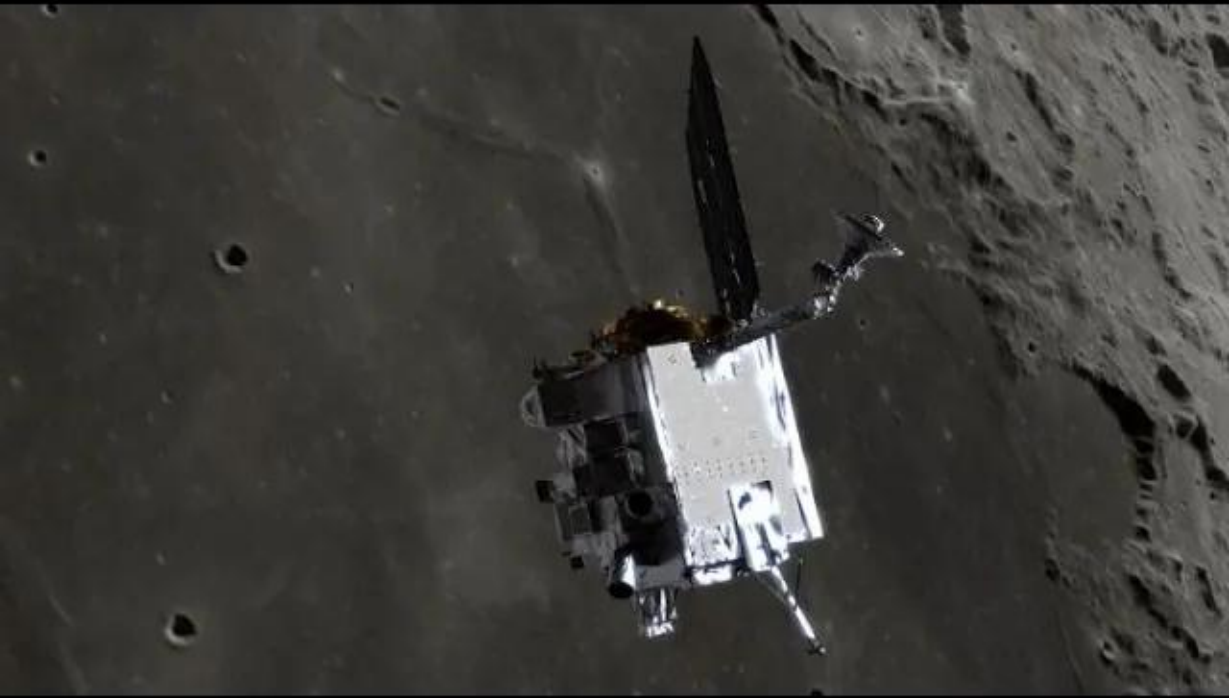

1
00:00:00,866 --> 00:00:04,000
This year the Lunar Reconnaissance Orbiter celebrates 13 years

2
00:00:04,000 --> 00:00:05,800
of orbit around our Moon.

3
00:00:05,800 --> 00:00:09,166
And in that time, it has collected over a petabyte of data -

4
00:00:09,166 --> 00:00:10,800
the largest volume ever collected

5
00:00:10,800 --> 00:00:13,500
by a planetary science mission at NASA.

6
00:00:13,500 --> 00:00:16,633
Due to its success and continued operational abilities,

7
00:00:16,633 --> 00:00:19,066
NASA has awarded the spacecraft an additional

8
00:00:19,066 --> 00:00:21,933
extended mission phase so that it can continue

9
00:00:21,933 --> 00:00:24,200
gathering critical information on the Moon

10
00:00:24,200 --> 00:00:28,000
and help pave the way for future lunar missions.

11
00:00:28,000 --> 00:00:31,933
Going forward, the LRO mission will have four main areas of focus.

12
00:00:32,933 --> 00:00:35,866
The first is the study of volatiles, which are chemicals

13
00:00:35,866 --> 00:00:40,066

that easily evaporate or vaporize, such as water.

14
00:00:40,066 --> 00:00:43,333
In terms of lunar exploration, volatiles will be useful

15
00:00:43,333 --> 00:00:45,200
for things like creating rocket fuel

16
00:00:45,200 --> 00:00:47,266
and making oxygen to breathe.

17
00:00:47,266 --> 00:00:48,833
So they are a primary resource

18
00:00:48,833 --> 00:00:53,033
that future astronauts will depend on having.

19
00:00:53,033 --> 00:00:56,566
LRO will continue to provide new data for identifying which areas

20
00:00:56,566 --> 00:00:59,666
are rich in volatiles, and for clueing us in to how they may

21
00:00:59,666 --> 00:01:02,166
move around the lunar surface.

22
00:01:02,166 --> 00:01:04,700
Current LRO data suggests they may be frozen in

23
00:01:04,700 --> 00:01:08,866
permanently shadowed craters, in areas that receive some sunlight,

24
00:01:08,866 --> 00:01:12,533
and may be chemically locked in minerals on the Moon.

25
00:01:12,533 --> 00:01:15,866
This is helping pave the way for future missions like VIPER,

26
00:01:15,866 --> 00:01:18,666
which will send a robotic rover to explore an area near

27
00:01:18,666 --> 00:01:20,100
the lunar South Pole,

28
00:01:20,100 --> 00:01:23,766
and ultimately, the astronaut-led Artemis missions.

29
00:01:23,766 --> 00:01:26,633
The second area of focus is on the Moon’s interior,

30
00:01:26,633 --> 00:01:30,300
volcanic features and the tectonics of the Moon’s surface –

31
00:01:30,300 --> 00:01:33,166
because understanding the lunar surface requires knowledge

32
00:01:33,166 --> 00:01:35,700
of what’s been going on underneath.

33
00:01:35,700 --> 00:01:37,300
Scientists want to figure out when the Moon

34
00:01:37,300 --> 00:01:41,000
was last volcanically active, and how current geologic processes,

35
00:01:41,000 --> 00:01:45,500
like moonquakes, could affect the safety of future exploration.

36
00:01:45,500 --> 00:01:48,100
They’ll do these things by studying lobate scarps,

37
00:01:48,100 --> 00:01:50,900
as well as deep crustal and mantle composition

38
00:01:50,900 --> 00:01:52,866

that are exposed at the surface.

39
00:01:53,866 --> 00:01:56,700
Studying the Moon’s history of volcanism and tectonics

40
00:01:56,700 --> 00:01:59,033
will also inform us about other planetary bodies

41
00:01:59,033 --> 00:02:02,633
in our solar system and beyond.

42
00:02:03,633 --> 00:02:06,133
The third area of focus is on the Moon’s surface –

43
00:02:06,133 --> 00:02:08,466
its regolith and impact craters.

44
00:02:08,466 --> 00:02:10,833
We want to know how impact craters break down,

45
00:02:10,833 --> 00:02:14,600
and if different ejected materials might degrade at different rates.

46
00:02:14,600 --> 00:02:17,166
These studies will give us a better understanding of the mineral

47
00:02:17,166 --> 00:02:21,866
and chemical makeup of the lunar surface and subsurface.

48
00:02:21,866 --> 00:02:24,166
This information can tell us how the Moon has changed

49
00:02:24,166 --> 00:02:28,200
over hundreds of millions, or billions of years.

50
00:02:28,200 --> 00:02:30,400
Studying the Moon’s regolith and impact craters

51
00:02:30,400 --> 00:02:33,133
also informs scientists about space weathering,

52
00:02:33,133 --> 00:02:35,666
which can help similar studies looking at the Earth,

53
00:02:35,666 --> 00:02:39,900
as well as on places like Mars, Mercury, or even asteroids.

54
00:02:41,933 --> 00:02:44,433
The last focus area for LRO going forward

55
00:02:44,433 --> 00:02:48,200
is support for future missions.

56
00:02:48,200 --> 00:02:50,300
NASA has plans for numerous missions to go

57
00:02:50,300 --> 00:02:54,633
to the lunar surface during LRO's extended phase.

58
00:02:54,633 --> 00:02:57,633
Sending missions to the lunar surface requires planning,

59
00:02:57,633 --> 00:02:59,133
not only to build the mission,

60
00:02:59,133 --> 00:03:02,800
but to find safe and interesting landing sites.

61
00:03:02,800 --> 00:03:05,266
LRO is in a unique position to directly assist

62
00:03:05,266 --> 00:03:08,900
with some of those operations and science objectives.

63
00:03:08,900 --> 00:03:12,000

LRO can help identify landing sites by making maps

64
00:03:12,000 --> 00:03:14,200
that tell us what the surface is like,

65
00:03:14,200 --> 00:03:16,300
where there may be hazards to landers,

66
00:03:16,300 --> 00:03:19,633
and where there are interesting features to explore.

67
00:03:19,633 --> 00:03:22,133
LRO is also capable of helping landed missions

68
00:03:22,133 --> 00:03:24,633
get simultaneous measurements from orbit

69
00:03:24,633 --> 00:03:28,033
while they gather data from the surface.

70
00:03:29,366 --> 00:03:33,033
After studying the Moon for 13 years, LRO has proven to be

71
00:03:33,033 --> 00:03:36,900
one of NASA’s most valuable tools for advancing lunar science.