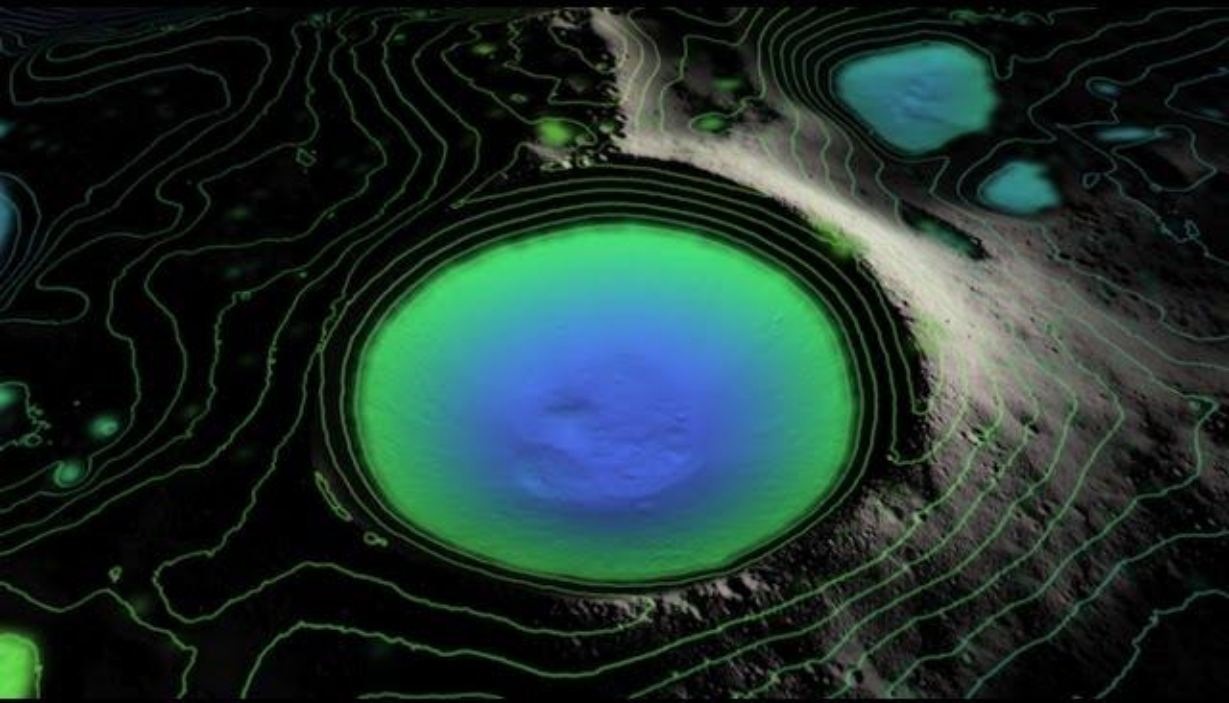

1
00:00:00,050 --> 00:00:02,830
[music]

2
00:00:02,850 --> 00:00:05,280
As you watch the Moon over the course of a month,

3
00:00:05,300 --> 00:00:10,040
you'll notice that different features are illuminated by the Sun at different times.

4
00:00:10,060 --> 00:00:13,660
However, there are some parts of the Moon that never see sunlight.

5
00:00:13,680 --> 00:00:17,830
These areas are called permanently shadowed regions, and they appear dark

6
00:00:17,850 --> 00:00:23,690
because unlike on the Earth, the axis of the Moon is nearly perpendicular to the direction of the Sun's light.

7
00:00:23,710 --> 00:00:28,350
The result is that the bottoms of certain craters, like here at the Moon's south pole,

8
00:00:28,370 --> 00:00:33,430
are never pointed toward the Sun, with some remaining dark for over two billion years.

9
00:00:33,450 --> 00:00:37,160
However, thanks to new data from NASA's Lunar Reconnaissance Orbiter,

10
00:00:37,180 --> 00:00:40,660
we can now see into these dark craters in incredible detail.

11
00:00:40,680 --> 00:00:45,260
Seeing the shape of the crater is important, and LRO has used its LOLA instrument

12
00:00:45,280 --> 00:00:50,730
to make the best yet topographical maps of these craters by reflecting lasers off the lunar surface.

13
00:00:50,750 --> 00:00:54,730

This has allowed us to see the shapes of the craters' interiors from any angle,

14
00:00:54,750 --> 00:01:00,330
and by making 3D models, we can light up the crater floors as if we had a giant flashlight.

15
00:01:00,350 --> 00:01:07,380
And although the Sun never illuminates these craters, other stars still cast a faint light into the permanent shad

16
00:01:07,400 --> 00:01:14,580
LRO's LAMP instrument can actually measure this light, giving us yet another view of this unique region on the

17
00:01:14,600 --> 00:01:21,850
LRO's DIVINER instrument can also measure temperature, revealing the extreme cold within the craters.

18
00:01:21,870 --> 00:01:29,460
Finally, LRO's LEND instrument can measure the speed of neutrons to detect elements like hydrogen in the lu

19
00:01:29,480 --> 00:01:33,440
So, while there are some areas on the Moon that never see the light of day,

20
00:01:33,460 --> 00:01:37,120
LRO will keep collecting data so that we can learn more about them.

21
00:01:37,140 --> 00:01:42,210
And as we continue to study the Moon, we'll improve our understanding of Earth's original satellite,