Temecula Valley Astronomer

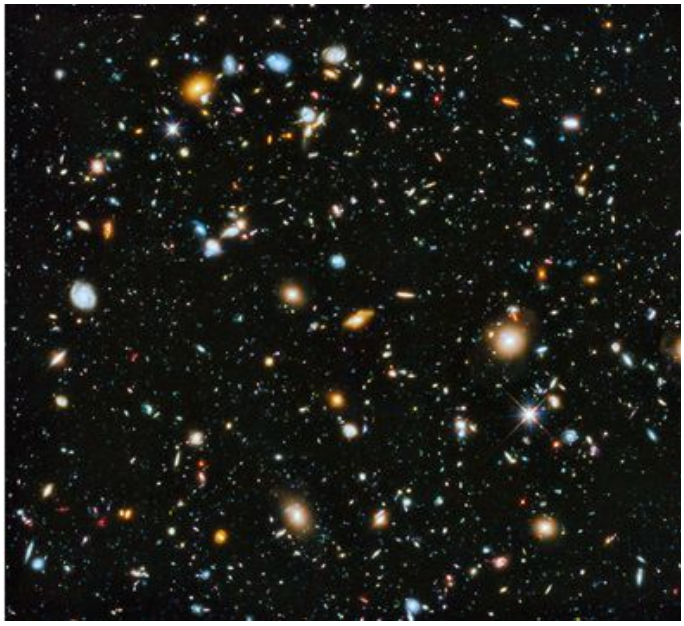
The monthly newsletter of the Temecula Valley Astronomers Sep 2018

Events:

General Meeting :
No general meeting this month.

Please consider helping out at one of the many Star Parties coming up over the next few months. For the latest schedule, check the Calendar on the web page.

Your newsletter editor is out of town at the end of September so the October newsletter will be delayed. Be sure to watch your TVAstro emails for the October 1st meeting announcement. The October newsletter will be out about the 10th of October.



Hubble Ultra Deep Field 2014. *Credit STSci-2014-27*

WHAT'S INSIDE THIS MONTH:

Send newsletter submissions to Mark DiVecchio <markd@silogic.com> by the 20th of the month for the next month's issue.

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General information:
Subscription to the TVA is included in the annual $25 membership (regular members) donation ($9 student; $35 family).

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Cosmic Comments
by President Mark Baker

OUTREACH… I wonder how many of us think this is "just" a Club endeavor?? Personally, I feel it is part of my individual daily routine as well. Through our Club efforts, we often reach dozens, even hundreds, of our community members across all demographics. But I truly enjoy the one on one activity also…often, you can go deeper and, literally, farther into the Cosmos and make a long term difference for someone.

Sometimes, it is just a matter of setting up a scope somewhere and chatting with passersby… we did this on our AZ trip this year and had some great dialog in Monument Valley under really dark skies. I'm hoping to do some "Sidewalk Astronomy" in our communities this year as well.

And I'll confess that I will miss our regular visit to Malaysia and Singapore this year, if nothing else because it's nice to be on the receiving end of someone else's Outreach efforts too!!! It's a worldwide phenomenon…something for nothing!!!

So I'll admonish all of you to maybe take some time to step outside and see what sharing opportunities arise…right now is a perfect time as Venus, Jupiter, Saturn, and Mars are all clearly visible. Combined with a friendly Luna, all you need is a good set of binoculars and someone to walk by…you'd be surprised at the wonder people express in viewing these objects, up close and personal. And you'll find that you acquire more knowledge…the best way to learn, sometimes, is to teach!!!

And so, my TVA family, look up, but remember, sharing is required. Thanks for all you do…!!!

Clear, Dark Skies my Friends…

Looking Up Redux

compiled by Clark Williams

from sources:
Sky and Telescope
Wikipedia
in-the-sky.org
The American Meteor Society, Ltd.
NASA.gov

ALL TIMES ARE LOCAL PST WILDOMAR

Times are given in 24-hour time either as hh:mm:ss or hhmmss. A time given as hhmm+ indicates that it is the hour of the next day. Similarly a time hhmm− indicates a time in a previous day.

Moon Phases for the month by date: (all times are PDT)

Sunday the 2nd @ 19:37 THIRD QTR
Sunday the 9th @ 11:01 NEW
Sunday the 16th @ 16:14 FIRST QTR
Monday the 24th @ 19:52 FULL

Perigee comes on 2018-09-08 @ 01:23 – 361, 354 km (224, 536 mi)
Apogee comes on 2018-09-20 @ 00:55 – 404, 874 km (404, 875 mi)

2018 has: (12) new moons, (12) 1st Qtr moons, (14) Full moons, (13) 3rd Qtr moons
(2) Blue moons and (1) Black moon

Luna:

Luna can be found rising in Taurus at the beginning of the month about 23:13:55. Approximately 60% illuminate and Waning Gibbous. By mid month Luna is rising in Ophiuchus around noon Waxing Crescent and transiting in the afternoon about 17:56. By the end of the month Luna is rising again in Taurus around 22:44:18 Waning Gibbous and around 62% illuminated.

Highlights: (distilled from Sky & Telescope and Clark's planetary Orrey program[s])

05 September: Dawn – Tonight and for the next few weeks look for the Zodiacal light visible in the eastern sky about two-hours before end of Astronomical Twilight. It will appear as a cone of dim light leaning slightly to the right. You'll need dark skies.

06 September: Dawn – Look fr Mercury near Regulus in the constellation Leo. Mercury should be bright and easily identified in binoculars.

07 September: Evening – The Demon star (Algol) at minimum. It will reach a maximum at 1929.

15 September: Evening – **Seven planets in a single night.** At 19:45:00 you have a perfect chance to catch six planets in their ecliptic paths. Start by looking south and then find the

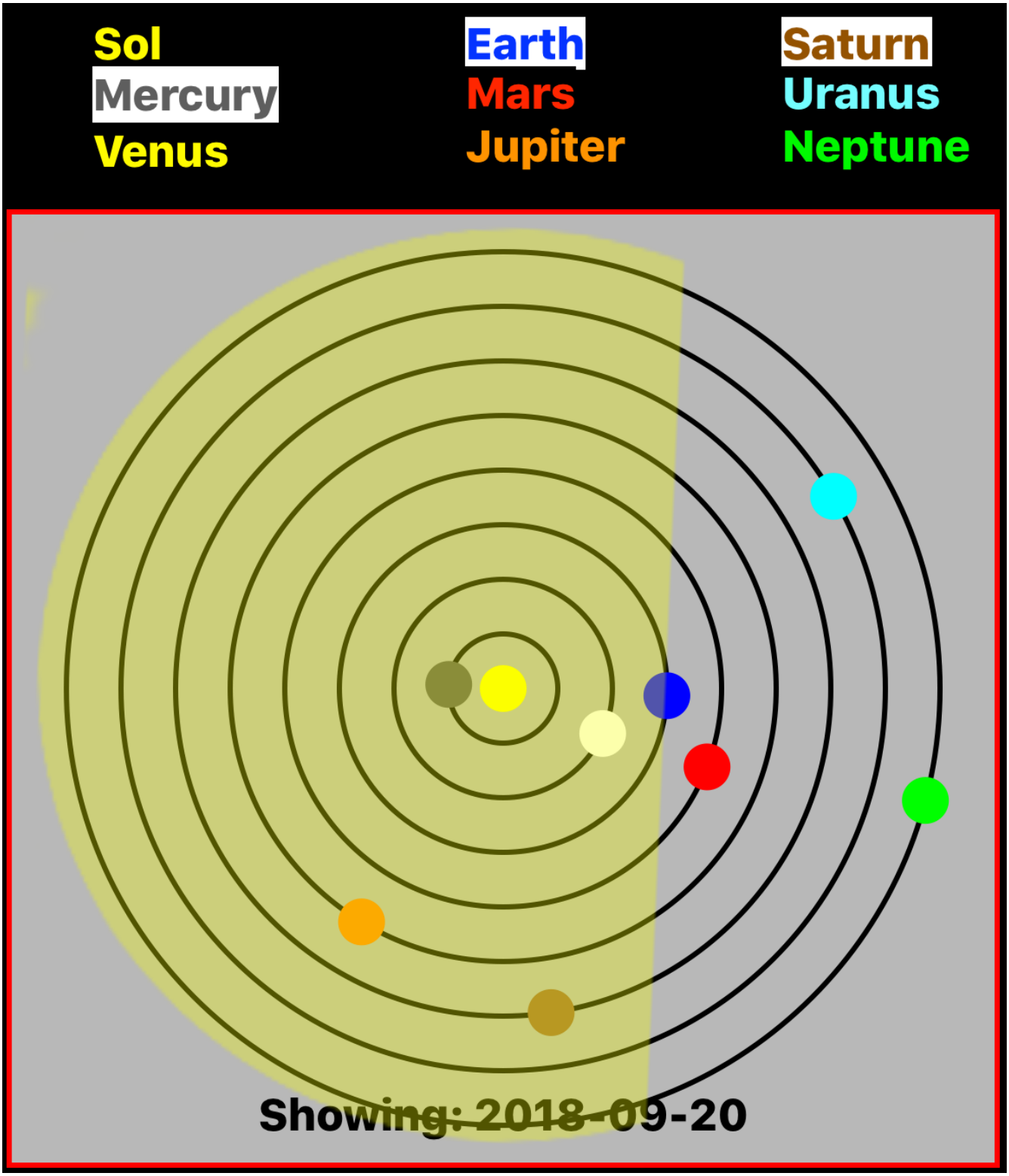
brightest light near the west; that will be Venus. Proceed east to Jupiter, (Antares, Luna), Saturn, Pluto, Mars and way off to the east Neptune. At 2100 although Venus has set, you can again pick up 6 planets: Jupiter, Saturn, Pluto, Mars, Neptune and Uranus just above the horizon in the eastern sky. That is seven planets in less than 2-hours of viewing. (*Editor's note: if you look down at your feet, you will see the eighth planet!*)

21 September: Night – The Piscid meteor shower will reach maximum. You'll need dark skies for this one.

22 September: Autumn begins.

30 September: Night – Luna is Waxing Gibbous rising at 23:38:26 preceded by a stunning Aldebaran. By midnight they will be separated by about one degree.

Planets:
Planetary Positions September 2018: (from TVA App iOS version)



- **Mercury:** You should start your Mercury viewing on the 1st of September starting at about 05:15:00. Mercury will be about 65% illuminated and creeping up in the eastern sky followed almost immediately by the sun. Your best view on the 1st should be around 05:30:00. By the 2nd Mercury is lost in the sun and won't emerge until October will it will be in the daylight sky.
- **Venus:** Still the evening star all month and about 30% illuminated on the first, Venus will set around 20:58:21. This will continue all month setting earlier each day until by the end of the month the Lady of the night will fall to the horizon at 19:35:28 and only about 17% illuminated.
- **Mars:** Mars is still dazzling this month beginning the month rising at 17:25:29. By mid-month the warrior is up by 16:34:58 and at month's end rises by 15:48:54. The Warrior is visible and a great star party object all month.
- **Jupiter:** Jupiter rises by 11:47:19 at the beginning of September and the Jovial Giant is visible all month. Jupiter sets 20:43:49 on the 30th of September.
- **Saturn:** The ringed wonder starts out the month rising by 1517 and transiting by 2015 and doesn't set until 0117+. On the 15th of September at 1945 you have a perfect chance to catch six planets in their ecliptic paths.
- **Uranus:** Uranus finally is creeping up in the late night sky rising at 2130 and transiting by +04:08:07. Still it is a good time to try imaging this jewel or even find it, with a magnitude of +5.7 and 100% illuminated. By mid-month you're finding a rise time of 2034transiting at 0311+ and by end of month you have from 1934 until dawn.
- **Neptune:** Neptune is trailing Mars rising in the beginning of the month by 1926 and transiting at 0114+. By mid-month rise time is at 1830 and you have until dawn. Even by the end of the month The trident pokes above the surface of the horizon by 1730 and you can observe or image all night long.
- **Pluto:** Pluto is dim this month at about mag +14.3. Sitting between Saturn and Mars from our terrestrial point of view draw a triangle with Altair, Saturn and Mars as the vertices. Pluto is about mid distance between the two planets of the triangle's base most of the month. At the start of the month Pluto is rising at 1626 and doesn't set until 0229+. This means you have a lot of time to find and image this wonderful little planet. By mid-month Pluto is rising at 1530, transiting around 2030 and setting at about 0134+. End of month sees a rise time of 1431, a transit time of 1931. The point of all of this is that your best bet for viewing and imaging Pluto is now.

Asteroids:

- Wednesday 05 September: Asteroid 27 Euterpe at opposition
- Tuesday 18 September: Asteroid 30 Urania at opposition

Meteors:

- The Piscid meteor shower will reach its maximum rate of activity on 21 September 2018.

Comets:

- Comets come in various classifications:
  - 1) Short Period comets – further broken down into:
    - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.
    - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.

    - Short period comets may have a near circular orbit or an elliptical orbit. The latter being far more common.
  - 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.
- Comet 21P/Giacobini-Zinner – Is at perihelion on Monday 10 September and reaches its brightest on Sunday 19 September.

Deep Sky:

In each case you should look for the following on or about the 15th Day of September 2018 at 2100 PDT and you will have about 20 minutes of viewing time total.

The one thing September brings us is the potential for marvelous viewing and imaging:

- **The Ring Nebula** – AKA M57 or NGC 6720 is a planetary nebula in the northern constellation of Lyra. Discovered by the French astronomer Charles Messier in late January 1779 he reported his independent discovery of Comet Bode to fellow French astronomer Antoine Darquier de Pellepoix two weeks later, who then independently rediscovered the nebula while following the comet. (from Wikipedia)
- **The Whirlpool Galaxy** – AKA Messier 51a, M51a, and NGC 5194, is an interacting grand-design spiral galaxy with a Seyfert 2 active galactic nucleus. It lies in the constellation Canes Venatici, and was the first galaxy to be classified as a spiral galaxy. Its distance is estimated to be between 15 and 35 million light-years (Wikipedia)
- **The Saturn Nebula** – AKA NGC 7009 is a planetary nebula in the constellation Aquarius. It appears as a greenish-yellowish hue in a small amateur telescope. It was discovered by William Herschel on September 7, 1782. The nebula was originally a low-mass star that ejected its layers into space, forming the nebula. The central star is now a bright white dwarf star of apparent magnitude 11.5. The Saturn Nebula is a complex planetary nebula and contains many morphological and kinematic sub-systems in three dimensions. It includes a halo, jet-like streams, multiple shells, ansae ("handles"), and small-scale filaments and knots. The ansae are expanding non-radially from the central star. Although the ansae are most prominent in the Saturn Nebula, they are also visible in other planetary nebulae, including NGC 3242, NGC 6543 and NGC 2371-2. (Wikipedia)

September is great for both planetary and deep sky viewing and imaging. Spend some time outside with your scope. Summer is here Autumn is coming.

For now – Keep looking up.

Random Thoughts
by Chuck Dyson

ROOTS

Almost as soon as Hans Lippershey had applied for a patent on his telescope in 1608, a Dutch politician blabbed to one and all about the Dutch army's new military optical aid and by the end of the month everyone who was anyone was claiming that he was the inventor of this new optical device and you did not need one of the newfangled optical devices to see the claims, counter claims, and law suits flying around either.

The next amazing thing that happened is that just about as fast as a good horse could run the news of Lippershey's discover made it to the University of Padua where one Galileo Galilei was teaching math and doing physics experiments. Galileo after only hearing about Lippershey's telescope and after several failed attempts managed to make his own telescope using the lens design of Lippershey; however, the Galileo scope magnified items 10X while the Lippershey scope could only manage 3X. The big advantage of the Lippershey design was that it used a convex objective and a concave eyepiece and produced an upright and right and left correct image (just like a pair of binoculars) the downside of the design was that it had a very narrow field of view, actually rather than a field of view it had more of the view of a bush in the field that you were trying to view, but help was on its way as more than one fast horse left Middelburg to spread the good news about telescopes.

One of those fast horses went to Prague and gave the exciting news to a mathematician named Johannes Kepler who was working on both the planetary orbital observational data willed to him by Tyco Brahe in 1602 and on problems concerning optics. Kepler like Galileo immediately realizes how the optical thing works and unlike Galileo realizes how to make it better. Kepler fiddles with the design for about a year and then in 1611 writes Galileo a letter asking him to consider a telescope of this new design.

The Kepler refractor though still using only two lenses and still a chromate (Latin for lots of color) has a wider field of view than the Lippershey design so the observer can now see three bushes rather than just one in the field of view. Kepler writes Galileo about his idea and asks Galileo to build him, Kepler, a telescope; Galileo being Galileo grabs the design and tells Kepler "Go fish!" when it comes to the telescope.

Kepler finally has a German optician build him a telescope and all that he manages to do with it is to write a commentary on Galileo's book, the Starry Messenger. Kepler, it turns out, is a theorist and not an experimentalist.

How did our early telescope entrepreneurs fair? Lippershey was denied a patent on his invention but was granted a large reward for his work by the Dutch government. Galileo continued to develop and improve on his telescopes and eventually showed them at the court in Florence Italy, here he was offered a court appointment and a teaching position at the University of Padua at double his old salary. Kepler got nothing except a wife who died after several bouts of fever; however, he did remarry and had six children by his new wife, not bad.

As Galileo was dying, Isaac Newton was being born and a new era of telescope development was started but not by our old friend Newton. Instead, it was an obscure clergyman named James Gregory. In 1663 he proposed a design for a reflecting telescope as he was in agreement with Mr. Newton that there were design problems in the refracting telescope that could never be corrected.

Unfortunately the complex design of the Gregory telescope prevented it from being successfully produced during his (Gregory's) lifetime; he died at 37 years of age during an observing session with his students.

In 1671, Newton, after several years of working on the best metal or metal alloy to use, no silvered mirrors here folks, and how best to shape it, Newton produced a working prototype of his reflecting telescope for the Royal Society of London in 1671 but he actually built it in 1668 and then described it in a formal letter to the Royal Society in 1669. So you may see any of these dates as the birth of the reflecting telescope.

[As an aside, the effective working diameter of this telescope that has caused all the fuss and excitement in the Royal Society was 1.3 inches; we've come a long way from that first scope.]

In 1672 an obscure physics and math teacher, Laurent Cassegrain, at the equivalent to a high school community college publishes a note on his design for a reflecting telescope that is different from Newton's design. Newton's good friend and confident Christian Huygens writes a very, very dismissive review of the design possibly to eliminate any competing design from taking away any of the glory from Newton. As a result, Cassegrain fades almost completely into obscurity as even today, after an exhaustive records search, historians are not really sure that he is the actual person who invented the Cassegrain scope, he is just the best candidate.

A big problem with early reflectors, especially if you wanted to make Newton's 1.3 inch model bigger, was the fact that the mirrors were spherical and the light came to focus at different points, spherical aberration, and it wasn't until 1721 that John Hadley was able to reliably produce and polish a metal parabolic mirror that brought all of the light to one focus point.

In 1778 a musician named William Herschel using his own metal formulation and his own mold technique was able to produce a 6.2 inch metal mirror and with this mirror was able to find and positively identify Uranus. After the discovery of Uranus, Herschel's musical career suffered but his astronomy career prospered greatly. Herschel made and used many telescopes in his life time but two stand out; the 49½ inch mirror of 1789 that was a bit of a failure because of the difficulties in operating it and an 18½ inch mirror of 1783 that he ground several mirrors for and was used not only himself but also by his son John to conduct surveys of objects in the Northern and Southern hemispheres.

The problem with all of Herschel's mirrors was that they were made of metal and not glass with a metal coating on the surface; so, when the metal surface became corroded the entire mirror has to be reground or replaced plus the metal has a tendency to sag and creep over time destroying its shape. When Herschel's 49½ inch mirror needed to be redone he abandoned the scope and never used it again while the 18½ inch scope had several mirror replacements.

How did our first generation of reflecting telescope designers do? Although Gregory never had a telescope of his design produced in his lifetime, the radio telescope at Arecibo Observatory is of Gregorian design and was the largest radio telescope in the world for decades.

Cassegrain's design languished because of the difficulty in producing the corrector plate at the front of the telescope until after WWII, when the people at Valor Electronics, later Celestron, developed a way to make the corrector plates efficiently. Today, Schmidt-Cassegrain telescopes are the bread and butter of amateur astronomy.

Newton we all know about. William Herschel, his sister Caroline and his son, John, had long and distinguished careers creating their catalog of deep sky objects that formed the basis of and are a good part of the New General Catalogue (NGC).

Cheers,
Chuck

A Trip Through the Milky Way

By Jane Houston Jones and Jessica Stoller-Conrad

Feeling like you missed out on planning a last vacation of summer? Don't worry—you can still take a late summertime road trip along the Milky Way!

The waning days of summer are upon us, and that means the Sun is setting earlier now. These earlier sunsets reveal a starry sky bisected by the Milky Way. Want to see this view of our home galaxy? Head out to your favorite dark sky getaway or to the darkest city park or urban open space you can find.

While you're out there waiting for a peek at the Milky Way, you'll also have a great view of the planets in our solar system. Keep an eye out right after sunset and you can catch a look at Venus. If you have binoculars or a telescope, you'll see Venus's phase change dramatically during September—from nearly half phase to a larger, thinner crescent.

Jupiter, Saturn and reddish Mars are next in the sky, as they continue their brilliant appearances this month. To see them, look southwest after sunset. If you're in a dark sky and you look above and below Saturn, you can't miss the summer Milky Way spanning the sky from southwest to northeast.

You can also use the summer constellations to help you trace a path across the Milky Way. For example, there's Sagittarius, where stars and some brighter clumps appear as steam from a teapot. Then there is Aquila, where the Eagle's bright Star Altair combined with Cygnus's Deneb and Lyra's Vega mark what's called the "summer triangle." The familiar W-shaped constellation Cassiopeia completes the constellation trail through the summer Milky Way. Binoculars will reveal double stars, clusters and nebulae all along the Milky Way.

Between Sept. 12 and 20, watch the Moon pass from near Venus, above Jupiter, to the left of Saturn and finally above Mars!

This month, both Neptune and brighter Uranus can also be spotted with some help from a telescope. To see them, look in the southeastern sky at 1 a.m. or later. If you stay awake, you can also find Mercury just above Earth's eastern horizon shortly before sunrise. Use the Moon as a guide on Sept. 7 and 8.

Although there are no major meteor showers in September, cometary dust appears in another late summer sight, the morning zodiacal light. Zodiacal light looks like a cone of soft light in the night sky. It is produced when sunlight is scattered by dust in our solar system. Try looking for it in the east right before sunrise on the moonless mornings of Sept. 8 through Sept 23.

You can catch up on all of NASA's current—and future—missions at www.nasa.gov

Caption: This illustration shows how the summer constellations trace a path across the Milky Way. To get the best views, head out to the darkest sky you can find. Credit: NASA/JPL-Caltech

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