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

2
00:00:05,000 --> 00:00:08,000
Hi! My name is Mike Meacham. I'm an engineer here at the Jet Propulsion Laboratory

3
00:00:08,000 --> 00:00:11,000
and I want to talk to you about some of the technologies we're developing for landing

4
00:00:11,000 --> 00:00:17,000
bigger and heavier things on Mars. One of which is a much larger supersonic parachute.

5
00:00:17,000 --> 00:00:19,000
(music)

6
00:00:19,000 --> 00:00:20,000
When we land spacecraft on Mars,

7
00:00:20,000 --> 00:00:23,000
we're going extremely fast.

8
00:00:23,000 --> 00:00:28,000
We have got to slow down. So we use a parachute. We use a really big parachute.

9
00:00:28,000 --> 00:00:31,000
To make these large parachutes you have to test them before you go.

10
00:00:31,000 --> 00:00:35,000
You need a way to apply the same load that you're going to feel on Mars.

11
00:00:35,000 --> 00:00:38,000
And you need a way to do that here on Earth.

12
00:00:38,000 --> 00:00:42,000
In the past, we've always used a wind tunnel, but the parachutes themselves

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00:00:42,000 --> 00:00:45,000

are getting so large that they can't fit into any of these wind tunnels any more.

14
00:00:45,000 --> 00:00:48,000
We needed a way to apply this same type of wind

15
00:00:48,000 --> 00:00:51,000
in a controlled way and we had to get outside the building.

16
00:00:51,000 --> 00:00:54,000
You want to go to Mars. You want to go big then you've got to test big here.

17
00:00:54,000 --> 00:00:58,000
You got to be a little crazy sometimes if you want to do the crazy things.

18
00:00:58,000 --> 00:01:03,000
The crazy idea we came up with was to attach it to a rocket sled and have that

19
00:01:03,000 --> 00:01:07,000
rocket sled pull it around a pulley with a huge one-kilometer long rope.

20
00:01:07,000 --> 00:01:11,000
And the way you have to do that is extremely complicated.

21
00:01:11,000 --> 00:01:13,000
Remember that game mousetrap when you were a kid?

22
00:01:13,000 --> 00:01:16,000
When all these mechanical things had to happen in sequence?

23
00:01:16,000 --> 00:01:18,000
This test is a lot like that.

24
00:01:18,000 --> 00:01:20,000
There's a whole bunch of stuff that's got to happen in sequence,

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00:01:20,000 --> 00:01:24,000
one after another, for us to be able to test this parachute.

26
00:01:24,000 --> 00:01:25,000
(music)

27
00:01:25,000 --> 00:01:29,000
First a Nighthawk helicopter has got to pick this parachute off the ground inside of a bag.

28
00:01:29,000 --> 00:01:32,000
Underneath that is an instrumentation plate.

29
00:01:32,000 --> 00:01:35,000
Underneath that is almost a kilometer of big heavy rope.

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00:01:35,000 --> 00:01:40,000
At the bottom of that rope is a two foot long steel bullet. It weighs a hundred pounds.

31
00:01:40,000 --> 00:01:43,000
That's all swinging up in the air underneath this helicopter.

32
00:01:43,000 --> 00:01:49,000
The bottom of that bullet is a fishing line - a smaller nylon line that goes another 400 meters or so,

33
00:01:49,000 --> 00:01:53,000
all the way down to the ground, through some rollers, down through the pipes,

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00:01:53,000 --> 00:01:57,000
around the pulley in the back in the sled attached to a 300 horsepower winch.

35
00:01:57,000 --> 00:02:00,000
That winch is turned on all the time pulling on this parachute.

36
00:02:00,000 --> 00:02:04,000
The helicopter releases the parachute. The winch spools up sucking the parachute

37
00:02:04,000 --> 00:02:07,000
down towards the ground and maintaining tension to the whole line.

38
00:02:07,000 --> 00:02:11,000

Our parachute is now inflated, our winch is still spooling it in and its pulling that bullet

39
00:02:11,000 --> 00:02:16,000
right down to the ground through all those same rollers, same pipes, into the back of the sled.

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00:02:16,000 --> 00:02:20,000
As soon as that bullet latches into the back of the sled we've got the parachute.

41
00:02:20,000 --> 00:02:25,000
We cut away that fishing line turn off the winch light the rockets and now our rocket sled

42
00:02:25,000 --> 00:02:28,000
is pulling our parachute down toward the ground around the pulley.

43
00:02:28,000 --> 00:02:30,000
(music)

44
00:02:30,000 --> 00:02:33,000
And that's our outdoor wind tunnel.

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00:02:33,000 --> 00:02:35,000
Okay so you're seeing the parachute rip right? It looks bad.

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00:02:35,000 --> 00:02:40,000
It's not as bad as it looks because really the point of these tests is to find these flaws.

47
00:02:40,000 --> 00:02:44,000
We want to see how far we can push these parachutes, we want to see what's wrong with them.

48
00:02:44,000 --> 00:02:47,000
And more important than anything, we want to see if it happens here on Earth