CENTURY'S LONGEST LUNAR ECLIPSE JULY 27

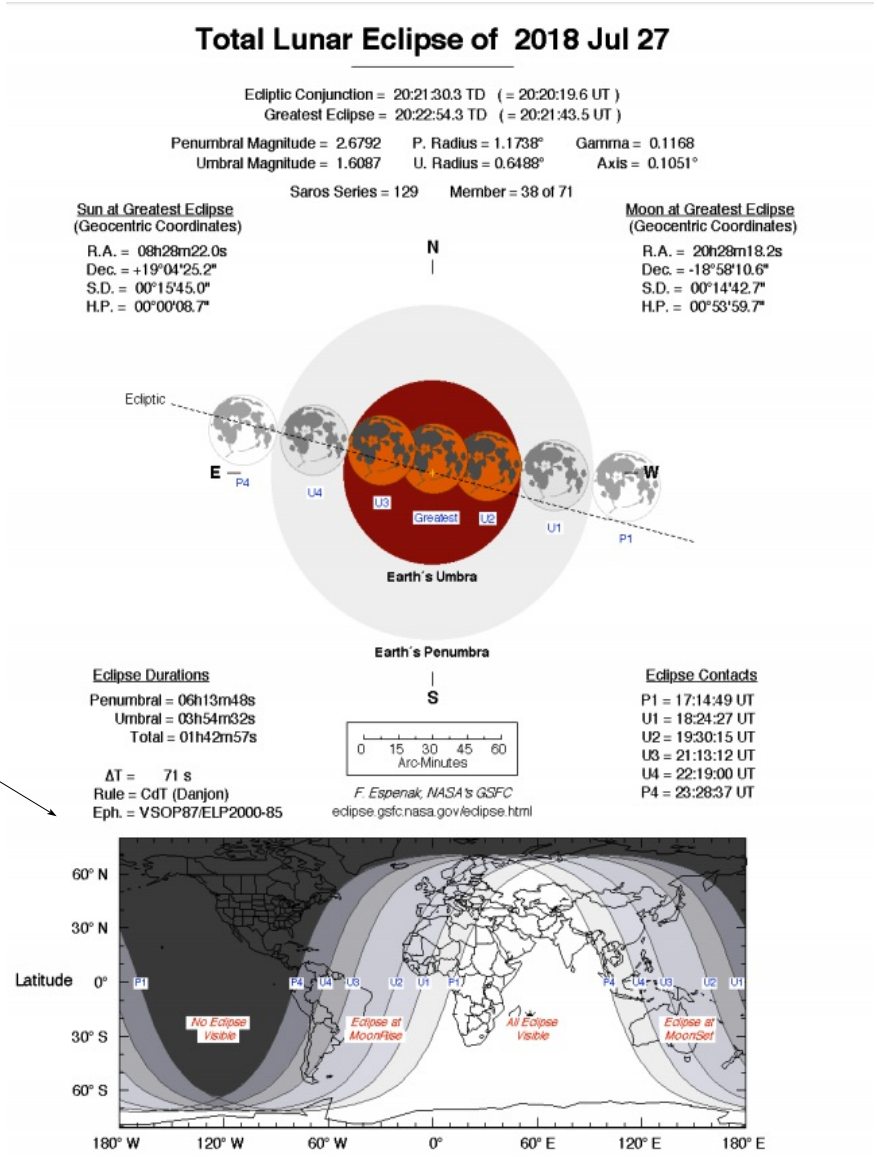
The July 2018 full moon presents the longest total lunar eclipse of the 21st century (2001 to 2100) on the night of July 27-28, 2018, lasting for a whopping 1 hour and 43 minutes. (In contrast, the previous total lunar eclipse on January 31, 2018, lasted 1 hour and 16 minutes.) A partial eclipse precedes and follows the century's longest total lunar eclipse, each time lasting 1 hour and 6 minutes. So, from start to finish, the moon takes nearly 4 hours (3 hours and 55 minutes) to cross the Earth's dark umbral shadow.

Total lunar eclipse photo taken on January 31, 2018,

The moon crosses the Earth's shadow from west to east, entering the dark umbra (inner shadow) at 18:24 UTC and leaving it at 22:19 UTC. The penumbra (outer shadow) is so faint that you may not notice any darkening of the moon while it's in the penumbra.

This lunar eclipse is primarily visible from the world's Eastern Hemisphere (Europe, Africa, Asia, Australia and New Zealand). South America, at least in part, can watch the final stages of the eclipse just after sunset July 27, whereas New Zealand will catch the beginning stages of the eclipse before sunrise July 28. North America, most of the Arctic and much of the Pacific Ocean will miss out entirely, as shown on worldwide map below.

We give you the eclipse times in Universal Time Partial eclipse begins: 18:24 (6:24 p.m.) UTC
Total eclipse begins: 19:30 (7:30 p.m.)
Greatest eclipse: 20:22 (8:22 p.m.)
Total eclipse ends: 21:13 (9:13 p.m.)
Partial eclipse ends: 22:19 (10:19p.m.)



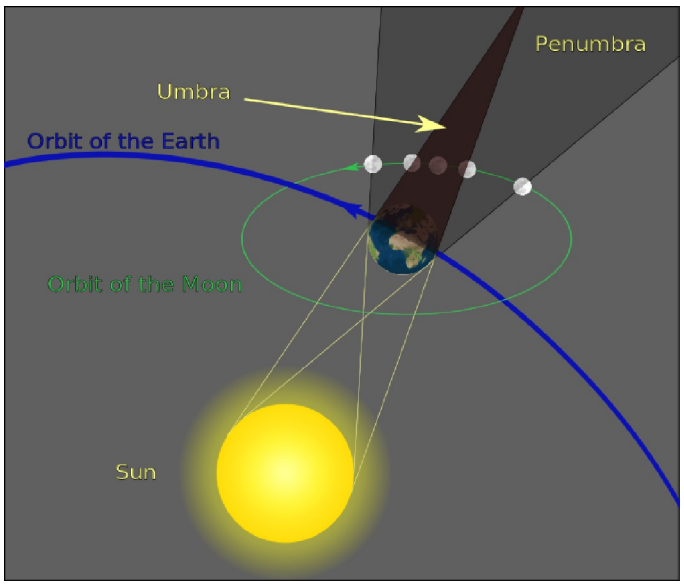
The greatest eclipse takes place at or around midnight for Madagascar and the Middle East. Europe and Africa view the greatest eclipse during the evening hours, whereas most of Asia, Indonesia and Australia view the greatest eclipse in the morning (sometime between midnight and sunrise on July 28).

What causes a long-lasting total lunar eclipse?

For an especially long-lasting total lunar eclipse of 1 hour and 43 minutes to occur, the moon has to pass through the central part of the Earth's shadow. The previous total lunar eclipse on January 31, 2018, didn't last as long (1 hour and 16 minutes) because the moon passed to the south of shadow's centre; and the next total lunar eclipse on January 21, 2019, won't be as long either (1 hour and 2 minutes) because it'll pass to the north of the shadow's centre.

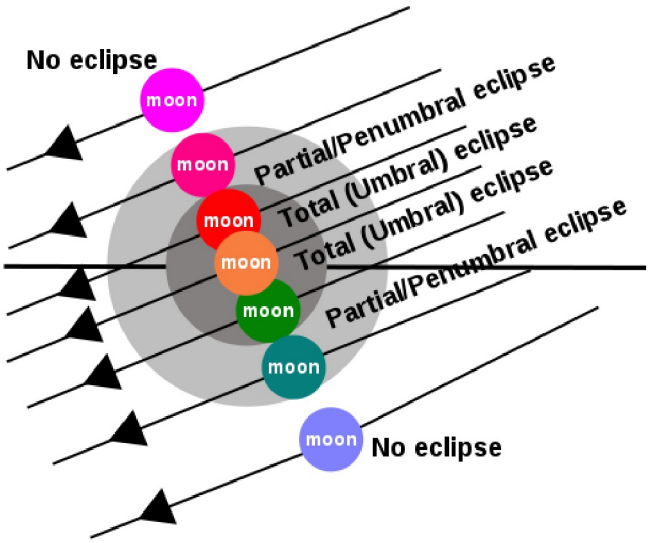
In 2018, the July full moon and July lunar apogee – the moon's most distant point from Earth in its monthly orbit – both fall on the same date: July 27, 2018. Therefore, the July 2018 full moon showcases the most distant and smallest full moon of the year. Sometimes called an apogean full moon (or micro-moon or mini-moon), this smaller and slower-moving full moon takes more time to

cross the Earth's shadow than does a full moon that's closer to Earth and moving faster in orbit. That's why a full moon at or near lunar apogee adds to the duration of a total lunar eclipse.



The longest possible total lunar eclipse is 1 hour and 47 minutes. In fact, the longest total eclipse of the 20th century (1901 to 2000) occurred on July 16, 2000, with a duration of 1 hour and 46.4 minutes. **That's because, at greatest eclipse, the centre of the lunar disk aligned almost perfectly with the centre of the Earth's shadow. This is no coincidence, by the way: The extra-long total lunar eclipses of July 16, 2000, and July 27, 2018, belong to the same Saros series and are separated by one Saros period (18.031 years).**

This descending node Saros series starts when the moon first clips the southernmost part (bottom) of Earth's shadow and then migrates northward (upward) with each succeeding Saros period of 18.031 years. Midway through the Saros series, the full moon passes through the centre of Earth's shadow for a maximally long total lunar eclipse. Saros Series 129, of which the total lunar eclipse on 2018 July 27 is a part, lasts for a total of 1,262 years. **The Saros is a period of approximately 223 synodic months (approximately 6585.3211 days, or 18 years, 11 days, 8 hours), that can be used to predict eclipses of the Sun and Moon**. One saros period after an eclipse, the Sun, Earth, and Moon return to approximately the same relative geometry, and a nearly identical eclipse will occur, in what is referred to as an eclipse cycle. The name "saros" was applied to the eclipse cycle by **Edmond Halley** in 1691, who took it from the Suda, a Byzantine lexicon of the 11th century, which says "The saros is a measure for Chaldeans and apparently comes from the Babylonian word 'saru' meaning the number 3600".



Descending node lunar eclipse paths

Lunar eclipses occurring near the Moon's ascending node are given odd saros series numbers. The first eclipse in such series passes through the southern edge of the Earth's shadow, and the Moon's path is shifted northward each successive saros.

On July 27, 2018, the centre of the lunar disk will swing a tiny bit north of the shadow's centre, so this total lunar eclipse with a duration of 1 hour and 43 minutes will be a few minutes shy of the maximum duration possible (1 hour and 47 minutes). Even so, this July 2018 total lunar eclipse counts as a whopper, giving us the longest total lunar eclipse of the 21st century.

The longest total lunar eclipses of the 20th and 21st centuries both take place in July. That's because yearly, in early July, the Earth swings out to aphelion – its farthest point from the Sun for the year.

At aphelion, the Earth's dark umbral shadow reaches its maximum length (and width) for the year. All else being equal (moon's distance and centrality of eclipse), the greater width of the Earth's umbra in July means a longer total lunar eclipse. Therefore, long-lasting total lunar eclipses tend to take place in a Northern Hemisphere summer (or Southern Hemisphere winter) because the umbra is wider at this time of year. During a total lunar eclipse, the moon always passes through Earth's very light penumbral shadow before and after its journey through the dark umbra.

The full moon will plunge deeply into the Earth's shadow on the night of July 27-28, 2018.

Depending on atmospheric conditions, this could be an especially dark total eclipse, though you won't know for sure unless you look!

AK, with EarthSky and Wikipedia Notes