:00:51,000 --> 00:00:55,000
Now we'll use this model of the drill bit assembly to illustrate.

13
00:00:55,000 --> 00:01:00,000

As we drill the hole the powder gets conveyed up this tube

14
00:01:00,000 --> 00:01:02,000
and gets stored in the chamber inside the drill bit assembly.

15
00:01:02,000 --> 00:01:07,000
Then to move the powder out of the drill bit, we use the robotic arm wrist

16
00:01:07,000 --> 00:01:13,000
and turret joint and the vibration caused by the drill percussion mechanism to move the sample like so.

17
00:01:13,000 --> 00:01:17,000
Tap tap tap tap tap...

18
00:01:17,000 --> 00:01:26,000
We continue this motion to deliver it to the CHIMRA, which is the sample, processing and delivery device.

19
00:01:26,000 --> 00:01:32,000
The drill sample comes up through the sample transfer tube into the chambers into CHIMRA.

20
00:01:32,000 --> 00:01:37,000
As we open her up, we could see where the sample comes in from the drill,

21
00:01:37,000 --> 00:01:41,000
then we would send the sample up to the scoop to take a picture of it.

22
00:01:41,000 --> 00:01:49,000
Once we do that, we then move the sample through the sieve and into the portion box

23
00:01:49,000 --> 00:01:52,000
to create a portion for the instruments inside the belly of Curiosity.

24
00:01:52,000 --> 00:01:57,000
And those portions are the size of a baby aspirin tablet.

25
00:01:57,000 --> 00:02:01,000
To get the sample to the instruments is similar to this puzzle game that I have on my phone,

26
00:02:01,000 --> 00:02:05,000
where we move the sample through a series of chambers using gravity and vibration.

27
00:02:05,000 --> 00:02:11,000
Curiosity uses gravity instead of mechanisms to move sample because there are fewer moving parts.

28
00:02:11,000 --> 00:02:17,000
So now I'll show you using these BBs in this model-how we move the sample from the reservoir into the scoop.

29
00:02:17,000 --> 00:02:29,000
(Rattle rattle rattle)

30
00:02:29,000 --> 00:02:31,000
And there it is.

31
00:02:31,000 --> 00:02:33,000
Curiosity could do this a lot better than I can.

32
00:02:33,000 --> 00:02:36,000
Now the sample is in the scoop. It still has a long way to go to get into the sieve