The Evening Sky Map

FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

WWW.SKYMAPS.COM

EQUATORIAL EDITION
DECEMBER 2016

Sky Calendar – December 2016

Get Sky Calendar on Twitter
http://twitter.com/skymaps

1 **Moon near Mercury** (18° from Sun, evening sky) at 5h UT. Mag. −0.5.

3 **Moon near Venus** (44° from Sun, evening sky) at 11h UT. Mag. −4.2.

5 **Moon near Mars** (66° from Sun) at 9h UT. Mag. +0.7.

7 **First Quarter Moon** at 9:03 UT.

11 **Mercury at greatest elongation** east (21° from Sun, evening sky) at 4h UT. Mag. −0.4.

12 **Moon near the Pleiades** (evening sky) at 13h UT.

12 **Moon at perigee** (closest to Earth) at 23:27 UT (358,461 km; angular size 33.3').

13 **Moon very near Aldebaran** (evening sky) at 3h UT. Occultation visible from USA, Mexico and Canada.

14 **Full Moon** at 00:06 UT.

14 **Geminid Meteor Shower** peaks at 17h UT. Major activity lasts 22 hours. Produces bright, medium-speed meteors at its peak (up to 80 meteors/hour). Most reliable meteor shower. Easy to observe (radiant shown on sky map). Best seen after midnight, but moonlight interferes badly in 2016.

17 **Moon near Beehive cluster** (morning sky) at 3h UT.

18 **Moon very near Regulus** (morning sky) at 17h UT. Occultation visible from southwest Australia.

21 **Last Quarter Moon** at 1:56 UT.

21 **December solstice** at 10:44 UT. The time when the Sun reaches the point farthest south of the celestial equator marking the start of winter in the Northern Hemisphere and summer in the Southern Hemisphere.

22 **Moon near Jupiter** (morning sky) at 18h UT. Mag. −1.9.

23 **Moon near Spica** (morning sky) at 2h UT.

25 **Moon at apogee** (farthest from Earth) at 6h UT (distance 405,870 km; angular size 29.4').

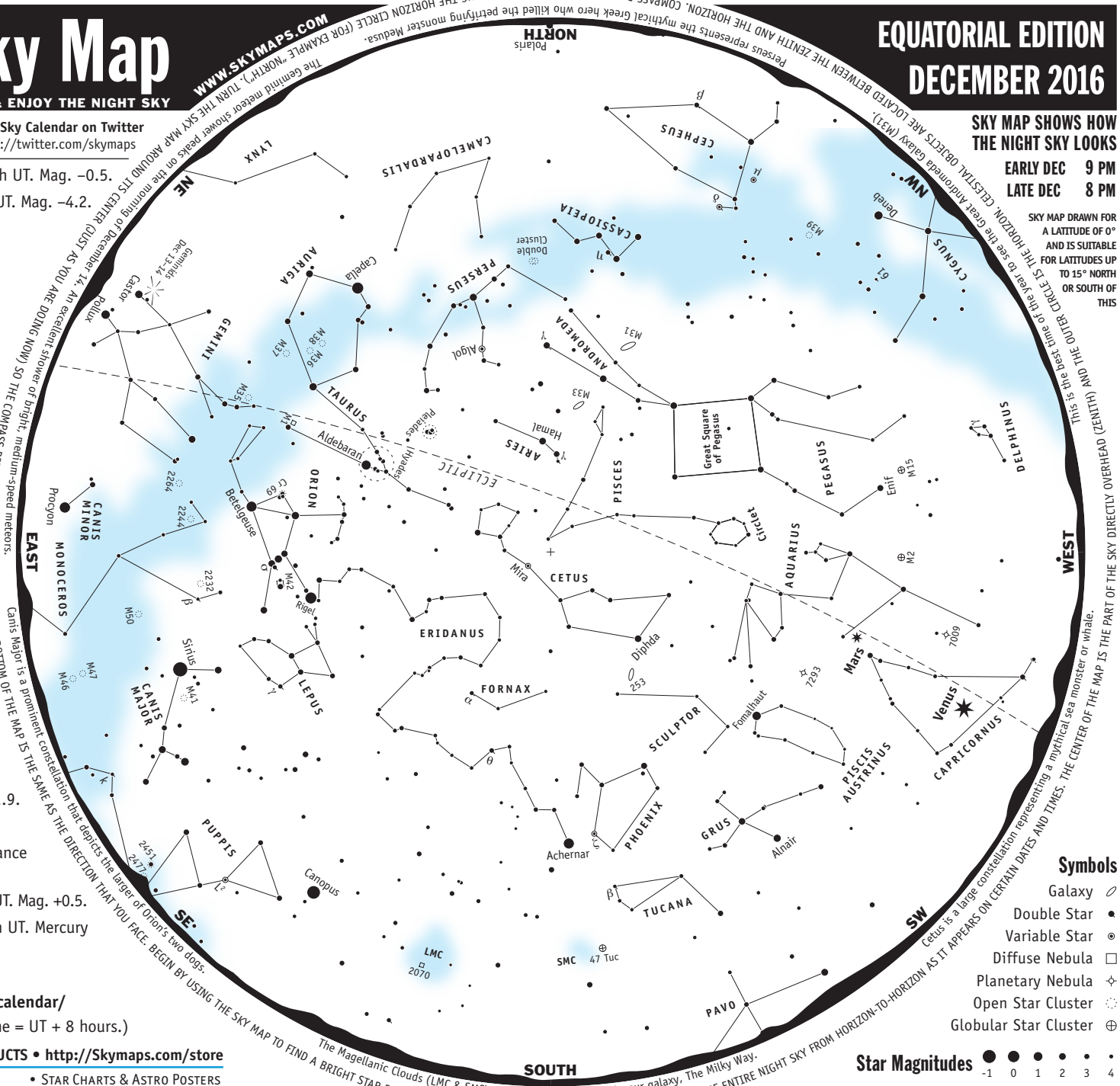
27 **Moon near Saturn** (16° from Sun, morning sky) at 21h UT. Mag. +0.5.

28 **Mercury at inferior conjunction** with the Sun at 19h UT. Mercury passes into the morning sky.

29 **New Moon** at 6:53 UT. Start of lunation 1163.

More sky events and links at http://Skymaps.com/skycalendar/

All times in Universal Time (UT). (Singapore Standard Time = UT + 8 hours.)



This is the great ellipse of the year to see the great Andromeda Galaxy (M31). THE EQUATOR CIRCLE IS THE HORIZON. CELESTIAL OBJECTS ARE LOCATED BETWEEN THE ZENITH AND THE HORIZON. COMPASS DIRECTIONS ARE INDICATED ALONG THE HORIZON CIRCLE (FOR EXAMPLE "NORTH"). TURN THE SKY MAP AROUND ITS CENTER (JUST AS YOU ARE DOING NOW) SO THE COMPASS DIRECTION THAT APPEARS ALONG THE BOTTOM OF THE MAP IS THE SAME AS THE DIRECTION THAT YOU FACE. BEGIN BY USING THE SKY MAP TO FIND A BRIGHT STAR PATTERN IN THE SKY.

Perseus represents the mythical Greek hero who killed the petrifying monster Medusa.

The Geminid meteor shower peaks on the morning of December 14. An excellent shower of bright, medium-speed meteors.

Canis Major is a prominent constellation that depicts the larger of Orion's two dogs.

Cetus is a large constellation representing a mythical sea monster or whale.

The Magellanic Clouds (LMC & SMC) are companion galaxies to our galaxy, The Milky Way.

THE CENTER OF THE MAP IS THE PART OF THE SKY DIRECTLY OVERHEAD (ZENITH) AND THE OUTER CIRCLE IS THE HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES.

SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY DEC 9 PM
LATE DEC 8 PM

SKY MAP DRAWN FOR A LATITUDE OF 0° AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

Symbols

- Galaxy
- Double Star
- Variable Star
- Diffuse Nebula
- Planetary Nebula
- Open Star Cluster
- Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4

KT

INSTRUCTIONS: THE SKY MAP SHOWS THE ENTIRE NIGHT SKY FROM HORIZON-TO-HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES.

Skymaps.com

SAVE ON RECOMMENDED PRODUCTS • http://Skymaps.com/store

- Star Atlases & Planispheres
- Star Charts & Astro Posters
- Books for Sky Watchers
- Telescopes & Binoculars

All sales support the production and free distribution of The Evening Sky Map.

Copyright © 2000–2016 Kym Thalassoudis. All Rights Reserved.

* **TERMS OF USE:** FREE FOR NON-COMMERCIAL EDUCATIONAL USE. ASTRONOMY EDUCATION GROUPS MAY FREELY DISTRIBUTE PRINTED HANDOUTS. FULL DETAILS AT http://Skymaps.com/terms.html

About the Celestial Objects

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

Tips for Observing the Night Sky

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

Astronomical Glossary

Conjunction – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

Constellation – A defined area of the sky containing a star pattern.

Diffuse Nebula – A cloud of gas illuminated by nearby stars.

Double Star – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

Ecliptic – The path of the Sun's center on the celestial sphere as seen from Earth.

Elongation – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

Galaxy – A mass of up to several billion stars held together by gravity.

Globular Star Cluster – A ball-shaped group of several thousand old stars.

Light Year (ly) – The distance a beam of light travels at 300,000 km/sec in one year.

Magnitude – The brightness of a celestial object as it appears in the sky.

Open Star Cluster – A group of tens or hundreds of relatively young stars.

Opposition – When a celestial body is opposite the Sun in the sky.

Planetary Nebula – The remnants of a shell of gas blown off by a star.

Universal Time (UT) – A time system used by astronomers. Also known as Greenwich Mean Time. Singapore Standard Time is UT plus 8 hours.

Variable Star – A star that changes brightness over a period of time.

EQUATORIAL EDITION
DECEMBER 2016

CELESTIAL OBJECTS

Skymaps.com

Easily Seen with the Naked Eye

Capella	Aur	●	The 6th brightest star. Appears yellowish in color. Spectroscopic binary. Dist=42 ly.
Sirius	CMa	●	The brightest star in the sky. Also known as the "Dog Star". Dist=8.6 ly.
Procyon	CMi	●	Greek name meaning "before the dog" -- rises before Sirius (northern latitudes). Dist=11.4 ly.
Canopus	Car	●	Second brightest star in the sky. 14,000 times more luminous than the Sun. Dist=309 ly.
δ Cephei	Cep	◉	Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.
Deneb	Cyg	●	Brightest star in Cygnus. One of the greatest known supergiants. Dist=1,400±200 ly.
Achernar	Eri	●	Brightest star in Eridanus, The River. Arabic name meaning "end of river". Dist=144 ly.
Castor	Gem	◉	Multiple star system with 6 components. 3 stars visible in telescope. Dist=52 ly.
Pollux	Gem	●	With Castor, the twin sons of Leda in classical mythology. Dist=34 ly.
Rigel	Ori	●	The brightest star in Orion. Blue supergiant star with mag 7 companion. Dist=770 ly.
Betelgeuse	Ori	●	One of the largest red supergiant stars known. Diameter=300 times that of Sun. Dist=430 ly.
Algol	Per	◉	Famous eclipsing binary star. Magnitude varies between 2.1 & 3.4 over 2.867 days.
Fomalhaut	PsA	●	Brightest star in Piscis Austrinus. In Arabic the "fish's mouth". Dist=25 ly.
Pleiades	Tau	☼	The Seven Sisters. Spectacular cluster. Many more stars visible in binoculars. Dist=399 ly.
Hyades	Tau	☼	Large V-shaped star cluster. Binoculars reveal many more stars. Dist=152 ly.
Aldebaran	Tau	●	Brightest star in Taurus. It is not associated with the Hyades star cluster. Dist=66.7 ly.
Polaris	UMi	◉	The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433 ly.

Easily Seen with Binoculars

M31	And	⬭	The Andromeda Galaxy. Most distant object visible to naked eye. Dist=2.5 million ly.
M2	Aqr	⊕	Resembles a fuzzy star in binoculars.
M38	Aur	☼	Stars appear arranged in "pi" or cross shape. Dist=4,300 ly.
M36	Aur	☼	About half size of M38. Located in rich Milky Way star field. Dist=4,100 ly.
M37	Aur	☼	Very fine star cluster. Discovered by Messier in 1764. Dist=4,400 ly.
M41	CMa	☼	First recorded observation by Aristotle in 325 BC as "cloudy spot". Dist=2,300 ly.
μ Cephei	Cep	◉	Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
Mira	Cet	◉	Famous long period variable star. Mag varies between 3.0 & 10.1 over 332 days.
M39	Cyg	☼	May be visible to the naked eye under good conditions. Dist=900 ly.
LMC	Dor	⬭	Large Magellanic Cloud. A neighbouring galaxy of the Milky Way. Dist=180,000 ly.
M35	Gem	☼	Fine open cluster located near foot of the twin Castor. Dist=2,800 ly.
γ Leporis	Lep	◉	Visible with binoculars. Gold & white stars. Mags 3.6 & 6.2. Dist=30 ly. Sep=96.3".
2232	Mon	☼	A large scattered star cluster of 20 stars. Dist=1,300 ly.
2244	Mon	☼	Surrounded by the rather faint Rosette Nebula. Dist=5,540 ly.
M50	Mon	☼	Visible with binoculars. Telescope reveals individual stars. Dist=3,000 ly.
Cr 69	Ori	☼	Lambda Orionis Cluster. Dist=1,630 ly.
M42	Ori	□	The Great Orion Nebula. Spectacular bright nebula. Best in telescope. Dist=1,300 light years.
M15	Peg	⊕	Only globular known to contain a planetary nebula (Mag 14, d=1"). Dist=30,000 ly.
Double Cluster	Per	☼	Double Cluster in Perseus. NGC 869 & 884. Excellent in binoculars. Dist=7,300 ly.
ζ Phoenicis	Phe	◉	Eclipsing binary star and double (mag 8). Varies between 3.9 & 4.4 over 1.667 days.
253	Scl	⬭	Fine, large, cigar-shaped galaxy. Requires dark sky. Member of Sculptor Group.
47 Tucanae	Tuc	⊕	Spectacular object. Telescope will reveal stars. Near edge of SMC. Dist=15,000 ly.
β Tucanae	Tuc	◉	Complex multiple star. Binoculars show one pair. Telescope required to split primary star.
SMC	Tuc	⬭	Small Magellanic Cloud. Companion galaxy to Milky Way. Requires dark sky. Dist=210,000 ly.

Telescopic Objects

γ Andromedae	And	◉	Attractive double star. Bright orange star with mag 5 blue companion. Sep=9.8".
7009	Aqr	✧	Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.
7293	Aqr	✧	Helix Nebula. Spans nearly 1/4 deg. Requires dark sky. Dist=300 ly.
γ Arietis	Ari	◉	Impressive looking double blue-white star. Visible in a small telescope. Sep=7.8".
η Cassiopeiae	Cas	◉	Yellow star mag 3.4 & orange star mag 7.5. Dist=19 ly. Orbit=480 years. Sep=12".
2070	Dor	□	Tarantula Nebula. A bright nebula located in LMC. A star-forming region.
θ Eridani	Eri	◉	Striking blue-white double star. Mags 3.2 & 4.3. Visible in a small telescope. Sep=8.2".
β Monocerotis	Mon	◉	Triple star. Mags 4.6, 5.0 & 5.4. Requires telescope to view arc-shape. Sep=7.3".
2264	Mon	☼	Christmas Tree Cluster. Associated with the Cone Nebula. Dist=2,450 ly.
σ Orionis	Ori	◉	Superb multiple star. 2 mag 7 stars one side, mag 9 star on other. Struve 761 triple in field.
M1	Tau	□	Crab Nebula. Remnant from supernova which was visible in 1054. Dist=6,500 ly.
M33	Tri	⬭	Fine face-on spiral galaxy. Requires a large aperture telescope. Dist=2.3 million ly.

The Evening Sky Map (ISSN 1839-7735) Copyright © 2000–2016 Kym Thalassoudis. All Rights Reserved.