1
00:00:02,159 --> 00:00:07,150
Future deep space exploration missions will
demand even more robust and fuel-efficient

2
00:00:07,150 --> 00:00:10,160
spacecraft than used in the past.

3
00:00:10,160 --> 00:00:14,860
To meet this challenge, the NASA Glenn Research
Center in Cleveland Ohio has developed an

4
00:00:14,860 --> 00:00:22,180
advanced ion propulsion system, known as Nasa's
Evolutionary Xenon Thruster or NEXT.

5
00:00:22,180 --> 00:00:27,039
The NEXT Ion propulsion system is exciting
because it provides an unparalleled fuel-efficient

6
00:00:27,039 --> 00:00:28,779
propulsion system capability.

7
00:00:28,779 --> 00:00:34,309
What this means is for the same amount of
Delta V or change in velocity for a spacecraft,

8
00:00:34,309 --> 00:00:37,809
the chemical system would have required 10
times the amount of fuel.

9
00:00:37,809 --> 00:00:42,239
This allows for expanded reach for the NASA
robotics science missions and a higher return

10
00:00:42,239 --> 00:00:46,489
on scientific value for those missions deep
within the solar system.

11
00:00:46,489 --> 00:00:52,860

Operated in one of NASA's high vacuum chambers
for more than 48,000 hours, NEXT has been

12
00:00:52,860 --> 00:00:56,899
tested longer than any space propulsion system
in history.

13
00:00:56,899 --> 00:01:03,879
The system uses electrically charged xenon
gas atoms or ions and electrical power.

14
00:01:03,879 --> 00:01:09,630
This makes it more fuel-efficient and cost-effective
than traditional chemical propulsion systems.

15
00:01:09,630 --> 00:01:13,280
The reason why it's important that the NEXT
ion engine has lasted as long as it has is

16
00:01:13,280 --> 00:01:18,001
because electric propulsion inherently produces
a low amount of thrust, which means that you

17
00:01:18,001 --> 00:01:20,310
accelerate very slowly in space.

18
00:01:20,310 --> 00:01:24,360
So in order to speed up and get where you're
going, it needs to push for a very long period

19
00:01:24,360 --> 00:01:25,360
of time.

20
00:01:25,360 --> 00:01:29,080
So that longer it lasts, the farther you can
go out in space.

21
00:01:29,080 --> 00:01:34,869
More advanced than the ion thruster technology
that propelled the Deep Space One and DAWN

22
00:01:34,869 --> 00:01:40,280
missions, NEXT offers greater power and higher
efficiency for even more complex and distant

23
00:01:40,280 --> 00:01:41,890
missions.

24
00:01:41,890 --> 00:01:46,370
Over the past few decades, we've done a lot
of planetary science missions, right, and

25
00:01:46,370 --> 00:01:50,569
we've kind of picked the low hanging fruit
in terms of those missions that are relatively

26
00:01:50,569 --> 00:01:52,030
easy to achieve.

27
00:01:52,030 --> 00:01:57,090
But now having done most of those missions,
there's remaining missions that are critically

28
00:01:57,090 --> 00:02:00,670
important from a science perspective that
require a lot of energy.

29
00:02:00,670 --> 00:02:05,520
And the NEXT ion propulsion system delivers
that capability and does so very efficiently.

30
00:02:05,520 --> 00:02:10,720
Helping to fuel new discoveries in space,
the NEXT ion propulsion system will allow