1
00:00:00,010 --> 00:00:08,270
[ music ]

2
00:00:08,290 --> 00:00:16,060
Forty-five years ago, Apollo 8 astronauts Frank Borman, Jim Lovell, and Bill Anders became the first humans t

3
00:00:16,080 --> 00:00:20,750
and the first to witness the magnificent sight called "Earthrise."

4
00:00:20,770 --> 00:00:26,630
Now, for the first time, we can see this historic event exactly as the astronauts saw it,

5
00:00:26,650 --> 00:00:32,130
thanks to new data from NASA's Lunar Reconnaissance Orbiter, or LRO.

6
00:00:32,150 --> 00:00:37,780
LRO's superb global lunar maps, combined with the astronauts' own photographs,

7
00:00:37,800 --> 00:00:43,270
reveal where Apollo 8 was over the Moon, and even its precise orientation in space,

8
00:00:43,290 --> 00:00:52,380
when the astronauts first saw the Earth rising above the Moon's barren horizon.

9
00:00:52,400 --> 00:00:57,980
On December 24, 1968, a few minutes after 10:30 am Houston time,

10
00:00:58,000 --> 00:01:02,780
Apollo 8 was coming around from the far side of the Moon for the fourth time.

11
00:01:02,800 --> 00:01:10,720
Mission Commander Frank Borman was in the left-hand seat, preparing to turn the spacecraft to a new orienta

12
00:01:10,740 --> 00:01:18,730
Navigator Jim Lovell was in the spacecraft's lower equipment bay, about to make sightings on lunar landmarks

13
00:01:18,750 --> 00:01:23,480

and Bill Anders was in the right-hand seat, observing the Moon through his side window,

14
00:01:23,500 --> 00:01:30,080
and taking pictures with a Hasselblad still camera, fitted with a 250-mm telephoto lens.

15
00:01:30,100 --> 00:01:38,830
Meanwhile, a second Hasselblad with an 80-mm lens was mounted in Borman's front-facing window, the so-ca

16
00:01:38,850 --> 00:01:43,980
photographing the Moon on an automatic timer: a new picture every twenty seconds.

17
00:01:44,000 --> 00:01:53,080
These photographs, matched with LRO's high resolution terrain maps, show that Borman was still turning Apol

18
00:01:53,100 --> 00:01:57,280
It was only because of the timing of this rotation that the Earthrise,

19
00:01:57,300 --> 00:02:06,200
which had happened on Apollo 8's three previous orbits, but was unseen by the astronauts, now came into vie

20
00:02:06,220 --> 00:02:12,880
Here's what it looked like, as recreated from LRO data by Goddard's Scientific Visualization Studio.

21
00:02:12,900 --> 00:02:17,850
You'll hear the astronauts' voices as captured by Apollo 8's onboard tape recorder,

22
00:02:17,870 --> 00:02:21,560
beginning with Frank Borman announcing the start of the roll maneuver,

23
00:02:21,580 --> 00:02:28,250
and you'll see the rising Earth move from one window to another as Apollo 8 turns.

24
00:05:22,200 --> 00:05:27,530
For the astronauts, seeing the Earthrise was an unexpected and electrifying experience,

25
00:05:27,550 --> 00:05:33,480
and one of the three photographs taken by Bill Anders became an iconic image of the 20th century.

26
00:05:33,500 --> 00:05:38,160
But as we've just seen and heard, that photograph was actually a group effort:

27
00:05:38,180 --> 00:05:42,330
not just because Jim Lovell found the roll of color film and gave it to Anders,

28
00:05:42,350 --> 00:05:49,580
but because the astronauts wouldn't have seen the Earth if Frank Borman hadn't been turning the spacecraft ju

29
00:05:49,600 --> 00:05:54,800
Today, the Earthrise has become a symbol of one of history's greatest explorations,

30
00:05:54,820 --> 00:05:58,820
when humans first journeyed to another world and then, looking back,

31
00:05:58,840 --> 00:06:05,180
saw their home planet, in Lovell's words, as a grand oasis in the vastness of space.