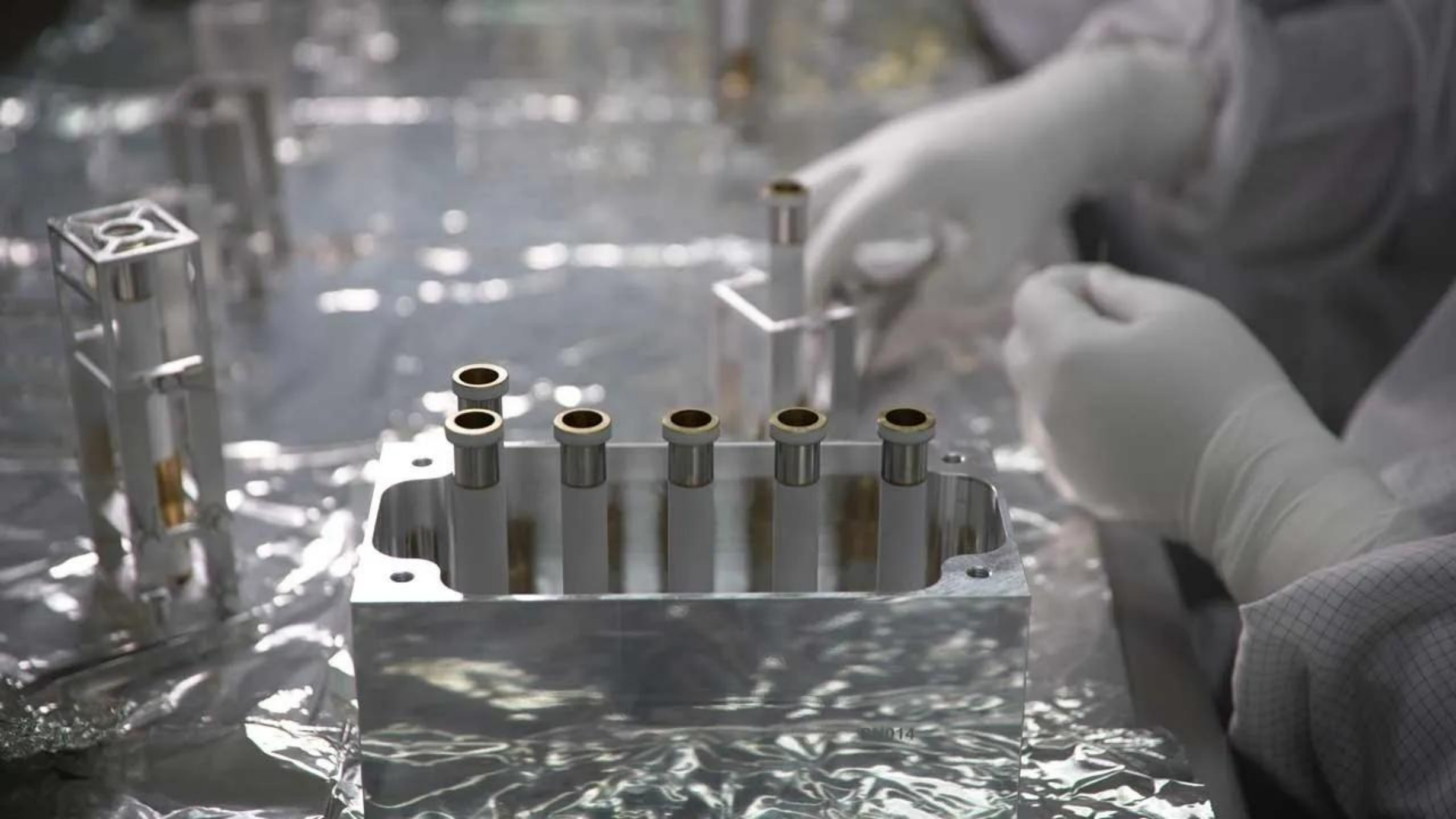

1
00:00:04,710 --> 00:00:02,790
we are working on something that is the

2
00:00:06,370 --> 00:00:04,720
cleanest we've ever really attempted to

3
00:00:09,990 --> 00:00:06,380
send into space

4
00:00:12,390 --> 00:00:10,000
[Music]

5
00:00:13,190 --> 00:00:12,400
the perseverance mission has as its

6
00:00:16,710 --> 00:00:13,200
central goal

7
00:00:17,349 --> 00:00:16,720
astrobiology and also being the first

8
00:00:20,630 --> 00:00:17,359
step

9
00:00:23,509 --> 00:00:20,640
in mars sample return we're going to

10
00:00:26,470 --> 00:00:23,519
collect a suite of samples about 35

11
00:00:28,150 --> 00:00:26,480
samples that each weigh about 15 grams

12
00:00:30,230 --> 00:00:28,160
and the reason we we collect those

13
00:00:31,830 --> 00:00:30,240

intact samples is that we are the first

14
00:00:32,549 --> 00:00:31,840
mission that's part of mars sample

15
00:00:34,389 --> 00:00:32,559
return

16
00:00:36,069 --> 00:00:34,399
and it's our job to collect the the

17
00:00:37,910 --> 00:00:36,079
samples intact

18
00:00:39,110 --> 00:00:37,920
uh to be brought back to earth for

19
00:00:40,950 --> 00:00:39,120
further analysis

20
00:00:44,150 --> 00:00:40,960
to better assess the question of was

21
00:00:46,630 --> 00:00:44,160
their life previously on mars

22
00:00:48,229 --> 00:00:46,640
inside the belly of the rover sit a

23
00:00:50,630 --> 00:00:48,239
number of sample tubes

24
00:00:51,510 --> 00:00:50,640
in an entire adaptive caching assembly

25
00:00:53,110 --> 00:00:51,520
that is used to

26
00:00:54,790 --> 00:00:53,120
help collect these samples

27
00:00:57,430 --> 00:00:54,800
extraordinarily complex

28
00:00:58,389 --> 00:00:57,440
robotic system and to make it even more

29
00:01:01,750 --> 00:00:58,399
complicated

30
00:01:03,830 --> 00:01:01,760
it has to be super clean

31
00:01:04,789 --> 00:01:03,840
we don't want to have these samples come

32
00:01:06,710 --> 00:01:04,799
back from mars

33
00:01:08,149 --> 00:01:06,720
and discover life in them but then

34
00:01:10,870 --> 00:01:08,159
realize oh

35
00:01:12,710 --> 00:01:10,880
that's life that was in the apparatus

36
00:01:14,789 --> 00:01:12,720
when we send it to mars

37
00:01:16,630 --> 00:01:14,799
that was a a big challenge for the

38
00:01:18,310 --> 00:01:16,640

mission because we were meeting

39
00:01:20,149 --> 00:01:18,320
cleanliness standards that no

40
00:01:21,990 --> 00:01:20,159
no rover mission has ever had to meet

41
00:01:22,789 --> 00:01:22,000
before the requirements that we have for

42
00:01:26,710 --> 00:01:22,799
this mission

43
00:01:28,630 --> 00:01:26,720
are extraordinarily challenging once we

44
00:01:30,230 --> 00:01:28,640
would go through machining the tube

45
00:01:31,350 --> 00:01:30,240
itself getting all of our protective

46
00:01:33,510 --> 00:01:31,360
coatings on there

47
00:01:35,350 --> 00:01:33,520
and then looking at our beautiful tubes

48
00:01:36,630 --> 00:01:35,360
we found carbon contamination places we

49
00:01:38,390 --> 00:01:36,640
were not expecting

50
00:01:39,910 --> 00:01:38,400
so as a team we all had to really come

51
00:01:41,350 --> 00:01:39,920
together and look at the entire

52
00:01:43,350 --> 00:01:41,360
manufacturing process

53
00:01:45,190 --> 00:01:43,360
how we're handling these tubes we had to

54
00:01:46,389 --> 00:01:45,200
start polishing the interior board

55
00:01:49,030 --> 00:01:46,399
prior to putting on some of our

56
00:01:51,190 --> 00:01:49,040
protective coatings it meant having to

57
00:01:53,990 --> 00:01:51,200
come up with an entirely new technique

58
00:01:56,469 --> 00:01:54,000
to clean all of the hardware

59
00:01:57,990 --> 00:01:56,479
and demonstrate that the hardware could

60
00:02:00,469 --> 00:01:58,000
maintain that cleanliness

61
00:02:01,670 --> 00:02:00,479
all the way to mars that's what jpl does

62
00:02:03,990 --> 00:02:01,680
i mean we

63
00:02:05,749 --> 00:02:04,000

discover problems and then we solve them

64
00:02:07,990 --> 00:02:05,759
having these very strict controls in

65
00:02:09,990 --> 00:02:08,000
this record of how much contamination or

66
00:02:12,150 --> 00:02:10,000
how clean these tubes are prior to going

67
00:02:13,270 --> 00:02:12,160
to mars is essential for that return

68
00:02:16,150 --> 00:02:13,280
sample science

69
00:02:16,710 --> 00:02:16,160
great discoveries require remarkable

70
00:02:19,190 --> 00:02:16,720
evidence

71
00:02:20,630 --> 00:02:19,200
and so the cleanliness of the sample

72
00:02:22,790 --> 00:02:20,640
tubes and of all the hardware that's

73
00:02:25,910 --> 00:02:22,800
going to be collecting those samples

74
00:02:27,670 --> 00:02:25,920
is paramount and making sure that the

75
00:02:29,350 --> 00:02:27,680
evidence and that the story and that the

76
00:02:31,430 --> 00:02:29,360
discoveries that come from these

77
00:02:33,130 --> 00:02:31,440
these samples that are brought back are

78
00:02:34,830 --> 00:02:33,140
irrefutably

79
00:02:37,030 --> 00:02:34,840
[Music]