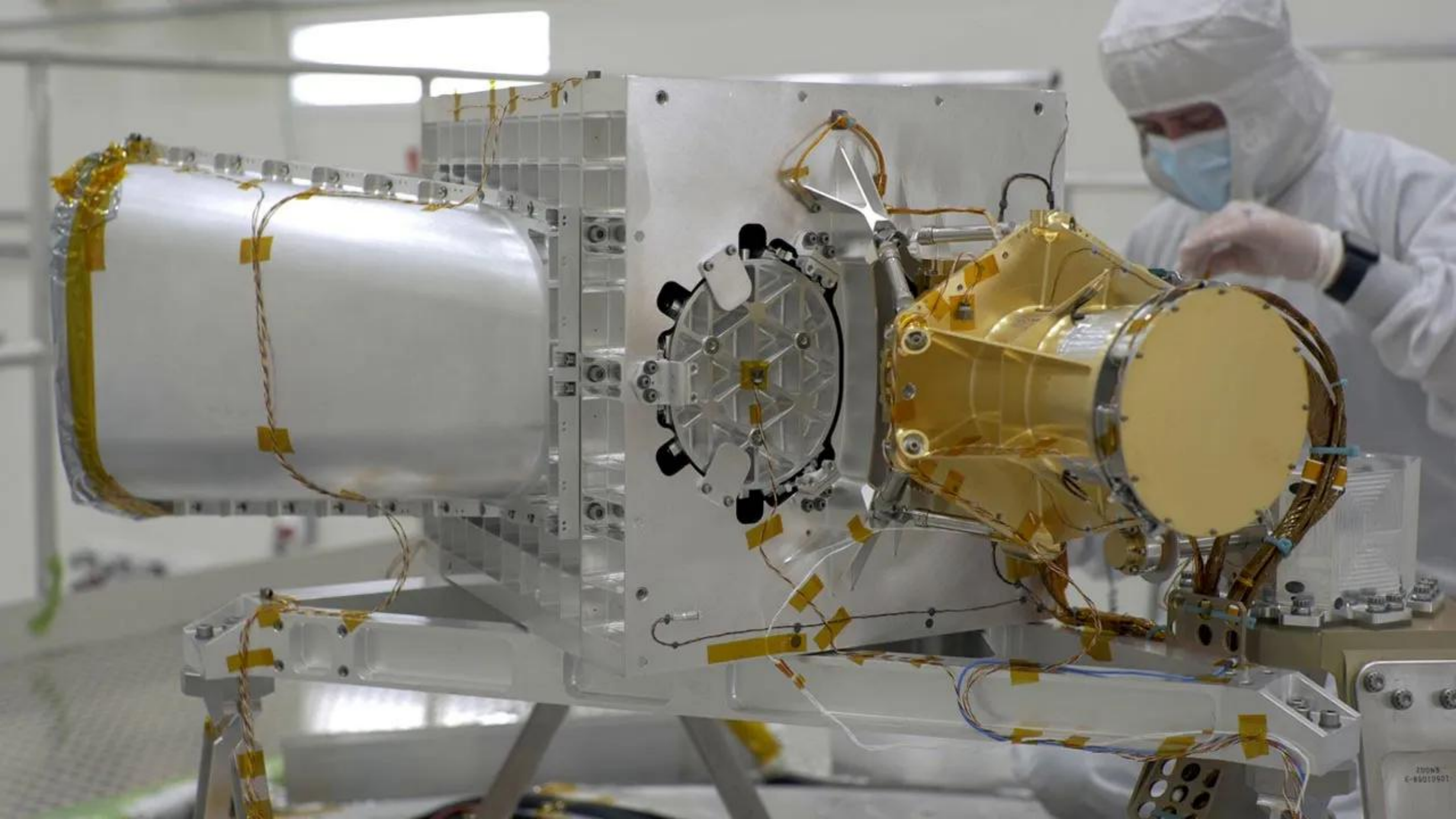

1
00:00:13,270 --> 00:00:11,430
mineral dust can travel thousands of

2
00:00:15,190 --> 00:00:13,280
miles where it interacts throughout the

3
00:00:17,590 --> 00:00:15,200
earth system in our case we're going to

4
00:00:19,750 --> 00:00:17,600
study how that mineral dust heats or

5
00:00:21,510 --> 00:00:19,760
cools planet earth currently we aren't

6
00:00:24,390 --> 00:00:21,520
sure whether mineral dust

7
00:00:27,189 --> 00:00:24,400
heats the planet or cools the planet

8
00:00:29,349 --> 00:00:27,199
we're looking at dust sources

9
00:00:32,790 --> 00:00:29,359
on the earth's surface so deserts arid

10
00:00:35,190 --> 00:00:32,800
regions wind can basically emit

11
00:00:37,190 --> 00:00:35,200
that dust into the atmosphere

12
00:00:39,270 --> 00:00:37,200
and so we are very interested in knowing

13
00:00:40,549 --> 00:00:39,280

what it is and depending on what it is

14
00:00:43,110 --> 00:00:40,559
it will tell us whether or not it is

15
00:00:45,190 --> 00:00:43,120
warming or cooling our environment

16
00:00:47,110 --> 00:00:45,200
some minerals are dark maybe more red

17
00:00:48,950 --> 00:00:47,120
they would absorb solar energy and they

18
00:00:50,630 --> 00:00:48,960
could be heating elements other cases

19
00:00:52,790 --> 00:00:50,640
minerals are bright white and they could

20
00:00:54,630 --> 00:00:52,800
reflect sunlight back into space and

21
00:00:56,709 --> 00:00:54,640
cool the atmosphere

22
00:00:58,790 --> 00:00:56,719
and these desert dust plumes once they

23
00:01:00,630 --> 00:00:58,800
get into the atmosphere they are not

24
00:01:03,910 --> 00:01:00,640
small if you look at some of the

25
00:01:07,270 --> 00:01:03,920
satellite imagery you can see these huge

26
00:01:08,550 --> 00:01:07,280
desert dust plumes larger than spain for

27
00:01:10,950 --> 00:01:08,560
example

28
00:01:13,109 --> 00:01:10,960
coming across the north atlantic so this

29
00:01:14,950 --> 00:01:13,119
is an important impact potentially on

30
00:01:16,950 --> 00:01:14,960
climate change looking into the future

31
00:01:18,870 --> 00:01:16,960
as more lands become dust-forming

32
00:01:20,390 --> 00:01:18,880
regions as they become desertified we'll

33
00:01:22,390 --> 00:01:20,400
want to understand how those changes

34
00:01:24,789 --> 00:01:22,400
will affect our climate in the future

35
00:01:26,550 --> 00:01:24,799
this experiment is so important for us

36
00:01:28,310 --> 00:01:26,560
to understand what's going on at the

37
00:01:35,900 --> 00:01:28,320
surface of the earth in terms of the

38
00:01:35,910 --> 00:01:40,069

[Music]

39
00:01:44,710 --> 00:01:42,789
first we'll launch on a resupply service

40
00:01:47,350 --> 00:01:44,720
vehicle to the international space

41
00:01:49,350 --> 00:01:47,360
station and once we're on the iss we

42
00:01:51,670 --> 00:01:49,360
would attach to the exterior of the

43
00:01:54,230 --> 00:01:51,680
space station and i can't imagine a

44
00:01:56,310 --> 00:01:54,240
better platform than the international

45
00:01:58,310 --> 00:01:56,320
space station to measure

46
00:02:01,190 --> 00:01:58,320
earth science

47
00:02:03,429 --> 00:02:01,200
emit is an imaging spectrometer so it

48
00:02:05,429 --> 00:02:03,439
has a telescope which basically collects

49
00:02:06,950 --> 00:02:05,439
a lot of light and we image all of that

50
00:02:08,949 --> 00:02:06,960
light onto

51
00:02:10,309 --> 00:02:08,959
the slit of what we call a spectrometer

52
00:02:11,910 --> 00:02:10,319
that measures light in many different

53
00:02:14,070 --> 00:02:11,920
wavelengths of the electromagnetic

54
00:02:15,830 --> 00:02:14,080
spectrum our eyes see three wavelengths

55
00:02:17,670 --> 00:02:15,840
red green and blue but emits c's in

56
00:02:20,229 --> 00:02:17,680
hundreds of wavelengths out into the the

57
00:02:21,589 --> 00:02:20,239
infrared they give us signatures like

58
00:02:23,830 --> 00:02:21,599
fingerprints

59
00:02:26,390 --> 00:02:23,840
as we're traveling on the iss looking

60
00:02:28,710 --> 00:02:26,400
down at earth focusing on the spectral

61
00:02:29,830 --> 00:02:28,720
characteristics of minerals that are on

62
00:02:32,470 --> 00:02:29,840
the earth and so the imaging

63
00:02:34,790 --> 00:02:32,480

spectrometer allows us to detect those

64
00:02:36,470 --> 00:02:34,800
spectral signatures that tell us what

65
00:02:38,470 --> 00:02:36,480
type of mineral they're actually looking

66
00:02:40,390 --> 00:02:38,480
at

67
00:02:42,710 --> 00:02:40,400
this is setting a new benchmark for the

68
00:02:45,270 --> 00:02:42,720
quality of this class of instrumentation

69
00:02:47,270 --> 00:02:45,280
this is just extraordinary it's really a

70
00:02:49,190 --> 00:02:47,280
convergence of state-of-the-art

71
00:02:51,589 --> 00:02:49,200
technology and state-of-the-art science

72
00:02:56,330 --> 00:02:51,599
so that we better understand the climate