Testing a Parachute for **Mars**

1
00:00:00,500 --> 00:00:03,670
Testing a Parachute for Mars

2
00:00:03,670 --> 00:00:06,440
Fifty years ago NASA began
lofting parachutes

3
00:00:06,440 --> 00:00:08,842
to altitudes and speeds
meant to simulate

4
00:00:08,842 --> 00:00:10,711
the conditions of Mars entry.

5
00:00:10,711 --> 00:00:13,614
Those early tests demonstrated
the challenges of inflating

6
00:00:13,614 --> 00:00:16,783
lightweight materials in a
1500 mile an hour wind

7
00:00:16,783 --> 00:00:19,219
and having them survive well
enough to help enable

8
00:00:19,219 --> 00:00:21,521
a safe landing on
the Red Planet.

9
00:00:21,521 --> 00:00:24,024
Today, as our missions
become ever more daring,

10
00:00:24,024 --> 00:00:26,260
we need new parachutes
capable of surviving

11
00:00:26,260 --> 00:00:28,028

those strenuous environments.

12
00:00:28,028 --> 00:00:29,529
And we need ways of testing them

13
00:00:29,529 --> 00:00:32,132
at loads higher
than ever before.

14
00:00:32,132 --> 00:00:34,501
Engineers at NASA's Jet
Propulsion Laboratory

15
00:00:34,501 --> 00:00:36,637
worked with NASA's Wallops
Flight Facility

16
00:00:36,637 --> 00:00:38,639
to develop a new test technique.

17
00:00:38,639 --> 00:00:40,841
The Advanced Supersonic
Parachute Inflation

18
00:00:40,841 --> 00:00:43,377
Research Experiment,
or ASPIRE project,

19
00:00:43,377 --> 00:00:45,946
uses a 2-stage Black Brant 9
sounding rocket

20
00:00:45,946 --> 00:00:47,948
to carry its payload to
the conditions needed

21
00:00:47,948 --> 00:00:49,516
to stress the parachute.

22

00:00:49,516 --> 00:00:52,219
The rocket is launched out
over the Atlantic Ocean

23
00:00:52,219 --> 00:00:54,788
and ascends to altitudes where
the atmopsphere of Earth

24
00:00:54,788 --> 00:00:58,125
mimics the atmosphere near
the surface of Mars.

25
00:00:58,125 --> 00:01:01,828
The third and final ASPIRE test
launched on September 7.

26
00:01:01,828 --> 00:01:05,065
The parachute was deployed at
nearly twice the speed of sound.

27
00:01:05,065 --> 00:01:07,167
In less than half a
second, 200 pounds of

28
00:01:07,167 --> 00:01:09,002
nylon, Kevlar, and Technora

29
00:01:09,002 --> 00:01:12,205
go from a small, drum-sized bag
with the density of wood

30
00:01:12,205 --> 00:01:15,409
to an inflated parachute with
the volume of a large house,

31
00:01:15,409 --> 00:01:18,745
generating nearly
70,000 pounds of drag.

32
00:01:18,745 --> 00:01:21,381

In slow motion images, you
can see the rapid emergence

33
00:01:21,381 --> 00:01:23,684
of the parachute, as it
begins generating the drag

34
00:01:23,684 --> 00:01:26,086
crucial for deceleration
at Mars.

35
00:01:26,086 --> 00:01:28,488
These images give us
amazing insights into

36
00:01:28,488 --> 00:01:30,090
the physics and early behaviors

37
00:01:30,090 --> 00:01:32,426
of a supersonic
parachute inflation.

38
00:01:32,426 --> 00:01:34,795
The apparent ease of the
unfolding and unfurling

39
00:01:34,795 --> 00:01:36,763
in the parachute belies
the severity of

40
00:01:36,763 --> 00:01:39,533
the extreme environment
in which this occurs.

41
00:01:39,533 --> 00:01:41,768
After three successful
tests of ASPIRE,

42
00:01:41,768 --> 00:01:43,804
NASA has now tested

their new parachute

43
00:01:43,804 --> 00:01:45,772
at loads and
conditions exceeding

44
00:01:45,772 --> 00:01:48,241
any large supersonic
parachute before it,

45
00:01:48,241 --> 00:01:51,111
and 40% higher than the
highest load expected for

46
00:01:51,111 --> 00:01:52,980
the Mars 2020 mission.

47
00:01:53,413 --> 00:01:57,050
Our parachute is now certified
for flight at Mars!

48
00:01:57,050 --> 00:01:58,118
NASA Jet Propulsion Laboratory