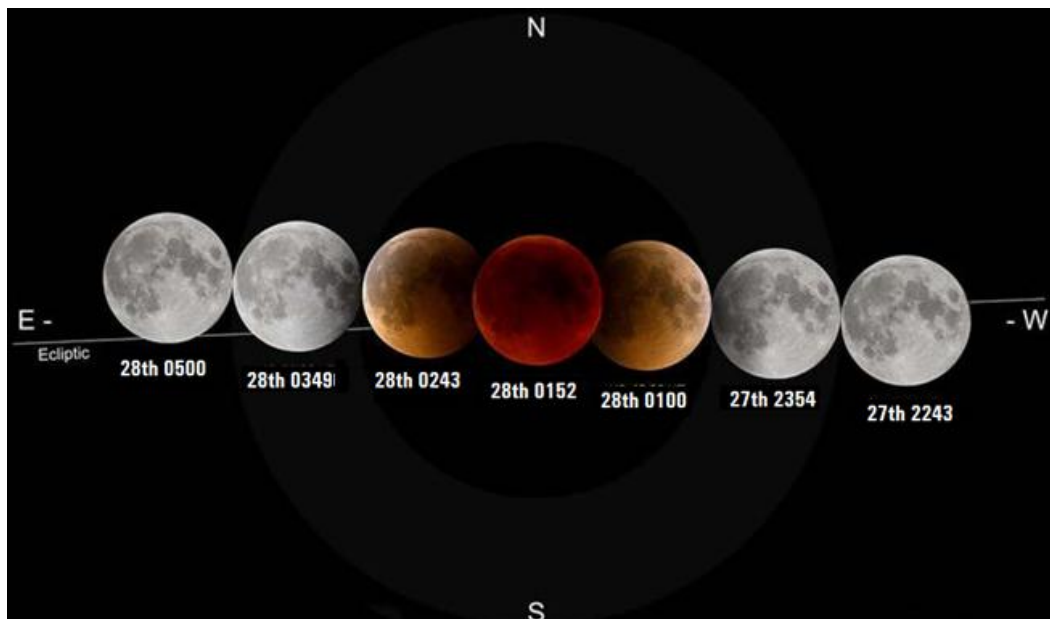


Longest  
TOTAL LUNAR ECLIPSE  
observe from  
AGARTALA, TRIPURA

July 27-28, 2018



Path of Longest Total Lunar Eclipse through Shadow of Earth



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**A Longest Total Lunar Eclipse**  
**July 27-28, 2018, Friday - Saturday.**

Total Lunar Eclipse is visible throughout India begins before mid-night of  
 July 27, 2018 at 23h 54.2m to early hours of next day July 28, 2018 to 3h 49.3m.  
**(Timings Expressed in Indian Standard Time (IST))**

Region of Visibility : Earth as a whole the Total Lunar Eclipse will be visible from the region of Antarctica, Australa, Russia, except northernmost part, Middle-East, Asia, Africa, Scandinavia, Europe, Central and Eastern South America, South Pacific Ocean, Atlantic Ocean and Indian Ocean.

The places from where beginning of Total Lunar Eclipse (Umbral Phase) is visible at Moonset are New Zealand, South Pacific Ocean, north Pacific Ocean and eastern Russia. While ending of eclipse (Umbral Phase) is visible at Moonrise are Argentina, Bolivia, Brazil and north Atlantic Ocean.

Moon turns an orange-red colour, while total lunar eclipse is in progress which is the reason why lunar eclipses are sometimes referred to as a Blood Moon. This effect is caused by something called Rayleigh scattering. Same effect that causes sky to look blue in the day-time and red during sunrise or sunset. On a normal full Moon, the Moon is simply reflecting back light from Sun when it remains on opposite side of Earth from the Sun. At the time of lunar eclipse, Earth lies directly between Sun and Moon meaning the light should be totally blocked. However, some of this light from periphery area gets scattered and reflected around the atmosphere of Earth reaching Moon. As sunlight passes through atmosphere of Earth which contains dust grains, the green to violet portion of light spectrum is filtered out leaving primarily red light to reach Moon and reflect back to Earth. This is what causes reddish colour of Moon during a lunar eclipse.

**Earth as a Whole the Circumstances of Total Lunar Eclipse**  
**Night of July 27-28, 2018, Friday - Saturday**

Pheomena	day h m
Moon Enters Penumbral Shadow of Earth	<b>27 22 43.1</b>
Moon Enters Umbral Shadow of Earth – <b>Eclipse Begins</b>	<b>27 23 54.2</b>
Moon Totally in Umbral Shadow of Earth – <b>Totality Begins</b>	<b>28 01 00.0</b>
Moon Middle of Shadow of Earth – <b>Greatest Eclipse</b>	<b>28 01 51.7</b>
Moon Edge out of Umbral Shadow of Earth – <b>Totality Ends</b>	<b>28 02 43.5</b>
Moon Leaves Umbral Shadow of Earth – <b>Eclipse Ends</b>	<b>28 03 49.3</b>
Moon Leaves Penumbral Shadow of Earth	<b>28 05 00.4</b>

Magnitude = 1.613 :: Duration of Eclipse = 3h 55.1m :: Duration of Totality = 1h 43.5m

*Entry of Moon in Penumbral Phases are not considered as an eclipse in-ordinary sense, since the Moon is not covered by real shadow of Earth.*

**In India the Moon will rise at different time with respect to geographical location  
 but total lunar eclipse will be visible throughout India according to Indian Standard Time (IST)**

## Configuration of Moon in Celestial Sphere during July 2018

Phases of Moon	Date h m	Distance from Earth. (Approx.)
Last Quarter	6 13 21	0.002 5938 a.u.
New Moon	13 08 18	0.002 3901 a.u.
First Quarter	20 01 22	0.002 5807 a.u.
Full Moon	28 01 50	0.002 7141 a.u.

**July 28 , 2018 Full Moon : Sulka Purnima (S15) – ending moment 1h 50.3m**

Criteria	Date h m	Distance (Approx.)
Perigee – Nearest to Earth in Orbit	July 13 13 55	0.002 3894 a.u.
Apogee – Farthest from Earth in Orbit	July 27 11 14	0.002 7153 a.u.
Perigee – Nearest to Earth in Orbit	Aug 10 23 37	0.002 3940 a.u.

Timings are expressed in Indian Standard Time

The appearance of Moon during Total Lunar Eclipse on July 27-28, 2018 will be normal. Moon will be close to Earth in orbit on July 13, 2018 and will move to farthest position from Earth on July 27, 2018. As such during total lunar eclipse this time distance between Earth and Moon remain more than that of previous occasion.

During Total Lunar Eclipses as the phenomena are in progress, the Moon will slowly turn from its familiar pearly white color to a reddish colour then back to its original colour after the end of eclipse. The shade of red can vary from eclipse to eclipse depending on factors including conditions in the upper atmosphere of Earth and the position of Moon along its orbit. If there have been any significant volcanic eruptions for example, this can cause eclipsed Moon to appear a much darker red than of other eclipses. It is hard to predict that how much red the eclipse will be on July 27-28, 2018. The Full-Moon will pass almost below Ecliptic the apparent path of Sun as viewed from Earth.

### Astronomical Diary for July 2018

<b>July 6, 2018 2217 IST</b>	<b>Earth at Aphelion –</b>	<b>farthest position from Sun in orbit at a Distance of 1.0166949 a.u. (approx.)</b>
<b>July 20, 2018 1523 IST</b>	<b>Mercury at Aphelion –</b>	<b>farthest from Sun in Orbit</b>
<b>July 27, 2018 1043 IST</b>	<b>Mars at Opposition with Sun</b>	
<b>July 31, 2018 1320 IST</b>	<b>Mars nearest to Earth</b>	<b>at a distance of 0.384 970 a.u. (approx)</b>

**1 Astronomical Unit (a.u.) = 149.597870 million kms**

## Agartala : Rising - Setting of Sun-Moon-Planets during July 27, 2018

Objects	Rise h : m	Set h : m	Distance In a.u. (average)	Constellation	Visibility
Sun	04:52	18:11	1.015 5556	Cancer (Karkata)	Day Light
Moon	17:53	f05:03	0.002 7153	Capricornus (Makara)	Rises at Sunset and Sets next day at Sunrise Total Lunar Eclipse
Mercury	06:24	19:03	0.649 303	Cancer (Karkata)	Evening Western Sky within ½hr of Sunset
Venus	08:14	20:35	0.858 335	Leo (Simha)	Evening Western Sky after Sunset
Mars	18:22	f04:48	0.386 285	Capricornus (Makara)	Evening Eastern Sky after Sunset to next day
Jupiter	12:16	23:25	5.125 352	Libra (Tula)	Evening Sky after Sunset
Saturn	16:01	f02:40	9.173 460	Sagittarius (Dhanus)	Evening Sky after Sunset

Timings are expressed In Indian Standard Time :: f = Next Day

The celestial objects are seen appear to rise from the eastern horizon- move across the sky towards western horizon for setting—due to rotation of Earth about its axis in the direction from west to east – attains highest position in the sky while crossing Meridian – the imaginary line of arc joining North Celestial Pole to South Celestial Pole passing through the Zenith (the overhead) of an observer on Earth.

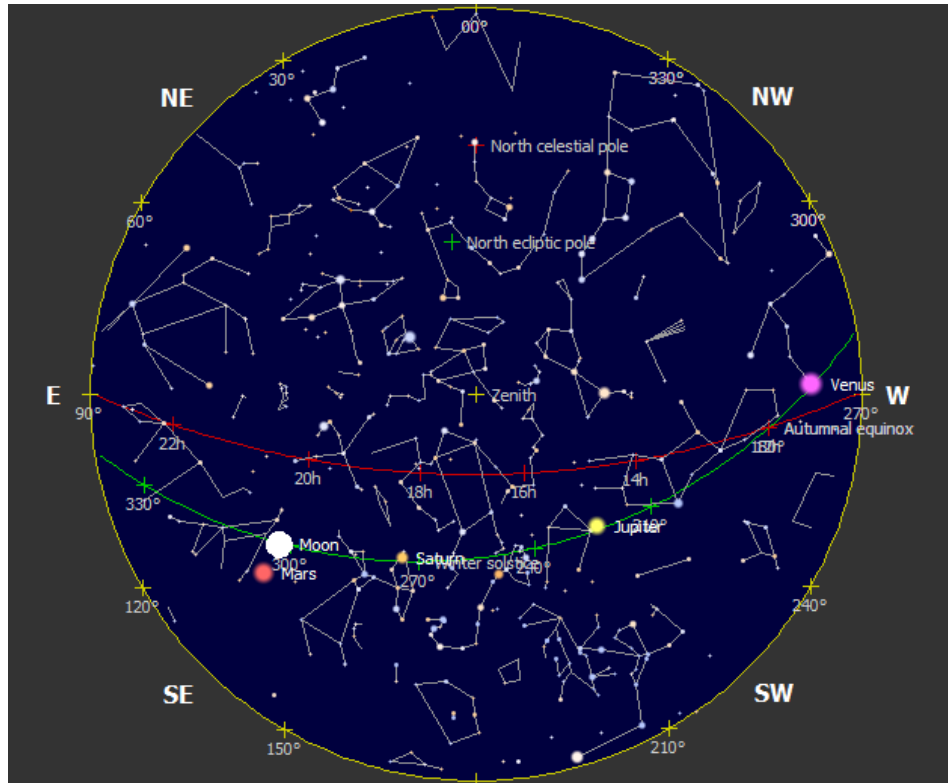
### Total Lunar Eclipse During 2011-2021 AD

Date	Greatest Eclipse(UT)	Eclipse Duration	Totality Duration	Mag	Region of Visibility
2011 Jun 15	20h 12.6m	3h 40.0m	1h 40.9m	1.705	Australasia, Japan, Asia except northern, India, Africa, Europe, S. America except N-W Part
2011 Dec 10	14h 31.8m	3h 32.9m	0h 52.3m	1.110	N. America except East, Northern Mexico, Hawaiian Islands Oceania, Asia, E.Africa, Europe
2014 Apr 15	07h 45.7m	3h35.4m	1h 18.6m	1.295	Western Africa, Western Europe, America, Australasia, Eastern Asia
2014 Oct 08	10h 54.6m	3h 20.2m	0h 59.9m	1.171	America, Australasia, Asia
2015 Apr 04	12h 00.2m	3h 29.7m	0h 12.3m	1.006	W. North America, Oceania, Australasia, E. Asia
2015 Sep 28	02h 47.1m	3h 20.6m	1h 12.8m	1.282	Western Asia, Africa, Europe, America excluding western Alaska
2018 Jan 31	13h 29.9m	3h 23.5m	1h 16.9m	1.321	North America except eastern Part, Oceania, Russia, Asia, Middle East, eastern Europe
2018 Jul 27	20h21.7m	3h 55.1m	1h 43.5m	1.613	Antarctica, Australasia, Russia except north, Asia, Africa, Europe, Central and S-E America
2019 Jan 21	05h 12.3m	3h 17.4m	1h 03.0m	1.201	Middle East, Africa, Europe, America, Oceania, easternmost Russia
2021 May 26	11h 18.6m	3h 07.4m	0h 14.5m	1.009	Eastern Asia, Australia, Pacific, America

# Agartala

## Evening Sky

### Star Chart before Total Lunar Eclipse July 27-28, 2018, Friday – Saturday

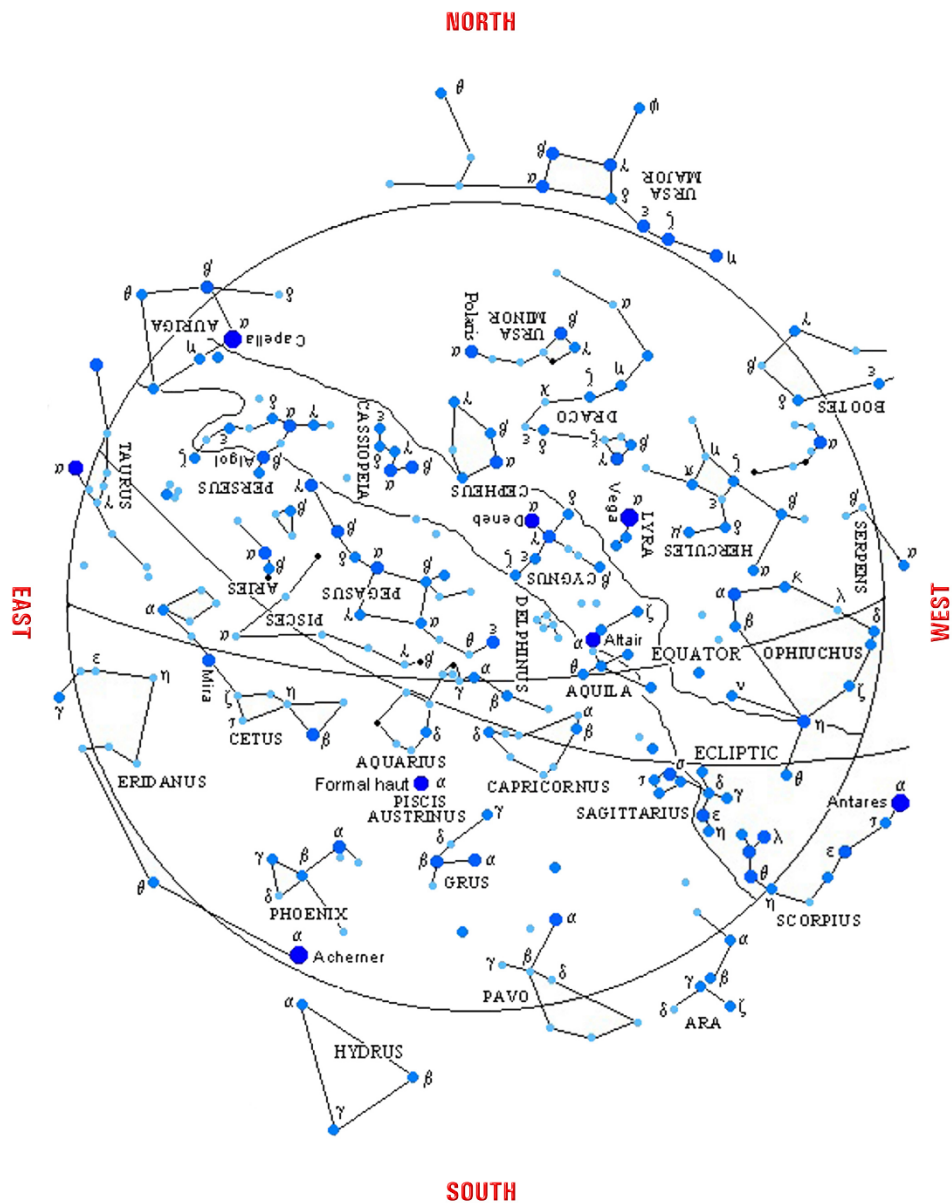


Circle represents visible horizon

**MOON WILL BE IN Capricornus (Makara) CONSTELLATION BELOW ECLIPTIC  
almost north of red-planet Mars  
Saturn will be seen towards west of the full-moon as well as of Mars**

### Zodiacal Constellations during Total Lunar Eclipse, July 27-28, 2018

EAST HORIZON		OVER-HEAD		WEST HORIZON	
Aqyarius (Kumbha)	Capricornus (Makara)	Sagittarius (Dhanus)	Scorpius (Vrischika)	Libra (Tula)	Leo (Simha)
	<b>Moon/Mars</b>	<b>Saturn</b>		<b>Jupiter</b>	<b>Venus</b>



Magnitudes	● Minus One	● Zero	● First	● Second	● Third	● Fourth	● Fifth
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Hold the Sky Chart over-head in such a way the Cardinal Points: North-South and East-West are matched with respect to proper directions. With the help of known stars/constellations-others can be find out by practice.  
 The period of rotation of the Earth with respect to star is 23h 56m 04s. A star seen over-head today will be identified 4minutes earlier on the next day-shorter than mean solar time (clock time)  
 The Circle representing the Horizon around latitude 22°35' N for middle of the moth at 2000 IST  
 RA LIMIT: 04hrs (EAST) 22hrs (MIDDLE) 16hrs (WEST)

## Physical Properties

Criteria	Earth	Moon
Perihelion Distance	147.1 million kms	Perigee 3,63,300 kms
Aphelion Distance	152.1 million kms	Apogee 4,05,500 kms
Orbital Period	365.256 days	27.322 days
Rotation Period	24.0 hrs	27.322 days
Orbital Velocity	29.78 km/sec	Direction to Sun 14.5/ hr
Escape Velocity	11.19 km/sec	2.4 km/sec
Tilted Axis	23° 27'	1° 5'
Orbital Inclination	23° 5'	5° 14.5'
Solar Days (sunrise - sunrise)	24.0 hrs	-
Escape Velocity	11.2 km/sec	2.38 km/sec
Surface Temperature	-89°C to +58°C <sup>0</sup>	-247°C to + 120°C
Atmosphere : Nitrogen	78.1%	H <sub>2</sub> 22.6 % H <sup>4</sup> 25.8 %
Oxygen	20.9%	Ne 25.8 %
Carbon dioxide	-	-
Argon	-	19.4 %
Traces - gases	1.0 %	H <sub>2</sub> 22.6 % H <sup>4</sup> 25.8 %

**The Moon has developed a synchronous rotation – meaning the satellite spins once its axis with each orbit of Earth.**  
**As such One Hemisphere – the near side always faces Earth while far side is forever turned away.**