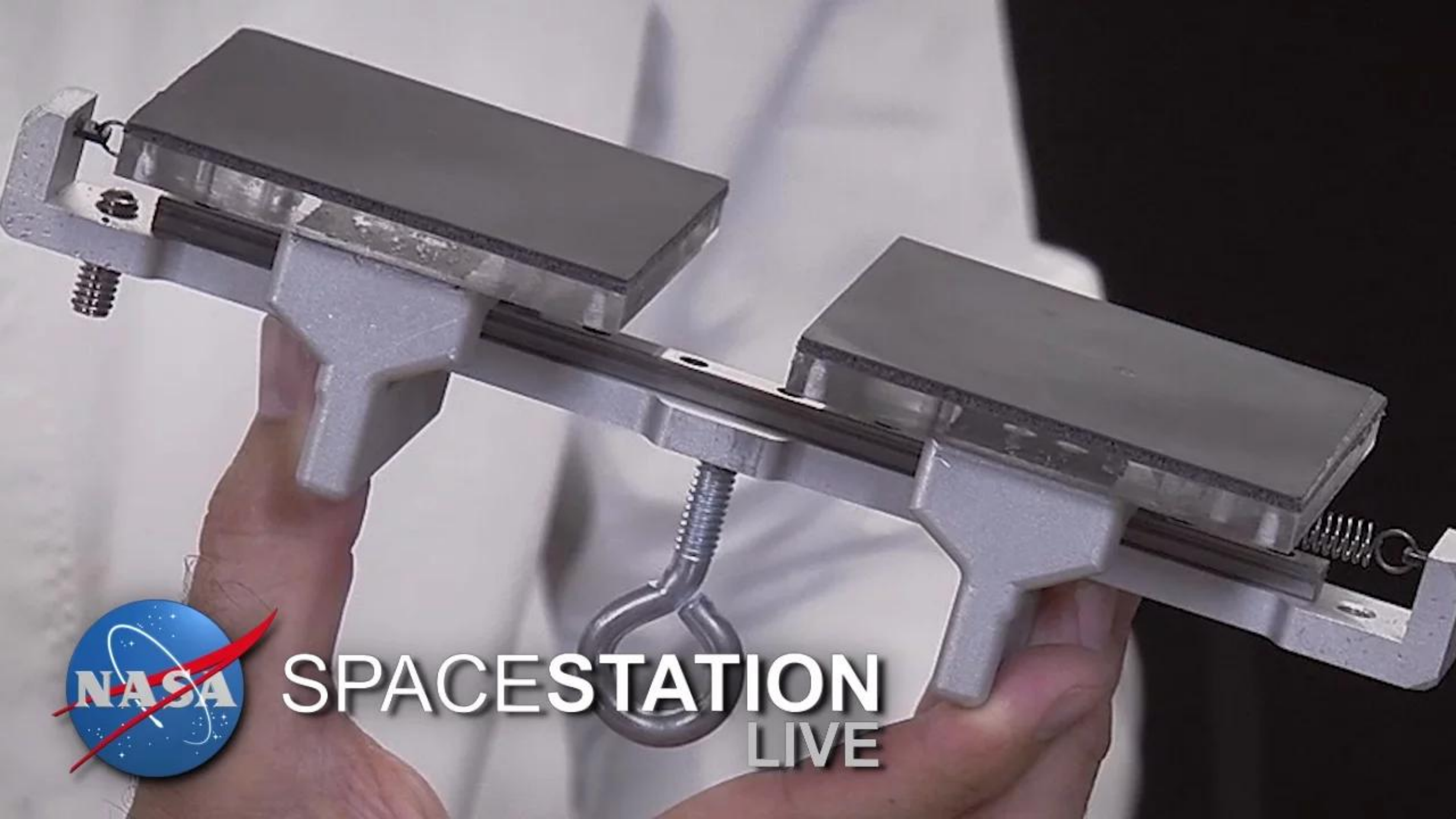
NASA
SPACESTATION
LIVE

1
00:00:09,509 --> 00:00:07,269
move over velcro a gecko-inspired

2
00:00:12,150 --> 00:00:09,519
technology is creating quite a sticky

3
00:00:14,230 --> 00:00:12,160
situation on the space station the gecko

4
00:00:15,990 --> 00:00:14,240
gripper is a device that can stick on

5
00:00:18,150 --> 00:00:16,000
command in the harsh environment of

6
00:00:20,230 --> 00:00:18,160
space i spoke with aaron parnes the

7
00:00:22,630 --> 00:00:20,240
principal investigator to learn more

8
00:00:24,550 --> 00:00:22,640
about the inspiration behind this

9
00:00:27,830 --> 00:00:24,560
adhesive technology

10
00:00:30,790 --> 00:00:27,840
our experiment is inspired by the

11
00:00:32,389 --> 00:00:30,800
toe pads of gecko lizards and so we're

12
00:00:34,709 --> 00:00:32,399
testing a gripper that uses the same

13
00:00:36,870 --> 00:00:34,719

kind of adhesive structure that you see

14
00:00:39,830 --> 00:00:36,880
on the animal now you say they have

15
00:00:42,709 --> 00:00:39,840
tiny hairs on their toes yeah geckos

16
00:00:44,709 --> 00:00:42,719
grow really amazing structures on the on

17
00:00:47,270 --> 00:00:44,719
the pads of their toes it's

18
00:00:48,790 --> 00:00:47,280
a forest of hairs that branch out into

19
00:00:50,709 --> 00:00:48,800
even smaller structures that are

20
00:00:52,470 --> 00:00:50,719
actually at the nanoscale

21
00:00:54,630 --> 00:00:52,480
and that lets it stick to almost

22
00:00:56,790 --> 00:00:54,640
anything so adhesion what are we trying

23
00:00:58,549 --> 00:00:56,800
to adhere to so there are lots of

24
00:01:00,229 --> 00:00:58,559
applications in space that you would

25
00:01:02,389 --> 00:01:00,239
want adhesion for

26
00:01:04,229 --> 00:01:02,399
what's special about gecko adhesives is

27
00:01:06,310 --> 00:01:04,239
that they're controllable you can turn

28
00:01:08,310 --> 00:01:06,320
the stickiness on and off

29
00:01:09,990 --> 00:01:08,320
so for instance you could use it on the

30
00:01:12,230 --> 00:01:10,000
foot of a robot that could crawl around

31
00:01:14,230 --> 00:01:12,240
the outside of the space station or on a

32
00:01:16,230 --> 00:01:14,240
gripper that would be able to

33
00:01:18,310 --> 00:01:16,240
anchor to something like the surface of

34
00:01:20,469 --> 00:01:18,320
a solar panel or

35
00:01:21,670 --> 00:01:20,479
a piece of orbital debris and then

36
00:01:24,230 --> 00:01:21,680
release it

37
00:01:26,310 --> 00:01:24,240
when you've put it where you want to

38
00:01:27,670 --> 00:01:26,320

pretty important for space flight and

39
00:01:29,590 --> 00:01:27,680
future space flight

40
00:01:31,350 --> 00:01:29,600
the applications are pretty broad and

41
00:01:33,109 --> 00:01:31,360
pretty large

42
00:01:35,030 --> 00:01:33,119
for this experiment we're just testing

43
00:01:37,590 --> 00:01:35,040
inside the station it's the first test

44
00:01:38,710 --> 00:01:37,600
of a gecko adhesive in space

45
00:01:41,190 --> 00:01:38,720
we're going to demonstrate the

46
00:01:43,510 --> 00:01:41,200
technology make sure it works the same

47
00:01:45,830 --> 00:01:43,520
way it does on earth and see how it does

48
00:01:47,590 --> 00:01:45,840
in long duration microgravity

49
00:01:49,270 --> 00:01:47,600
okay and let me just get this straight

50
00:01:51,030 --> 00:01:49,280
we're not talking about real gekko hair

51
00:01:52,870 --> 00:01:51,040
right not real geckos they're the

52
00:01:55,749 --> 00:01:52,880
inspiration right so we study real

53
00:01:58,550 --> 00:01:55,759
geckos but we make the material in my

54
00:01:59,830 --> 00:01:58,560
lab back at jpl it's a rubber-like

55
00:02:01,830 --> 00:01:59,840
material

56
00:02:04,550 --> 00:02:01,840
this is pretty much a lifelong project

57
00:02:06,950 --> 00:02:04,560
for you right i mean how did this begin

58
00:02:08,469 --> 00:02:06,960
i've been working on gecko adhesives for

59
00:02:10,469 --> 00:02:08,479
over 10 years now

60
00:02:13,670 --> 00:02:10,479
it was actually the topic of my phd

61
00:02:15,589 --> 00:02:13,680
thesis at stanford university and we've

62
00:02:16,949 --> 00:02:15,599
been trying to apply that to space

63
00:02:18,869 --> 00:02:16,959

applications

64
00:02:21,270 --> 00:02:18,879
so when we see it on orbit what's going

65
00:02:23,750 --> 00:02:21,280
to happen what what are the procedures

66
00:02:25,510 --> 00:02:23,760
so we're sending up five small gecko

67
00:02:27,430 --> 00:02:25,520
grippers and the crew will perform

68
00:02:29,350 --> 00:02:27,440
experiments with them to measure their

69
00:02:31,190 --> 00:02:29,360
effectiveness on different surfaces

70
00:02:32,790 --> 00:02:31,200
inside the station we're going to leave

71
00:02:35,430 --> 00:02:32,800
some of those grippers in place for a

72
00:02:37,509 --> 00:02:35,440
full year and show that

73
00:02:39,509 --> 00:02:37,519
this material doesn't wear out we're

74
00:02:42,630 --> 00:02:39,519
really excited it's the first experiment

75
00:02:43,990 --> 00:02:42,640
for gecko adhesives in space but

76
00:02:45,110 --> 00:02:44,000
we think there'll be many more in the

77
00:02:47,350 --> 00:02:45,120
years to come

78
00:02:49,430 --> 00:02:47,360
is this your first experiment it is it's

79
00:02:51,509 --> 00:02:49,440
my first experiment my first hardware

80
00:02:53,430 --> 00:02:51,519
that's going to space

81
00:02:55,430 --> 00:02:53,440
extremely excited to see something you

82
00:02:57,670 --> 00:02:55,440
invented something um

83
00:02:59,430 --> 00:02:57,680
that your your name is on the patent and

84
00:03:02,070 --> 00:02:59,440
it's actually going to get used and

85
00:03:05,110 --> 00:03:02,080
hopefully help the crew and and help our

86
00:03:06,630 --> 00:03:05,120
goals in space it's very fulfilling i

87
00:03:07,750 --> 00:03:06,640
can already see this on store shelves

88
00:03:09,110 --> 00:03:07,760

too

89
00:03:11,589 --> 00:03:09,120
there are a lot of terrestrial

90
00:03:14,309 --> 00:03:11,599
applications as well a few companies are

91
00:03:15,750 --> 00:03:14,319
trying to commercialize gecko adhesives

92
00:03:18,550 --> 00:03:15,760
the first one might be inside the

93
00:03:20,470 --> 00:03:18,560
factory picking up cereal boxes or flat

94
00:03:21,990 --> 00:03:20,480
screen tvs and and packaging them or

95
00:03:23,350 --> 00:03:22,000
moving them around

96
00:03:26,070 --> 00:03:23,360
in the long term though you might see

97
00:03:27,830 --> 00:03:26,080
these replacing velcro on your