Tue.sday June 26, 2012 Astronomical Events Summary:

Sunset: 20:29;
Civil twilight ends: 21:01;
Astronomical twilight ends: 22:27

At 21:01, Mercury is very low in the W; a 49% illuminated moon, Mars and Saturn are in the SW.

Mercury sets at 22:03
Mars sets at 00:35
Saturn sets at 01:48

**ISS Pass** starts at 21:27 / 9:27pm CT in WNW (EL=10 deg);
@ 21:30 Max EL=34 deg in SW

**m= -3 Iridium Flare** at 22:01:37 ALT=45/AZ=65 (ENE)

The moon sets after midnight

# Solar Data

Year 2012 Month June Day 26 Time 20:29

### Daily events for 26 June

| Event | Time | Altitude | Azimuth |
|---|---|---|---|
| Mimimum altitude: | 01:04 | -28.0° | 0° |
| Astronomical twilight begins: | 03:40 | -18.0° | 38° |
| Nautical twilight begins: | 04:26 | -12.0° | 47° |
| Civil twilight begins: | 05:06 | -6.0° | 54° |
| Sunrise: | 05:38 | -0.8° | 59° |
| Maximum altitude: | 13:04 | 74.7° | 180° |
| Sunset: | 20:29 | -0.8° | 301° |
| Civil twilight ends: | 21:01 | -6.0° | 306° |
| Nautical twilight ends: | 21:41 | -12.0° | 313° |
| Astronomical twilight ends: | 22:27 | -18.0° | 322° |

### Yearly events for 2012

| Event | Time |
|---|---|
| Spring equinox | Mar 20, 00:14 |
| Summer solstice | Jun 20, 18:08 |
| Autumn equinox | Sep 22, 09:49 |
| Winter solstice | Dec 21, 05:11 |

### Position at selected time

| | |
|---|---|
| Altitude | -0.8° |
| Azimuth | 301.1° |
| Right ascension | $6^h\ 25^m\ 21^s$ |
| Declination | 23° 18' 30" |
| Range (AU) | 1.0165629 |
| Constellation | Gemini |

# Moon Data

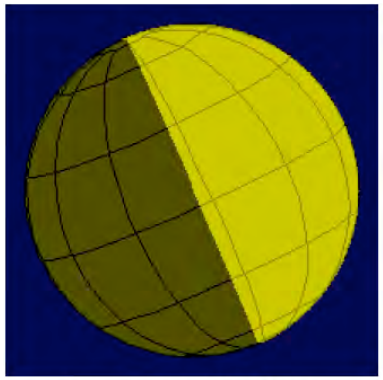
Year 2012 Month June Day 26 Time 20:30 Updat

### Position at selected time

| | |
|---|---|
| Altitude | 38.8° |
| Azimuth | 213.5° |
| Right ascension | $12^h\ 10^m\ 9^s$ |
| Declination | -6° 1' 51" |
| Range | 374,472 km |
| Constellation | Virgo |

### Appearance

| | |
|---|---|
| Diameter | 31.91' |
| Illumination of disk | 49% |
| Libration in longitude | -5.330° |
| Libration in latitude | 5.856° |

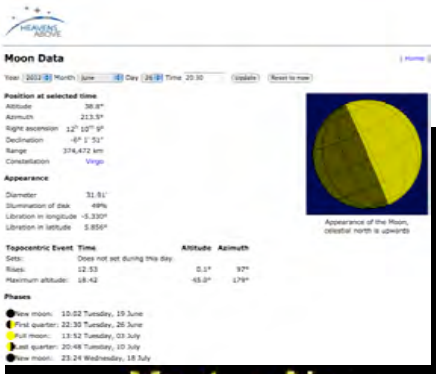


Appearance of the Moon, celestial north is upwards

| Topocentric Event | Time | Altitude | Azimuth |
|---|---|---|---|
| Sets: | Does not set during this day. | | |
| Rises: | 12:53 | 0.1° | 97° |
| Maximum altitude: | 18:42 | 45.0° | 179° |

### Phases

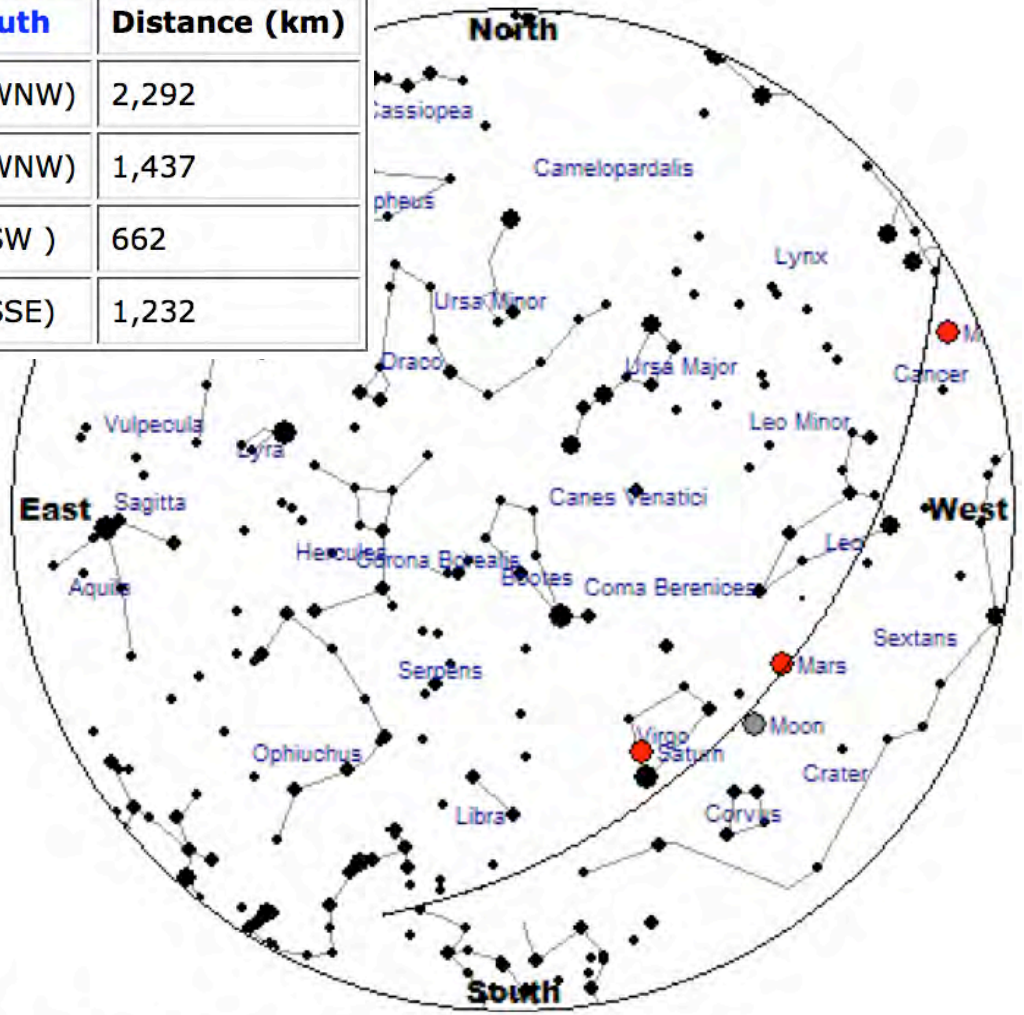
| | |
|---|---|
| New moon: | 10:02 Tuesday, 19 June |
| First quarter: | 22:30 Tuesday, 26 June |
| Full moon: | 13:52 Tuesday, 03 July |
| Last quarter: | 20:48 Tuesday, 10 July |
| New moon: | 23:24 Wednesday, 18 July |



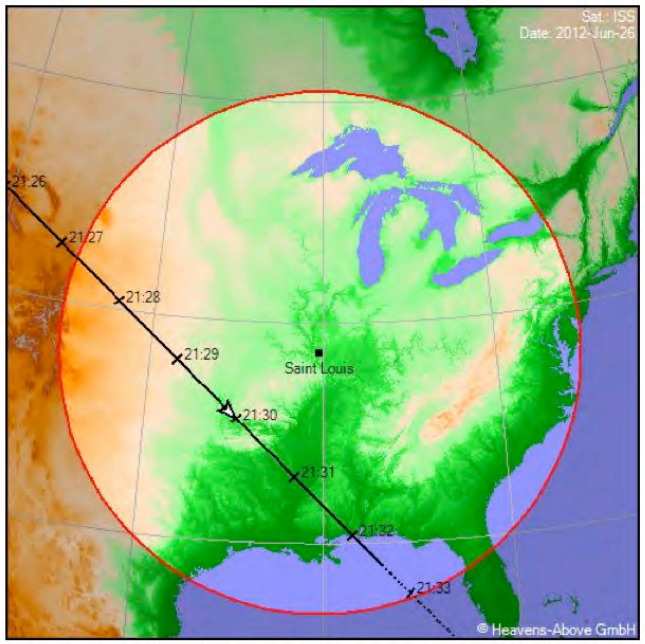

Vallis Alpes
Aristoteles
Mitchell
Mare Frigoris
Eudoxus
Hercules
Montes Alpes
Mons Pico
Mons Hadley
Mons Piton
Cassini & Cassini A
Plinius
Aristillus
Autolycus
Mare Serenitatis
Archimedes
Palus Putredinis
Montes Apenninus
Mare Crisium
Mare Vaporum
Manilius
Mare Tranquillitatis
Hipparchus
Sinus Medii
Ptolemaeus
Mare Fecunditatis
Albategnius
Davy
Alphonsus
Mare Nectaris
Arzachel
Rupes Recta
Walter
Tycho
Maginus
Gemma Frisius
Maurolycus

| | |
|---|---|
| Sunset: | 20:29 |
| Civil twilight ends: | 21:01 |
| Nautical twilight ends: | 21:41 |
| Astronomical twilight ends: | 22:27 |

| Event | Time | Altitude | Azimuth | Distance (km) |
|---|---|---|---|---|
| Rises above horizon | 21:25:04 | 0° | 301° (WNW) | 2,292 |
| Reaches 10° altitude | 21:27:14 | 10° | 292° (WNW) | 1,437 |
| Maximum altitude | 21:30:12 | 35° | 225° (SW ) | 662 |
| Enters shadow | 21:32:37 | 14° | 162° (SSE) | 1,232 |




**Ground Track Plot**




The highlighted circle is the region where the satellite is at least 10° above your horizon. The size of the circle depends on the height of the satellite.

Solid part of orbit shows where the satellite is sunlit, and the dashed part where it is in the Earth's shadow and invisible.

**Pass Details**

| | |
|---|---|
| Date: | Tuesday, 26 June, 2012 |
| Satellite: | ISS |
| Observer's Location: | Saint Louis ( 38.6270°N, 90.1980°W) |
| Local Time: | Central Daylight Time (GMT - 5:00) |
| Orbit: | 394 x 405 km, 51.6° (Epoch 26 Jun) |
| Sun altitude at time of maximum pass altitude: | -10.4° |

# ISS Pass starts at

# 21:27 CT in WNW

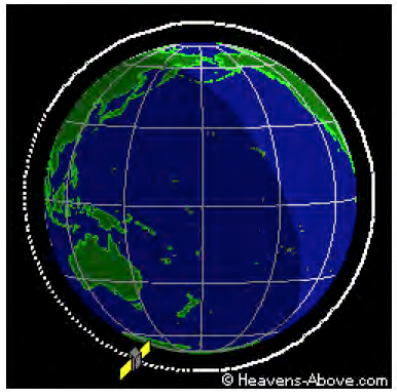
# Iridium Flares



Clicking on the time of the flare will load another page with more details, including a map showing the track of the flare along the ground, and the location of the nearest point of maximum intensity.

Search Period Start: 09:34, Tuesday, 26 June, 2012
Search Period End: 10:34, Wednesday, 27 June, 2012
Observer's Location: Saint Louis ( 38.6270°N, 90.1980°W)
Local Time: Central Daylight Time (GMT - 5:00)

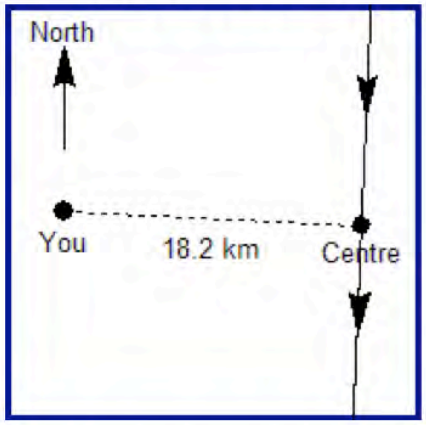
## 22:01 Iridium Flare Details




| Date | Local Time | Intensity ( Mag) | Alt. | Azimuth | Distance to flare centre | Intensity at flare centre (Mag.) | Satellite |
|---|---|---|---|---|---|---|---|
| 26 Jun | 22:01:37 | -3 | 45° | 65° (ENE) | 18.2 km (E) | -8 | Iridium 82 |
| 27 Jun | 03:50:13 | -1 | 29° | 116° (ESE) | 52.4 km (E) | -7 | Iridium 91 |

## Iridium Flare Details

| H




**Map showing path of flare centre over Earth's surface**

Date: Tuesday, 26 June, 2012
Your Location: Saint Louis (38.627°N, 90.198°W)
Time Zone: Central Daylight Time (GMT - 5:00)
Satellite: Iridium 82
Antenna (MMA): Right
Flare centre is at: 38.619°N, 89.989°W
Distance to centre: 18.2 km (11.3 miles)

| | At your location | At flare centre |
|---|---|---|
| Time: | 22:01:37 | 22:01:37 |
| Magnitude: | -3 | -8 |
| Altitude: | 45° | 46° |
| Azimuth: | 65° (ENE) | 64° (ENE) |
| Mirror angle: | 0.7° | 0.0° |

## Iridium 82- Information

**Identification**

USSPACECOM Catalog No.: 25467
International Designation Code: 1998-051-A

**Satellite Details**

Orbit: 775 x 780 km, 86.4°
Country/Org. of Origin: USA
Intrinsic brightness (Mag): 6.2 (at 1000km distance, 50% illuminated)
Maximum brightness (Mag): 5.1 (at perigee, 100% illuminated)

**Launch**

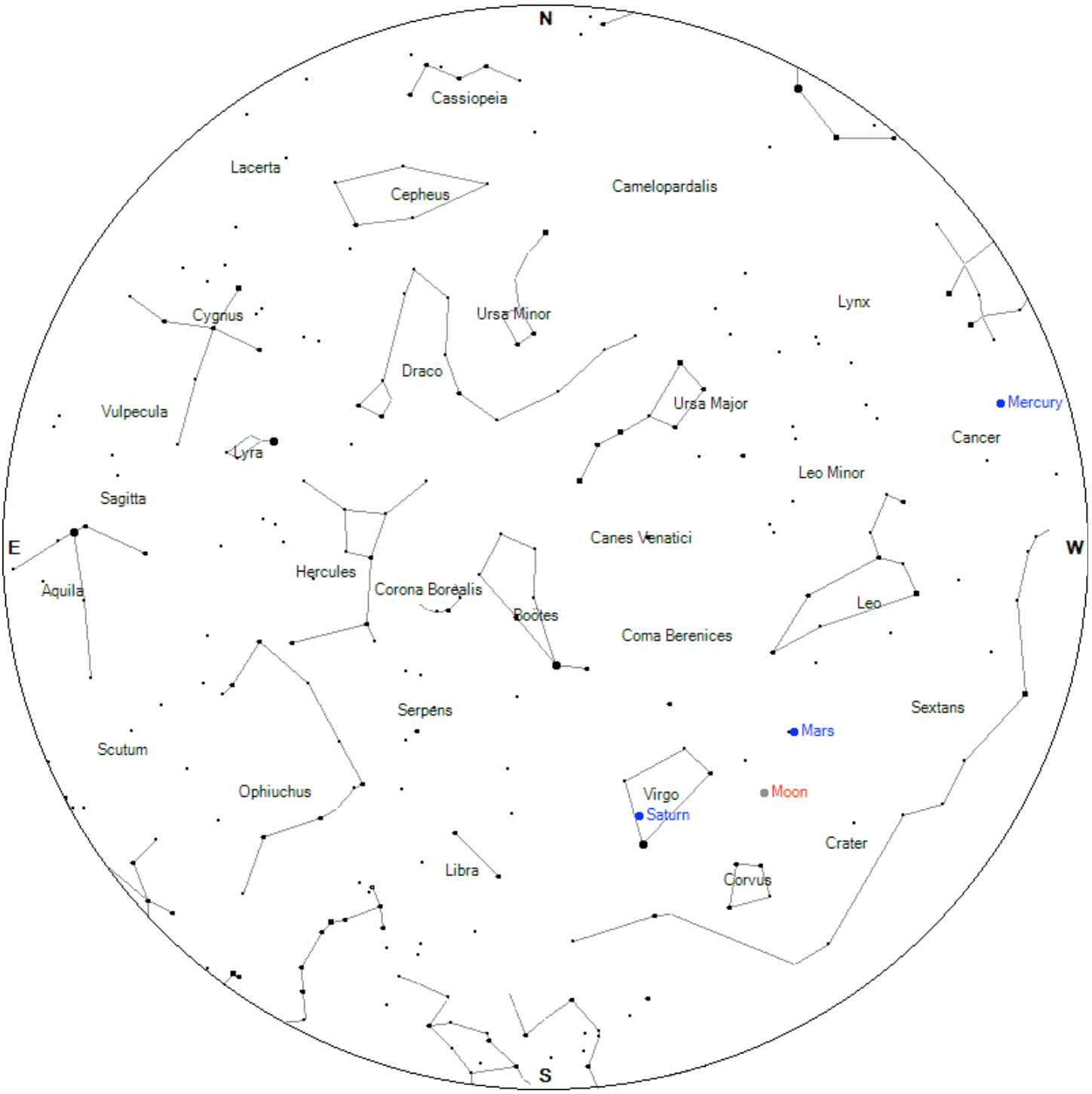
Date (UTC): 21:13, September 8, 1998
Launch site: Vandenberg SLC2W, California, USA
Launch vehicle: Delta 7920-10C

**Description**

Spare

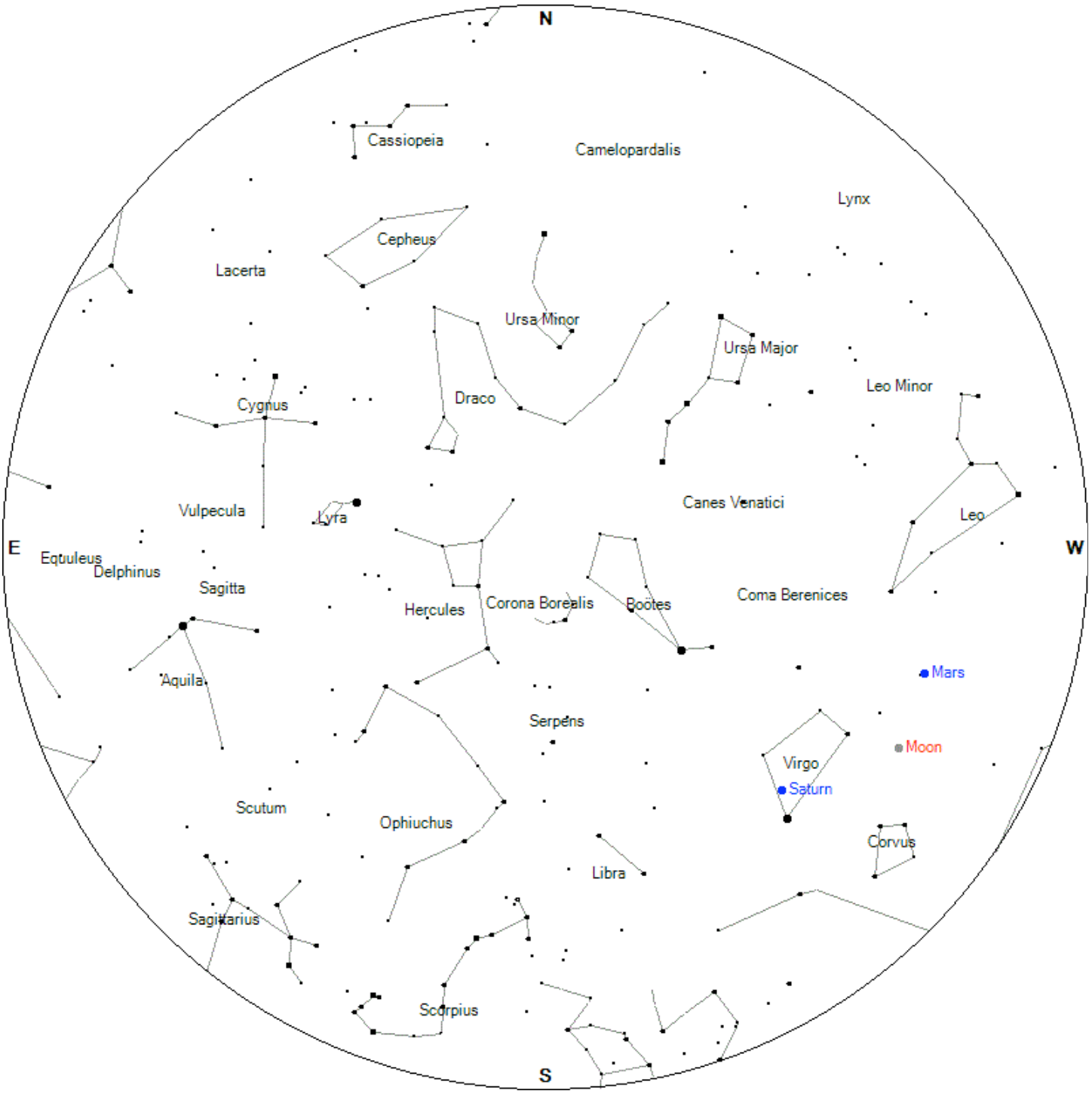
| | |
|---|---|
| Sunset: | 20:29 |
| Civil twilight ends: | 21:01 |
| Nautical twilight ends: | 21:41 |
| Astronomical twilight ends: | 22:27 |

Sky at 9:01 pm



| | |
|---|---|
| Sunset: | 20:29 |
| Civil twilight ends: | 21:01 |
| Nautical twilight ends: | 21:41 |
| Astronomical twilight ends: | 22:27 |

Sky at 10:27 pm



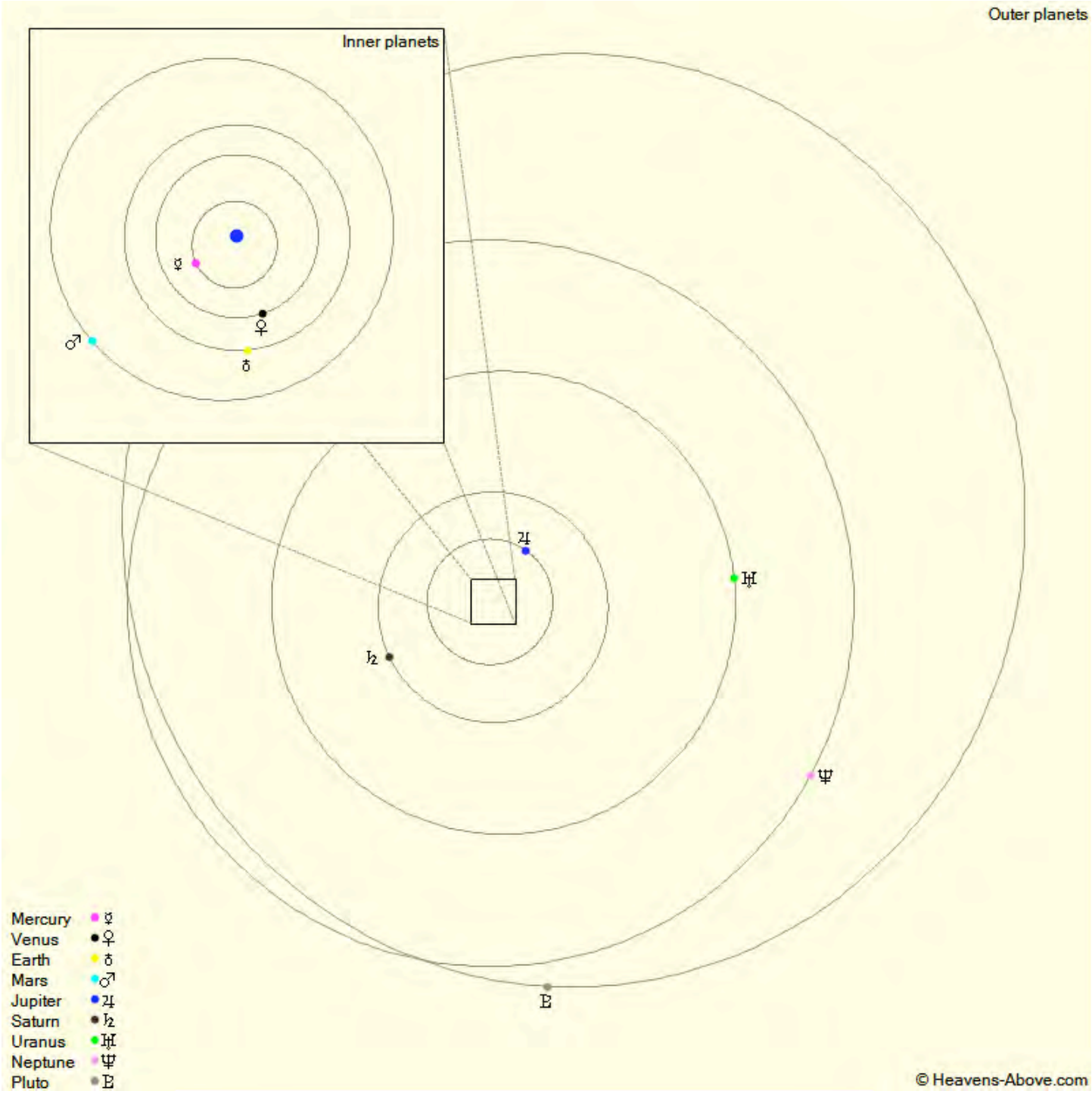
# Planet Data for 8:30pm Tue., June 26, 2012

## Planet Summary

| Home |

Year 2012 Month June Day 26 Time 20:30 Update Reset to now

| | Mercury | Venus | Mars | Jupiter | Saturn | Uranus | Neptune | Pluto |
|---|---|---|---|---|---|---|---|---|
| Right ascension | $8^h\ 14^m\ 14.7^s$ | $4^h\ 25^m\ 22.2^s$ | $11^h\ 48^m\ 33.4^s$ | $4^h\ 6^m\ 11.4^s$ | $13^h\ 28^m\ 4.4^s$ | $0^h\ 32^m\ 7.1^s$ | $22^h\ 20^m\ 44.2^s$ | $18^h\ 35^m\ 14.0^s$ |
| Declination | 20° 43' 53" | 17° 50' 49" | 1° 47' 5" | 20° 4' 48" | -6° 27' 59" | 2° 41' 3" | -10° 57' 20" | -19° 19' 14" |
| Range (AU) | 0.896 | 0.351 | 1.389 | 5.838 | 9.397 | 20.088 | 29.434 | 31.240 |
| Brightness | 0.3 | -4.4 | 0.8 | -1.8 | 0.9 | 5.8 | 7.9 | 14.0 |
| Constellation | Cancer | Taurus | Virgo | Taurus | Virgo | Cetus | Aquarius | Sagittarius |
| Meridian transit | 14:52 | 11:05 | 18:27 | 10:45 | 20:06 | 07:12 | 05:01 | 01:16 |
| Rises | 07:40 | 04:06 | 12:21 | 03:38 | 14:27 | 01:05 | 23:34 | 20:18 |
| Sets | 22:03 | 18:03 | 00:35 | 17:52 | 01:48 | 13:19 | 10:24 | 06:10 |
| Altitude | 17.1° | -23.0° | 43.7° | -23.3° | 44.6° | -44.8° | -35.7° | 2.0° |
| Azimuth | 283.2° | 320.0° | 224.9° | 325.4° | 188.2° | 28.5° | 74.1° | 116.8° |
| Inferior Conjunction | 2012-Mar-21<br>2012-Jul-28 | 2012-Jun-05<br>2014-Jan-11 | - | - | - | - | - | - |
| Opposition | - | - | 2012-Mar-03<br>2014-Apr-08 | 2011-Oct-28<br>2012-Dec-02 | 2012-Apr-15<br>2013-Apr-28 | 2011-Sep-25<br>2012-Sep-29 | 2011-Aug-22<br>2012-Aug-24 | 2011-Jun-28<br>2012-Jun-29 |
| Superior Conjunction | 2012-May-27<br>2012-Sep-10 | 2011-Aug-16<br>2013-Mar-28 | 2011-Feb-04<br>2013-Apr-17 | 2012-May-13<br>2013-Jun-19 | 2011-Oct-13<br>2012-Oct-25 | 2012-Mar-24<br>2013-Mar-28 | 2012-Feb-19<br>2013-Feb-21 | 2011-Dec-29<br>2012-Dec-30 |
| Max. eastern elongation | 2012-Mar-05<br>2012-Jun-30 | 2012-Mar-27<br>2013-Nov-01 | - | - | - | - | - | - |
| Max. western elongation | 2012-Apr-18<br>2012-Aug-16 | 2011-Jan-08<br>2012-Aug-15 | - | - | - | - | - | - |
| Perihelion | 2012-May-28<br>2012-Aug-24 | 2012-Mar-20<br>2012-Oct-31 | 2011-Mar-09<br>2013-Jan-24 | 2011-Mar-17<br>2023-Jan-20 | 2003-Jul-26<br>2032-Nov-28 | 1966-May-21<br>2050-Aug-16 | 1876-Aug-26<br>2042-Sep-03 | 1989-Sep-05<br>2237-Sep-15 |
| Aphelion | 2012-Apr-15<br>2012-Jul-11 | 2011-Nov-29<br>2012-Jul-11 | 2012-Feb-15<br>2014-Jan-02 | 2005-Apr-14<br>2017-Feb-17 | 1988-Sep-11<br>2018-Apr-17 | 2009-Feb-26<br>2092-Nov-22 | 1959-Jul-16<br>2125-Dec-01 | 1866-Jun-04<br>2114-Feb-18 |




| Planet | D-Sun (AU) | D-Earth(AU) | D-Sun (miles) | D-Earth (miles) | Light Minutes | Light-Hours | 100mph Trip (yrs) |
|---|---|---|---|---|---|---|---|
| **Mercury** | 0.44 | 0.9 | 40,900,555 | 83,660,226 | 7.496 | 0.125 | 95.50 |
| **Venus** | 0.73 | 0.35 | 67,857,739 | 32,534,532 | 2.915 | 0.049 | 37.14 |
| **Earth** | 1.02 | 0 | 94,814,923 | 0 | 0.000 | | 0.00 |
| **Mars** | 1.59 | 1.39 | 147,799,733 | 129,208,572 | 11.578 | 0.193 | 147.50 |
| **Jupiter** | 5.01 | 5.84 | 465,708,593 | 542,861,913 | 48.644 | 0.811 | 619.71 |
| **Saturn** | 9.74 | 9.4 | 905,389,560 | 873,784,586 | 78.296 | 1.305 | 997.47 |
| **Uranus** | 20.07 | 20.09 | 1,865,623,046 | 1,867,482,163 | 167.337 | 2.789 | 2131.83 |
| **Neptune** | 29.99 | 29.43 | 2,787,744,652 | 2,735,689,400 | 245.133 | 4.086 | 3122.93 |
| **Pluto** | 32.26 | 31.24 | 2,998,754,334 | 2,903,939,411 | 260.210 | 4.337 | 3315.00 |

Key to Saturnian satellites: E = Enceladus T = Tethys
D = Dione R = Rhea
Ti = Titan

## Mirror Reversed View

Key to Saturnian satellites: E = Enceladus T = Tethys
D = Dione R = Rhea
Ti = Titan

## Inverted View

SKY & TELESCOPE

# Saturn's Moons

This diagram shows the positions of Saturn's brightest moons in their orbits about the planet for any entered date and time between January 1900 and December 2100.

**Date:** 06/27/2012 (mm/dd/yyyy) **Time:** 03:00 **UT**

Reset to current date & time | Recalculate using entered date & time

− 1 day | − 1 hour | + 1 hour | + 1 day

Time-zone offset from UT in hours (from your Web browser): −5

**Telescope type: Inverted view**

N / E **Direct view** (Erect-image system)

W / N **Inverted view** (Newtonian / Dobsonian)

N / E **Mirror reversed** (SCT/Mak/refractor + diagonal)

# Planet Facts

**Mercury**

* 4878 km diameter
* 0 moons
* 0 rings
* -279 F to 800 F
* 88 Earth days = 1 Mercury year
* 59 Earth days = 1 Mercury day
* .06 mass
* .3 AU from the Sun

**Venus**

* 12,104 km diameter
* 0 moons
* 0 rings
* 900 F
* 225 Earth days = 1 Venus year
* 243 Earth days = 1 Venus day
* .82 mass
* .7 AU from the Sun

**Earth**

* 12,756 km diameter
* 1 moon
* 0 rings
* 56 F
* 365 days = 1 Earth year
* 24 hours = 1 Earth day
* 1 mass
* 1 AU from the Sun

**Mars**

* 6795 km diameter
* 2 moons
* 0 rings
* -200 to 70 F
* 687 Earth days = 1 Mars year
* 24.5 Earth hours = 1 Mars day
* .1 mass
* 1.67 AU from the Sun

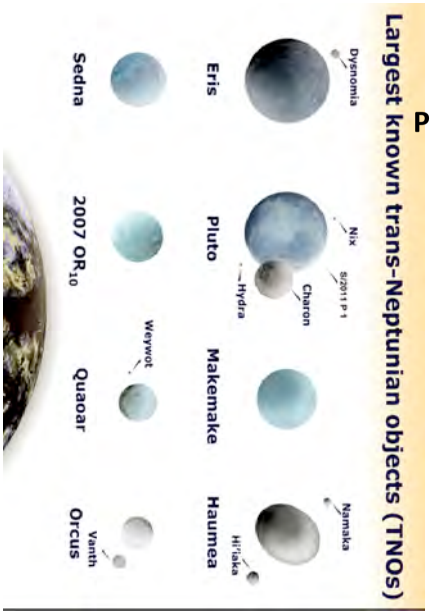
**Jupiter**

* 142,985 km diameter
* 67 moons
* 3 rings
* -150 F
* 12 Earth years = 1 Jupiter year
* 10 Earth hours = 1 Jupiter day
* 318 mass
* 5 AU from the Sun

Known planetary satellites, updated May 2012. As of then, the count stood at 172:

Earth 1, Mars 2, Jupiter 67, Saturn 62, Uranus 27, Neptune 13. Among the dwarf planets, Pluto has 4, Eris 1, and Haumea 2.

However, the locations of 11 Jovian and seven Saturnian moonlets are known so poorly that they are effectively lost.




**Saturn**

* 120,537 km diameter
* 62 moons
* 4 main and thousands of smaller rings
* -300 F
* 30 Earth years = 1 Saturn year
* 10.5 Earth hours = 1 Saturn day
* 95 mass
* 9 AU from the Sun

**Uranus**

* 51,119 km diameter
* 27 known moons
* 11 rings
* -350 F
* 84 Earth years = 1 Uranus year
* 15 Earth hours = 1 Uranus day
* 14.5 mass
* 19 AU from the Sun

**Neptune**

* 50,538 km diameter
* 13 known moons
* 4 rings
* -260 F
* 165 Earth years = 1 Neptune year
* 18 Earth hours = 1 Neptune day
* 17 mass
* 30 AU from the Sun

**Pluto (now considered a dwarf planet)**

* 2320 km diameter
* 4 moons
* 0 rings
* -370 F
* 249 Earth years = 1 Pluto year
* 6.5 Earth days = 1 Pluto day
* .003 mass
* 49 AU from the Sun

# The Evening Sky Map

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

WWW.SKYMAPS.COM

## NORTHERN HEMISPHERE
## JUNE 2012

## Sky Calendar – June 2012

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

1 **Moon near Spica and Saturn** (evening sky) at 1h UT. Mags. +1.0 and +0.5.

3 **Moon at perigee** (closest to Earth) at 13h UT (358,485 km; 33.3').

4 **Moon near Antares** (midnight sky) at 3h UT.

4 **Full Moon** at 11:11 UT.

4 **Partial Eclipse of the Moon** from 10:00 to 12:07 UT, mid-eclipse at 11:03 UT. Best seen from locations in and near the Pacific Ocean.

6 **Transit of Venus** across the Sun's face at 1h UT. For North America, the transit begins within 2 minutes of 22:05 UT on June 5 and is in progress till sunset. The W. Pacific, E. Asia, and E. Australia see the whole show. The second and final transit this century. Next transit of Venus occurs on Dec 11 2117.

11 **Last Quarter Moon** at 10:42 UT.

12 **Jupiter near the Pleiades** (22° from Sun, morning sky) at 11h UT. Mag –2.0.

16 **Moon at apogee** (farthest from Earth) at 1h UT (distance 405,787 km; angular size 29.4').

17 **Moon, Jupiter, and the Pleiades** within 4.9° circle (26° from Sun, morning sky) at 3h UT. Occultation of Jupiter visible from Arctic Canada at 6h UT.

18 **Moon, Venus, and Aldebaran** within 5.0° circle (18° from Sun, morning sky) at 2h UT.

19 **New Moon** at 15:02 UT. Start of lunation 1107.

20 **June solstice** at 23:07 UT. The time when the Sun reaches the point farthest north of the celestial equator marking the start of summer in the Northern Hemisphere and winter in the Southern Hemisphere.

21 **Moon near Mercury** (24° from Sun, evening sky) at 17h UT. Mag. +0.0.

22 **Moon near Beehive cluster (M44)** (evening sky) at 19h UT.

24 **Moon near Regulus** (evening sky) at 11h UT.

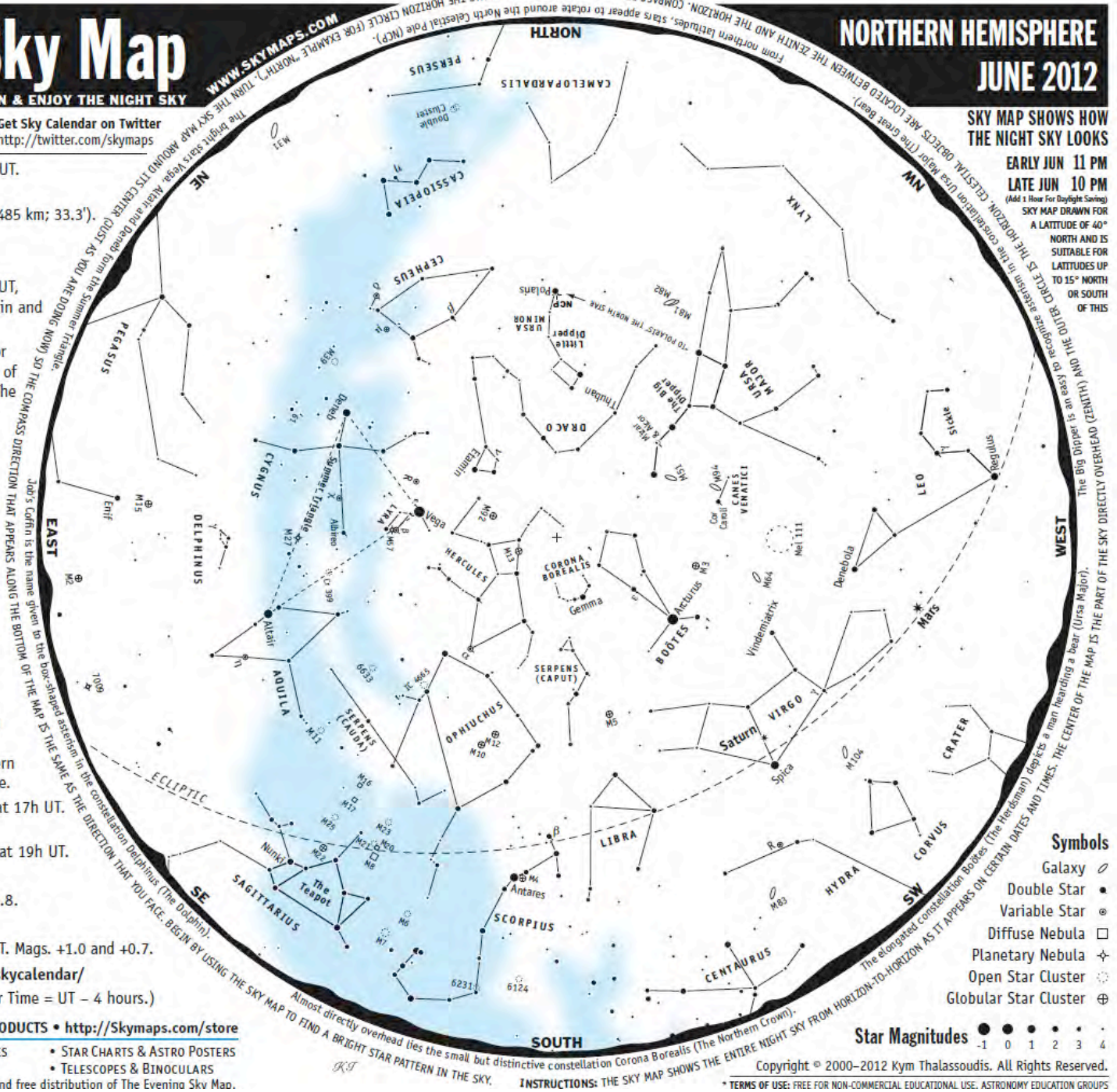
26 **Moon near Mars** (evening sky) at 11h UT. Mag. +0.8.

27 **First Quarter Moon** at 3:29 UT.

28 **Moon near Spica and Saturn** (evening sky) at 8h UT. Mags. +1.0 and +0.7.

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

All times in Universal Time (UT). (USA Eastern Summer Time = UT – 4 hours.)




SKY MAP SHOWS HOW THE NIGHT SKY LOOKS

EARLY JUN 11 PM
LATE JUN 10 PM
(Add 1 Hour For Daylight Saving)

SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

The bright stars Vega, Altair and Deneb form the Summer Triangle.

Job's Coffin is the name given to the box-shaped asterism in the constellation Delphinus (The Dolphin).

Almost directly overhead lies the small but distinctive constellation Corona Borealis (The Northern Crown).

The elongated constellation Bootes (The Herdsman) depicts a man herding a bear (Ursa Major).

From northern latitudes, stars appear to rotate around the North Celestial Pole (NCP). 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.

The Big Dipper is an easy to recognize asterism in the constellation Ursa Major (The Great Bear). THE OUTER CIRCLE IS THE HORIZON. CELESTIAL OBJECTS ARE LOCATED BETWEEN THE ZENITH AND THE HORIZON. THE CENTER OF THE MAP IS THE PART OF THE SKY DIRECTLY OVERHEAD (ZENITH).

### Symbols

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

Star Magnitudes -1 0 1 2 3 4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INSTRUCTIONS: THE SKY MAP SHOWS THE ENTIRE NIGHT SKY FROM HORIZON-TO-HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES.

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

## 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. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.

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

# CELESTIAL OBJECTS

NORTHERN HEMISPHERE JUNE 2012

Skymaps.com

## Easily Seen with the Naked Eye

| | | | |
|---|---|---|---|
| Altair | Aql | • | Brightest star in Aquila. Name means "the flying eagle". Dist=16.8 ly. |
| Arcturus | Boo | • | Orange, giant K star. Name means "bear watcher". Dist=36.7 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. |
| α Herculis | Her | ⊛ | Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion. |
| Regulus | Leo | • | Brightest star in Leo. A blue-white star with at least 1 companion. Dist=77 ly. |
| Vega | Lyr | • | The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly. |
| Antares | Sco | • | Red, supergiant star. Name means "rival of Mars". Dist=135.9 ly. |
| Polaris | UMi | • | The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433ly. |
| Spica | Vir | • | Latin name means "ear of wheat" and shown held in Virgo's left hand. Dist=250 ly. |

## Easily Seen with Binoculars

| | | | |
|---|---|---|---|
| η Aquilae | Aql | ⊛ | Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly. |
| M3 | CVn | ⊕ | Easy to find in binoculars. Might be glimpsed with the naked eye. |
| μ Cephei | Cep | ⊛ | Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days. |
| Mel 111 | Com | ◌ | Coma Berenices. 80 mag 5-6 stars in 5 deg. Dist=283 ly. Age=400 million years. |
| χ Cygni | Cyg | ⊛ | Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days. |
| M39 | Cyg | ◌ | May be visible to the naked eye under good conditions. Dist=900 ly. |
| ν Draconis | Dra | • | Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly. |
| M13 | Her | ⊕ | Best globular in northern skies. Discovered by Halley in 1714. Dist=23,000 ly. |
| M92 | Her | ⊕ | Fainter and smaller than M13. Use a telescope to resolve its stars. |
| ε Lyrae | Lyr | • | Famous Double Double. Binoculars show a double star. High power reveals each a double. |
| R Lyrae | Lyr | ⊛ | Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days. |
| M12 | Oph | ⊕ | Close to the brighter M10. Dist=18,000 ly. |
| M10 | Oph | ⊕ | 3 degrees from the fainter M12. Both may be glimpsed in binoculars. Dist=14,000 ly. |
| IC 4665 | Oph | ◌ | Large, scattered open cluster. Visible with binoculars. |
| 6633 | Oph | ◌ | Scattered open cluster. Visible with binoculars. |
| M8 | Sgr | □ | Lagoon Nebula. Bright nebula bisected by a dark lane. Dist=5,200 ly. |
| M25 | Sgr | ◌ | Bright cluster located about 6 deg N of "teapot's" lid. Dist=1,900 ly. |
| M22 | Sgr | ⊕ | A spectacular globular star cluster. Telescope will show stars. Dist=10,000 ly. |
| M4 | Sco | ⊕ | A close globular. May just be visible without optical aid. Dist=7,000 ly. |
| M6 | Sco | ◌ | Butterfly Cluster. 30+ stars in 7x binoculars. Dist=1,960 ly. |
| M7 | Sco | ◌ | Superb open cluster. Visible to the naked eye. Age=260 million years. Dist=780 ly. |
| M5 | Ser | ⊕ | Fine globular star cluster. Telescope will reveal individual stars. Dist=25,000 ly. |
| Mizar & Alcor | UMa | • | Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion. |
| Cr 399 | Vul | ◌ | Coathanger asterism or "Brocchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly. |

## Telescopic Objects

| | | | |
|---|---|---|---|
| ε Boötis | Boo | • | Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split. |
| M94 | CVn | ⌀ | Compact nearly face-on spiral galaxy. Dist=15 million ly. |
| M51 | CVn | ⌀ | Whirlpool Galaxy. First recognised to have spiral structure. Dist=25 million ly. |
| M64 | Com | ⌀ | Black-Eye Galaxy. Discovered by J.E. Bode in 1775 - "a small, nebulous star". |
| Albireo | Cyg | • | Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4". |
| 61 Cygni | Cyg | • | Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4". |
| γ Delphini | Del | • | Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field. |
| β Lyrae | Lyr | ⊛ | Eclipsing binary. Mag varies between 3.3 & 4.3 over 12.940 days. Fainter mag 7.2 blue star. |
| M57 | Lyr | ✧ | Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly. |
| M23 | Sgr | ◌ | Elongated star cluster. Telescope required to show stars. Dist=2,100 ly. |
| M20 | Sgr | □ | Trifid Nebula. A telescope shows 3 dust lanes trisecting nebula. Dist=5,200 ly. |
| M21 | Sgr | ◌ | A fine and impressive cluster. Dist=4,200 ly. |
| M17 | Sgr | □ | Omega Nebula. Contains the star cluster NGC 6618. Dist=4,900 ly. |
| M11 | Sct | ◌ | Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist=5,600 ly. |
| M16 | Ser | □ | Eagle Nebula. Requires a telescope of large aperture. Dist=8,150 ly. |
| M81 | UMa | ⌀ | Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope. |
| M82 | UMa | ⌀ | Close to M81 but much fainter and smaller. |
| γ Virginis | Vir | • | Superb pair of mag 3.5 yellow-white stars. Orbit=169 years. At their closest in 2005. |
| M27 | Vul | ✧ | Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly. |

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