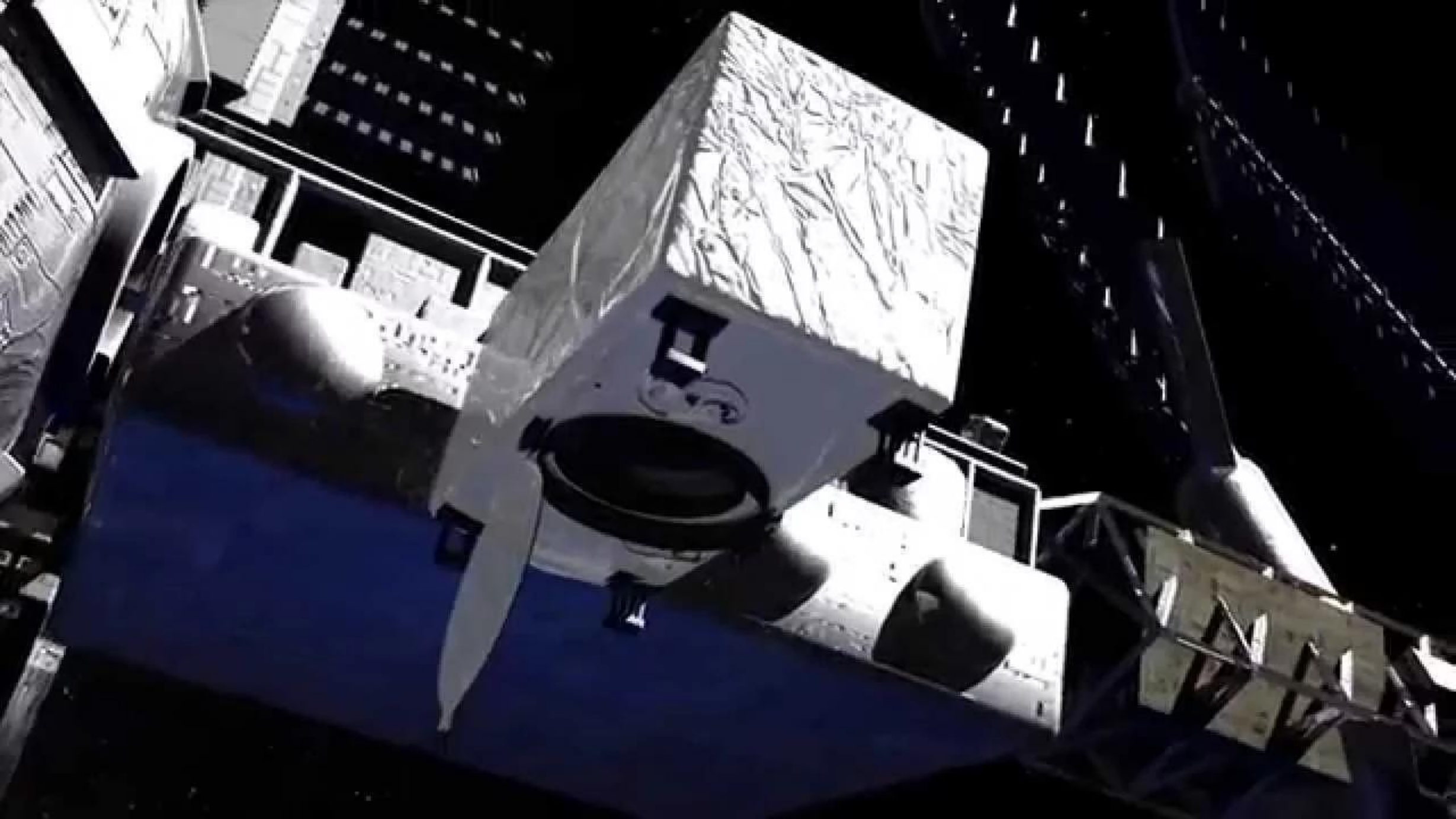

1
00:00:00,010 --> 00:00:08,040
[SFX]

2
00:00:08,040 --> 00:00:12,090
Hey John, I'm finished with your model.

3
00:00:12,090 --> 00:00:14,150
Thanks

4
00:00:14,150 --> 00:00:16,190
So you looking forward to the launch?

5
00:00:16,190 --> 00:00:19,200
You have no idea.

6
00:00:19,200 --> 00:00:24,230
[music and sounds of children]

7
00:00:24,230 --> 00:00:28,250
My project is a LiDAR instrument called CATS.

8
00:00:28,250 --> 00:00:32,310
And it measure clouds and pollution in the Earth's atmosphere.

9
00:00:32,310 --> 00:00:36,330
These are important because they affect society in many ways.

10
00:00:36,330 --> 00:00:39,400
So Little Johnny, how does this LiDAR work?

11
00:00:39,400 --> 00:00:41,460
LiDAR is actually quite simple.

12
00:00:41,460 --> 00:00:47,480
You shine laser light at the Earth's atmosphere and measure the amount of light scattered back.

13

00:00:47,480 --> 00:00:48,520
My instrument... [voice fades out]

14
00:00:48,520 --> 00:00:53,550
Today, a team at NASA Goddard is preparing to demonstrate,

15
00:00:53,550 --> 00:00:58,580
for the fist time in space, a 3-wavelength, laser remote sensing instrument.

16
00:00:58,580 --> 00:01:04,610
The Cloud-Aerosol Transport System, or CATS, will measure clouds and aerosols
in the Earth's atmosphere.

17
00:01:04,610 --> 00:01:10,630
To obtain this data, CATS uses a laser that generates 3 wavelengths or
"colors," of light.

18
00:01:10,630 --> 00:01:15,650
Internal to the laser, special optical crystals are used to generate these
wavelengths

19
00:01:15,650 --> 00:01:19,680
by adding the energy of two photons, to make a single new photon.

20
00:01:19,680 --> 00:01:23,700
The final output beam is made up of all three wavelengths

21
00:01:23,700 --> 00:01:27,720
and these photons are transmitted in groups, towards the atmosphere, at the
speed of light.

22
00:01:27,720 --> 00:01:32,750
As photons encounter clouds or particles, scattering of the laser beam occurs.

23
00:01:32,750 --> 00:01:36,770
Very few of the photons scatter directly back to the optical telescope,

24
00:01:36,770 --> 00:01:41,810
but the ones that return, are collected and counted by sensitive detectors and

electronics.

25
00:01:41,810 --> 00:01:48,870
By timing the difference between emission and detection, the precise altitude of the particles can be determined.

26
00:01:48,870 --> 00:01:52,910
While monitoring global hazards from above,

27
00:01:52,910 --> 00:01:56,940
CATS will determine the height, thickness and the extent of smoke, dust particles,

28
00:01:56,940 --> 00:01:58,970
and volcanic ash in our atmosphere.

29
00:01:58,970 --> 00:02:04,000
Improving cloud data will allow scientist to create more accurate climate models,

30
00:02:04,000 --> 00:02:08,020
which in turn, will improve air quality forecast and health risk alerts.

31
00:02:08,020 --> 00:02:12,030
This cost-effective, technology demonstration will utilize

32
00:02:12,030 --> 00:02:18,070
the International Space Station as a scientific platform for up to 3 years.

33
00:02:18,070 --> 00:02:24,100
Once proven, the CATS technology can be used to further a larger, free-flier satellite mission.

34
00:02:24,100 --> 00:02:28,120
Until then, CATS will provide information that can help us better understand

35
00:02:28,120 --> 00:02:32,150
Earth's complex atmospheric processes.