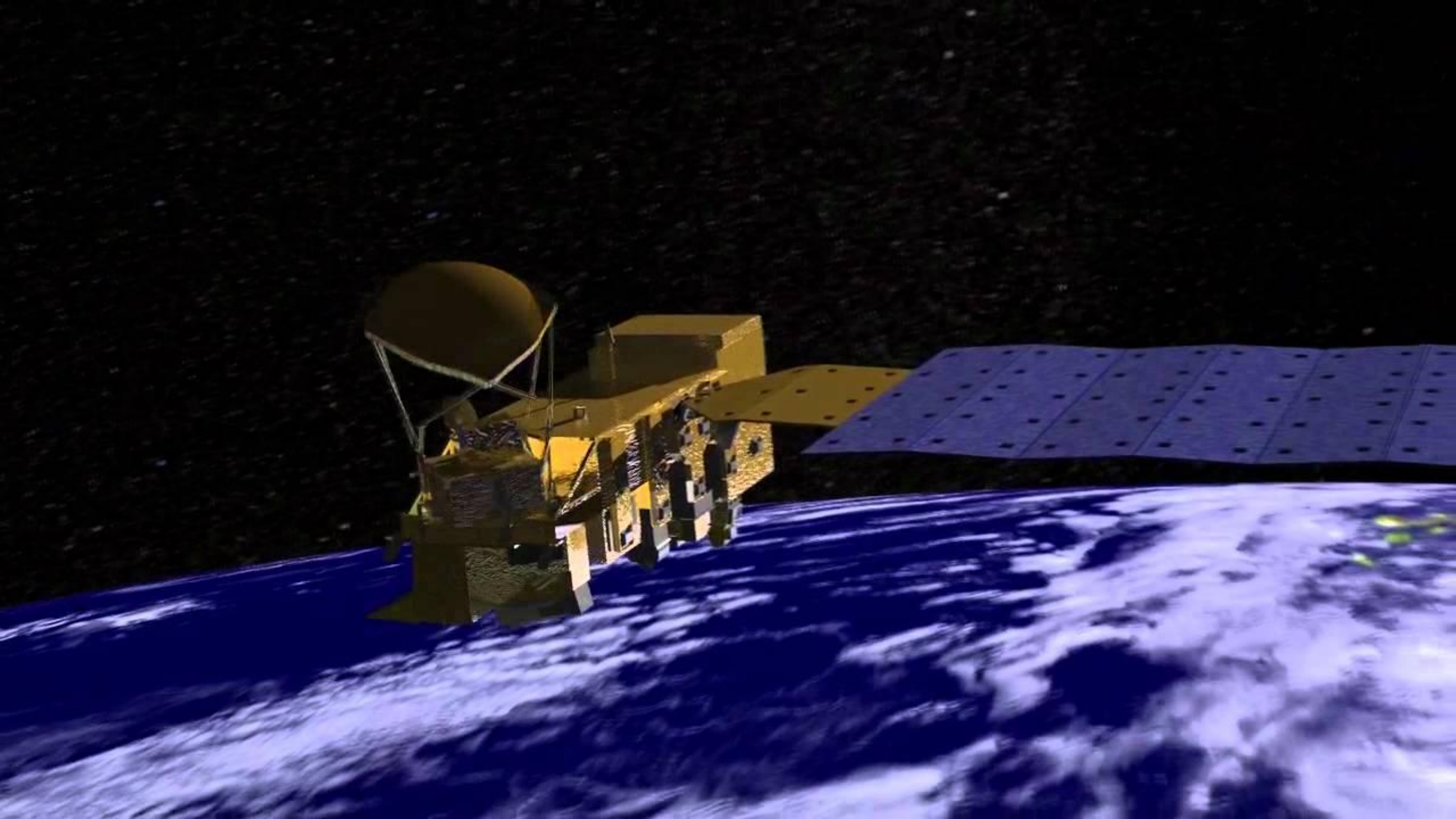

1
00:00:08,380 --> 00:00:12,580
[music]

2
00:00:12,600 --> 00:00:16,820
Narrator: There is good reason why the Earth is called the "water planet."

3
00:00:16,840 --> 00:00:20,980
Unlike all other known planets, Earth has an abundance

4
00:00:21,000 --> 00:00:25,160
of oceans and white clouds and ice all strikingly visible from space.

5
00:00:25,180 --> 00:00:29,350
At least 70% of the Earth's surface

6
00:00:29,370 --> 00:00:33,510
is covered by ocean, and sizable portions of the land are covered by water

7
00:00:33,530 --> 00:00:37,640
in the form of soil moisture, ice and snow.

8
00:00:37,660 --> 00:00:41,790
Water is also a major component of the Earth's atmosphere and is

9
00:00:41,810 --> 00:00:45,900
essential to all known forms of life

10
00:00:45,920 --> 00:00:49,990
Clouds typically cover at least half the Earth

11
00:00:50,010 --> 00:00:54,050
and water vapor is even more pervasive throughout the atmosphere.

12
00:00:54,070 --> 00:00:58,100
Water vapor is by far the most important greenhouse gas, helping to make

13
00:00:58,120 --> 00:01:02,150

our planet habitable. To understand our climate

14
00:01:02,170 --> 00:01:06,190
and to understand life on Earth, we need to understand how

15
00:01:06,210 --> 00:01:10,370
water systems work.

16
00:01:10,390 --> 00:01:14,550
Launch Announcer: Operations here at Vandenberg Air Force Base are going well this morning

17
00:01:14,570 --> 00:01:18,710
for the launch of the Aqua satellite on a Delta II launch vehicle. Liftoff is scheduled to

18
00:01:18,730 --> 00:01:22,880
occur on time at 2:55 a.m. Pacific Time.

19
00:01:22,900 --> 00:01:27,090
Six, five, four, three, two

20
00:01:27,110 --> 00:01:31,300
one ... and we have have liftoff of NASA's

21
00:01:31,320 --> 00:01:35,480
Aqua spacecraft, designed to study the Earth's water systems.

22
00:01:35,500 --> 00:01:39,600
[rocket sound]

23
00:01:39,620 --> 00:01:43,770
Narrator: NASA's Aqua spacecraft was launched on May 4th, 2002,

24
00:01:43,790 --> 00:01:47,880
, carrying six Earth-observing instruments to collect data about many

25
00:01:47,900 --> 00:01:51,980
aspects of the Earth's atmosphere, oceans, ice, land, and biosphere,

26
00:01:52,000 --> 00:01:56,070
with a major focus on water in all its forms.

27
00:01:56,090 --> 00:02:00,150
The Aqua spacecraft measures water vapor and clouds in the atmosphere

28
00:02:00,170 --> 00:02:04,200
liquid water and sea ice in the oceans,

29
00:02:04,220 --> 00:02:08,210
and glaciers, snow cover, and soil moisture on the land.

30
00:02:08,230 --> 00:02:12,390
To make these measurements, Aqua carries six Earth-observing instruments

31
00:02:12,410 --> 00:02:16,550
four from the U.S., one from Japan, and one from Brazil.

32
00:02:16,570 --> 00:02:23,760
All of them measure radiation,

33
00:02:23,780 --> 00:02:27,810
but different ones measure different kinds of radiation.

34
00:02:27,830 --> 00:02:31,850
For example, visible radiation, which is the type of radiation our eyes can see,

35
00:02:31,870 --> 00:02:35,880
is measured by three of teh Aqua instruments. This type of radiation is excellent for monitoring

36
00:02:35,900 --> 00:02:40,050
invisible phenomena like cloud cover.

37
00:02:40,070 --> 00:02:44,220
But just like our eyes, if an instrument only measures visible radiation

38
00:02:44,240 --> 00:02:48,400

it will have a hard time seeing through clouds, or seeing anything

39
00:02:48,420 --> 00:02:52,550
during periods of darkness. That's why Aqua's instruments

40
00:02:52,570 --> 00:02:56,740
also measure radiation outside the visible range in the

41
00:02:56,760 --> 00:03:00,930
infrared and microwave regions.

42
00:03:00,950 --> 00:03:05,090
Microwaves reaching Aqua's instruments are coming from the Earth's system and hence are not dependent

43
00:03:05,110 --> 00:03:09,240
on sunlight. And some of the microwaves pass straight through most

44
00:03:09,260 --> 00:03:13,370
clouds, giving Aqua the ability to see the Earth's surface,

45
00:03:13,390 --> 00:03:17,520
even on a cloudy day, and even during darkness.

46
00:03:17,540 --> 00:03:21,630
Every day, data pour down from the Aqua satellite

47
00:03:21,650 --> 00:03:25,710
and these data are processed for a wide range of users.

48
00:03:25,730 --> 00:03:29,760
Scientists use the data to improve our understandings of the Earth's very

49
00:03:29,780 --> 00:03:33,820
complicated and interconnected system, and weather forecasters, farmers,

50
00:03:33,840 --> 00:03:37,880
policmakers, businesses, and relief agencies use the