



[Press Release]



February 18, 2009

Japan Broadcasting Corporation (NHK)
Japan Aerospace Exploration Agency (JAXA)

**“Kaguya” lunar orbiter captures images of the Earth during a penumbral eclipse
with onboard HDTV camera**

On February 10, 2009 (Japan time), the Japan Aerospace Exploration Agency (JAXA) and Japan Broadcasting Corporation (NHK) successfully obtained video images of the Earth from the “Kaguya” (SELENE) lunar orbiter during a penumbral eclipse *. This video was taken by an onboard HDTV camera at the moment when the Earth came to cover most of the Sun making the Earth look like a diamond ring. The capturing of this phenomenon from the Moon was a world’s first.

The video was taken by an NHK-developed, space-compatible HDTV camera mounted on the Kaguya lunar orbiter. It was received by JAXA and subjected to image processing by NHK.

* A penumbral eclipse occurs when the Sun, Earth, and Moon are nearly aligned and the Moon passes through the Earth’s penumbra (at which time the Sun is partially covered by the Earth (partial eclipse) as seen from the Moon). Here, the amount of solar radiation illuminating the Moon decreases so that the surface of the Moon appears darker than usual from Earth. The Kaguya orbiter, which circles the Moon in a polar orbit, encounters a lunar eclipse only two times per year at the most making it a memorial event.

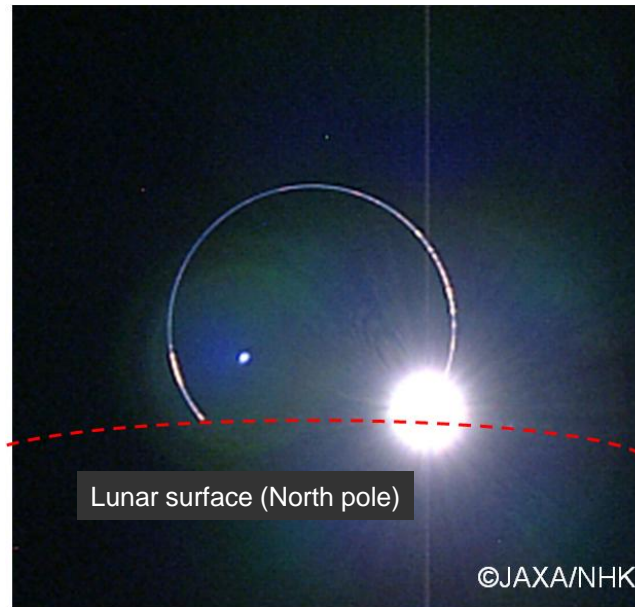


Figure 1: Image of Earth during a penumbral eclipse taken with a HDTV camera (telephoto)

This still image was extracted from video taken by the Kaguya (SELENE) HDTV camera (telephoto) on February 10, 2009 (Japan time). The bright, circular area in the lower right is the Sun and the dark area enclosed by a fine ring is the Earth. This view of the Earth is its nighttime side giving it a pitch dark appearance. Most of the Sun is covered by the Earth and the lunar surface, the latter of which is indicated by the red broken line.

The ring around the Earth appears to twinkle because of the Earth's atmosphere. Solar light is scattered by the Earth's atmosphere, and some of that light arrives at the Moon from around the edge of the Earth. As a result, the Earth's atmosphere takes on a bluish, ring shape as seen from the Moon. This bluish effect in solar light is thought to occur because blue light scatters easily in the Earth's atmosphere.



Figure 2: Consecutive images of Earth during a penumbral eclipse taken with a HDTV camera (telephoto)

The video taken by Kaguya captured the gradual emergence of the Earth and Sun from behind the lunar surface. The above series of images extracted from the video shows that transition.

The image at the upper left shows a portion of the Earth as it begins to emerge from behind the lunar surface. The Sun also emerges, and it takes about 47 seconds for the diamond-ring-like spectacle to appear (lower-right image).

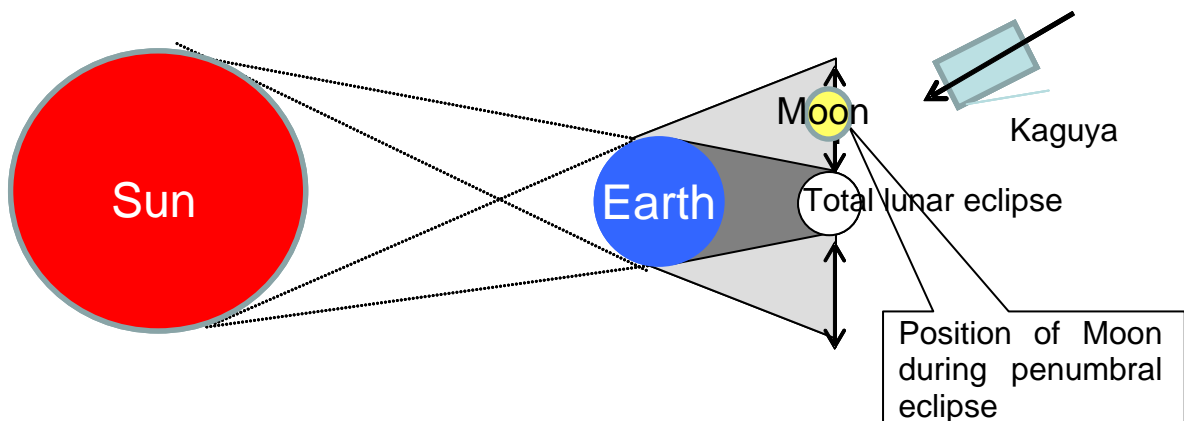


Figure 3: Orientation of Kaguya, Moon, Earth, and Sun when taking video of an “earthrise” during a penumbral eclipse.