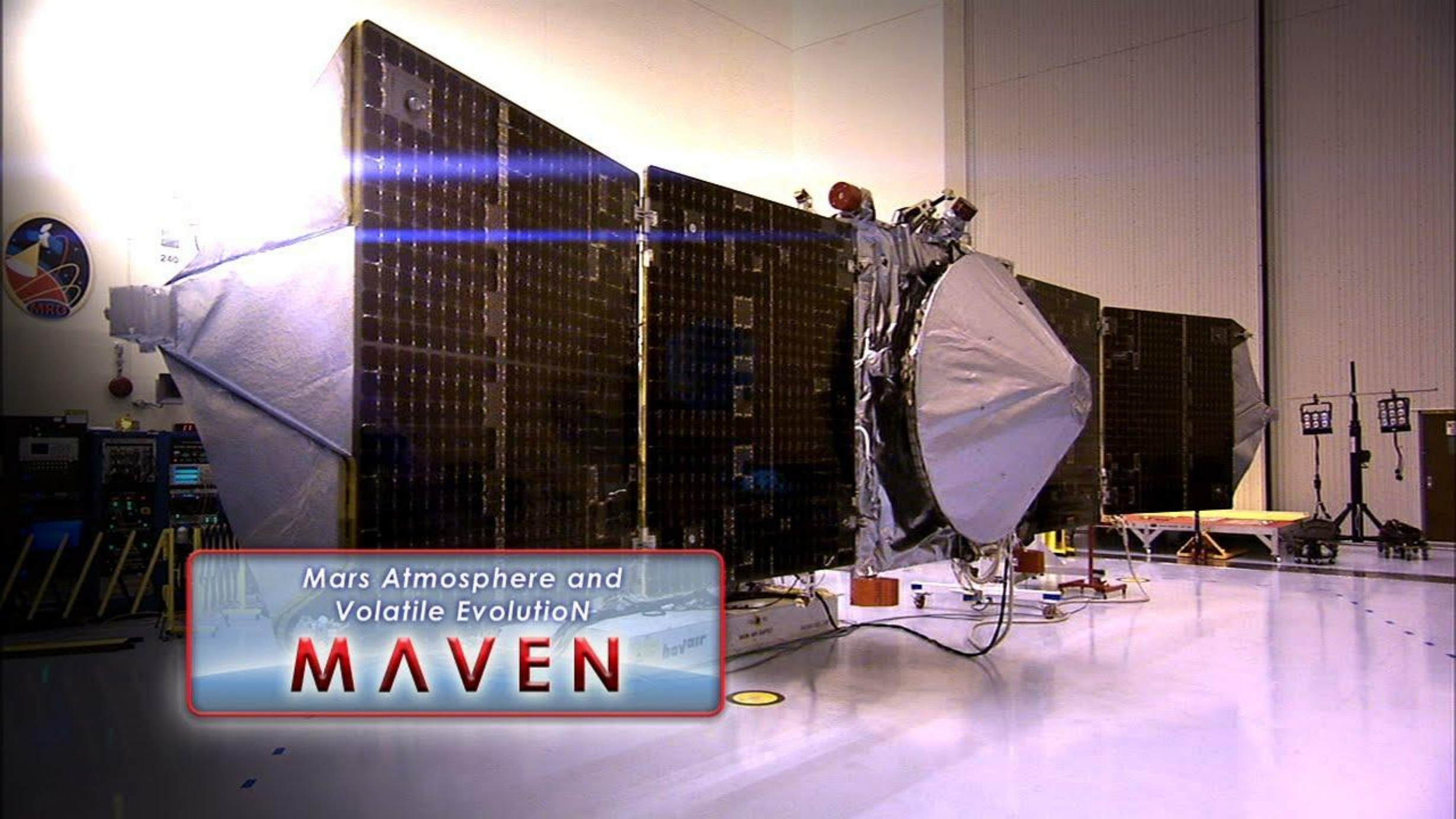
Mars Atmosphere and
Volatile EvolutioN
MAVEN

1
00:00:00,010 --> 00:00:08,250
[music]

2
00:00:08,270 --> 00:00:15,780
Mars's atmosphere is much less dense than the Earth's, it only has about one percent of the density of the Ear

3
00:00:15,800 --> 00:00:20,680
However, we're pretty sure that Mars had a much thicker atmosphere in the past,

4
00:00:20,700 --> 00:00:29,550
because there's such strong evidence for running water on the surface, and to have running water, Mars's atm

5
00:00:29,570 --> 00:00:39,880
Now MAVEN is going to look at how Mars lost its atmosphere, in particular whether it could have lost its atmos

6
00:00:39,900 --> 00:00:48,260
My name is Bob Lin, I'm a professor of physics and I work at the Space Sciences Laboratory of the University

7
00:00:48,280 --> 00:00:55,400
MAVEN is a Mars Scout mission for NASA, and it's an orbital mission to Mars

8
00:00:55,420 --> 00:00:59,660
which is designed to study the loss of the atmosphere of Mars.

9
00:00:59,680 --> 00:01:04,920
For example if there was a large solar eruption, if the solar wind increased in strength,

10
00:01:04,940 --> 00:01:10,080
we could then look at how the atmosphere gets lost in each of these situations.

11
00:01:10,100 --> 00:01:17,930
Because Mars is in the solar wind, a lot of the loss comes from these ions and electrons that are escaping,

12
00:01:17,950 --> 00:01:26,820
and the Particles and Fields package is designed to look at the escape of the charged particles from the atmos

13
00:01:26,840 --> 00:01:32,730

We have the Solar Wind Ion Analyzer, which measures the incoming solar wind,

14
00:01:32,750 --> 00:01:37,630
then we have the Solar Wind Electron Analyzer, which measures the incoming solar wind electrons.

15
00:01:37,650 --> 00:01:44,730
We have the Langmuir Probe and Waves instrument, and that measures solar ultraviolet.

16
00:01:44,750 --> 00:01:50,660
It also measures low-energy electrons that might be escaping from Mars,

17
00:01:50,680 --> 00:01:56,660
and furthermore it measures waves that might be accelerating the ions so that they can escape from Mars.

18
00:01:56,680 --> 00:02:06,030
We then have the STATIC instrument. It will give us the composition of what is escaping, whether it's CO2, or h

19
00:02:06,050 --> 00:02:11,890
The Solar Energetic Particle instrument, SEP, measures high-energy particles from the Sun,

20
00:02:11,910 --> 00:02:15,980
and those particles will hit the atmosphere and cause a lot of damage.

21
00:02:16,000 --> 00:02:24,050
And finally there's a magnetometer, which will measure the magnetic field in the solar wind and the magnetic fi

22
00:02:24,070 --> 00:02:30,140
Mars is the only planet, besides the Earth, where you really have a chance that life might have formed.

23
00:02:30,160 --> 00:02:35,390
The conditions for life are water, running water, and a reasonably thick atmosphere.

24
00:02:35,410 --> 00:02:41,570
We have a chance now to see whether that was in fact what Mars had early on,

25
00:02:41,590 --> 00:02:48,840
and whether the atmosphere was lost by this means, so we think it's an extremely important mission to do.

26
00:02:48,860 --> 00:02:53,310
[George Diller] Five, four, three, two, one.

27
00:02:53,330 --> 00:02:59,760
Main engine start, ignition, and liftoff of the Atlas V with MAVEN,

28
00:02:59,780 --> 00:03:07,250
looking for clues about the evolution of Mars through its atmosphere.