Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Sep 2020

Events:

Virtual meeting via Zoom on 14 September at 7PM. Join your fellow astronomers for What's Up, IFI and a Mission Highlight. Virtual refreshments provided by Annette Brown. Watch your club email for meeting ID and password.

Until we can resume our monthly meetings, you can also interact with your astronomy associates on Facebook or by posting a message to our mailing list.

The Arecibo Message was sent towards M13 in 1974. It will arrive in about 30,000 years but M13 may no longer be in position to receive it.

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.

Like us on Facebook

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

Now that my helicopter is Mars bound and the recent comet and meteor shower aren't grabbing the spotlight, I'll be returning to my most common dialogue for this year – Near Earth Objects!!!

While supporting CNEOS and PDCO, I've been encouraging any and all to sign up with them and assist in the search for the next extinction event object heading our way… okay, a little dramatic maybe, but there are as yet undiscovered objects that fall into an NEO, if not a PHO, category. Even the ZTF up at Palomar Observatory has detected one during its survey routine, that appears to be the closest recorded approach without actually striking the Earth or imploding in the atmosphere… being the size of a car, it would have been spectacular in either category – unless it was your yard it fell into!!!

Fortunately, STUDENTS all over the world have taken up the gauntlet and are using the tools and apps provided by related organizations to review survey data and even visually corroborate sightings…except here in the USA, sadly. Lots of younglings can take pride that their names are how over 90% of recent discoveries are identified…

Almost everyone knows of Arecibo, but few realize it was more than just a tool for SETI use, or a backup for the DSN… its radar capabilities were helping to discover many of the objects that have been followed up on and identified. The recent damage drastically reduces our ability to monitor the skies properly, but many have assumed the mantle of responsibility, if in a diminished capacity…

Bottom line?? We need more eyes on the skies and reviewing the available data… if you'd like to help, let me know. Maybe that upcoming extinction event will even bear your name… who knows??!!!

Clear, Dark Skies my Friends…

Looking Up Redux
compiled by Clark Williams

from these sources:
SeaSky.org
Wikipedia.com
in-the-sky.org
The American Meteor Society, Ltd.
cometwatch.co.uk
NASA.gov
TVA App (2.0.1296)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 7 (7.6.3.1373)
SkySafari 6 Pro (6.1.1)
Stellarium (0.18.2)
timeanddate.com/astronomy
https://www.fourmilab.ch/earthview/pacalc.html

ALL TIMES ARE LOCAL PACIFIC TIME UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)
- hh:mm:ss or hhmmss
- hhmm+ (time of the next day)
- hhmm− (time of the previous day)
- hhmm (seconds not shown)
- yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by phase:

Wednesday	**the 23rd**	**@ 1856 FIRST QTR in SAGITTARIUS**
Tuesday	**the 1st**	**@ 2223 FULL in AQUARIUS**
Thursday	**the 10th**	**@ 0226 THIRD QTR in TAURUS**
Thursday	**the 17th**	**@ 0401 NEW in VIRGO**

Apogee comes on 2020-09-06 @ **2332 – 405,605 km (252,031 mi)**
Perigee comes on 2020-09-18 @ **0645 – 359,080 km (223,122 mi)**

2020 has: (12) new moons, (13) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2020-Mar-08 : Ends: 2020-Nov-01

Luna: Luna is Full on the 1st of the month. Luna is transiting at **0015+** setting by **0543+**. Luna by mid-month is a Waning Crescent, 2.6% illuminated. Rising early at **0420** and setting in the morning at **1125**. By the-end-of-the-month Luna is again Waxing Gibbous, 99% illuminated setting by **0531+**.

Highlights: (distilled from**:** **SeaSky.org** and **Clark's planetary Orrey** program[s]**)**

September 2 - Full Moon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 05:23 UTC. This full moon was known by early Native American tribes as the Corn Moon because the corn is harvested around this time of year.

September 11 - Neptune at Opposition. The blue giant planet will be at its closest approach to Earth and its face will be fully illuminated by the Sun. It will be brighter than any other time of the year and will be visible all night long. This is the best time to view and photograph Neptune. Due to its extreme distance from Earth, it will only appear as a tiny blue dot in all but the most powerful telescopes.

September 17 - New Moon. The Moon will located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 11:00 UTC. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

September 22 - September Equinox. The September equinox occurs at 13:30 UTC. The Sun will shine directly on the equator and there will be nearly equal amounts of day and night throughout the world. This is also the first day of fall (autumnal equinox) in the Northern Hemisphere and the first day of spring (vernal equinox) in the Southern Hemisphere.

Algol minima: (All times Pacific Time)

09/02/2020	0553
09/05/2020	0242
09/07/2020	2330
09/10/2020	2019
09/13/2020	1708
09/16/2020	1356
09/19/2020	2245
09/22/2020	0733
09/25/2020	0422
09/28/2020	0111
09/30/2020	0959

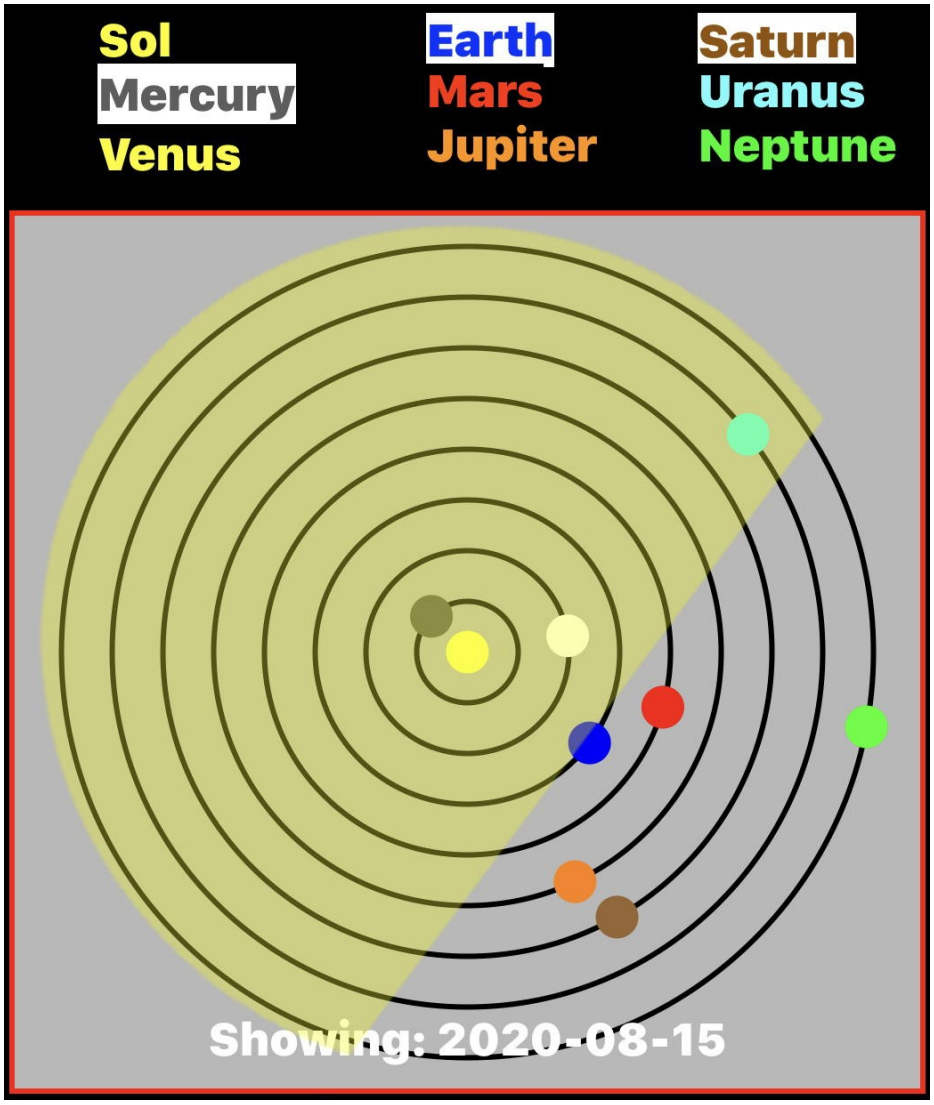
All times PDT
Ephemeris data for Sun

Local Time	Const.	Rise	Transit	Set	Distance
20200901 13:48:36	Leo	6:21	12:48	19:15	1.00894 au
20200902 13:48:36	Leo	6:22	12:48	19:13	1.00870 au
20200903 13:48:36	Leo	6:23	12:47	19:12	1.00846 au
20200904 13:48:36	Leo	6:23	12:47	19:11	1.00821 au
20200905 13:48:36	Leo	6:24	12:47	19:09	1.00797 au
20200906 13:48:36	Leo	6:25	12:46	19:08	1.00772 au
20200907 13:48:36	Leo	6:25	12:46	19:06	1.00747 au
20200908 13:48:36	Leo	6:26	12:46	19:05	1.00722 au
20200909 13:48:36	Leo	6:27	12:45	19:04	1.00697 au
20200910 13:48:36	Leo	6:27	12:45	19:02	1.00672 au
20200911 13:48:36	Leo	6:28	12:45	19:01	1.00646 au
20200912 13:48:36	Leo	6:29	12:44	19:00	1.00620 au
20200913 13:48:36	Leo	6:30	12:44	18:58	1.00594 au
20200914 13:48:36	Leo	6:30	12:44	18:57	1.00568 au
20200915 13:48:36	Leo	6:31	12:43	18:55	1.00541 au
20200916 13:48:36	Virgo	6:32	12:43	18:54	1.00514 au
20200917 13:48:36	Virgo	6:32	12:43	18:53	1.00487 au
20200918 13:48:36	Virgo	6:33	12:42	18:51	1.00459 au
20200919 13:48:36	Virgo	6:34	12:42	18:50	1.00432 au
20200920 13:48:36	Virgo	6:34	12:42	18:49	1.00403 au
20200921 13:48:36	Virgo	6:35	12:41	18:47	1.00375 au
20200922 13:48:36	Virgo	6:36	12:41	18:46	1.00346 au
20200923 13:48:36	Virgo	6:36	12:40	18:44	1.00318 au
20200924 13:48:36	Virgo	6:37	12:40	18:43	1.00289 au
20200925 13:48:36	Virgo	6:38	12:40	18:42	1.00260 au
20200926 13:48:36	Virgo	6:38	12:39	18:40	1.00231 au
20200927 13:48:36	Virgo	6:39	12:39	18:39	1.00202 au
20200928 13:48:36	Virgo	6:40	12:39	18:38	1.00173 au
20200929 13:48:36	Virgo	6:40	12:38	18:36	1.00144 au
20200930 13:48:36	Virgo	6:41	12:38	18:35	1.00116 au

All times PDT
Ephemeris data for The Moon

Local Time	Az	Alt	Con	Rise	Tran	Set	Dist(km)	Illum
20200901T210000	119° 05.692'	+17° 01.682'	Aqu	19:24	01:03	16:43	397130.1	99.76%
20200902T210000	108° 37.240'	+11° 57.496'	Aqu	19:54	01:46	07:39	400232.1	98.83%
20200903T210000	098° 40.271'	+06° 39.330'	Pis	20:22	02:27	08:34	402869.1	96.08%
20200904T210000	089° 03.220'	+01° 23.203'	Cet	20:49	03:07	09:28	404868.0	91.67%
20200905T210000	079° 34.318'	-04° 25.883'	Pis	21:16	03:47	10:23	406047.7	85.80%
20200906T210000	070° 01.530'	-09° 50.368'	Ari	21:44	04:29	11:18	406239.5	78.68%
20200907T210000	060° 12.267'	-15° 04.308'	Ari	22:15	05:12	12:14	405310.0	70.53%
20200908T210000	049° 53.155'	-20° 01.273'	Tau	22:49	05:58	13:11	403182.8	61.56%
20200909T210000	038° 50.231'	-24° 32.942'	Tau	23:28	06:47	14:09	399859.5	52.02%
20200910T210000	026° 50.166'	-28° 27.998'	Tau	00:13	07:39	15:06	395436.6	42.18%
20200911T210000	013° 43.336'	-31° 31.371'	Gem	01:06	08:33	16:00	390116.5	32.37%
20200912T210000	359° 29.086'	-33° 24.710'	Gem	01:06	08:33	16:00	384209.3	23.00%
20200913T210000	344° 21.391'	-33° 49.167'	Can	12:05	09:29	16:50	378120.8	14.54%
20200914T210000	328° 49.693'	-32° 30.710'	Leo	03:10	10:26	17:36	372322.6	07.57%
20200915T210000	313° 30.410'	-29° 25.704'	Leo	04:18	11:21	18:18	367302.5	02.65%
20200916T210000	298° 53.061'	-24° 43.129'	Leo	05:29	12:15	18:56	363498.9	00.29%
20200917T210000	285° 11.305'	-18° 42.092'	Vir	06:40	13:08	19:32	361230.1	00.82%
20200918T210000	272° 23.336'	-11° 46.892'	Vir	07:51	14:01	20:07	360641.0	04.30%
20200919T210000	260° 17.385'	-04° 22.536'	Vir	09:02	14:54	20:43	361682.1	10.49%
20200920T210000	248° 37.053'	+03° 20.257'	Lib	10:13	15:48	21:22	364131.7	18.89%
20200921T210000	237° 04.600'	+10° 29.727'	Sco	11:24	16:44	22:04	367652.0	28.83%
20200922T210000	225° 22.714'	+17° 14.178'	Oph	12:32	17:42	22:52	371858.9	39.64%
20200923T210000	213° 15.925'	+23° 14.043'	Sag	13:37	18:40	23:44	376386.3	50.67%
20200924T210000	200° 32.711'	+28° 14.652'	Sag	14:36	19:38	00:40	380930.2	61.35%
20200925T210000	187° 08.810'	+32° 02.559'	Sag	15:28	20:34	01:39	385269.9	71.25%
20200926T210000	173° 10.916'	+34° 26.195'	Cap	16:13	21:26	02:39	389267.3	80.02%
20200927T210000	158° 57.984'	+35° 18.076'	Cap	16:52	22:15	03:38	392852.9	87.37%
20200928T210000	144° 57.027'	+34° 37.189'	Aqu	17:26	23:01	04:36	396002.5	93.13%
20200929T210000	131° 34.143'	+32° 29.714'	Aqu	17:57	23:44	05:32	398712.5	97.14%
20200930T210000	119° 06.322'	+29° 07.289'	Pis	18:25	00:25	06:28	400976.6	99.33%

Planets:
Planetary Positions September 2020: (from TVA App iOS version)



- **Mercury:** Mercury is an evening object in the beginning of the month. It is illuminated at 91% and -0.57 apparent magnitude. Mercury rises at: **026** and sets by **1953** with sunset preceeding at **1915**. By mid-month the Winged Messenger is approaching Greatest Eastern Elongation. Sunset will be at **1855**; Mercury sets at **1948**. On the 31st Mercury is setting at **1933** preceded by sunset at **1835**.
- **Venus:** Is the Morning Star in the beginning of the month, rising at **0251** preceding sunrise at **0621**. By mid-month Venus rises at **0307** followed by Sol at **0631**. By the 30th Venus is rising at **0329**. followed by sunrise at **0641.**
- **Mars:** Mars is rising at **2128** on the 1st of the month, transiting at **0349**. By mid-month Mars is rising at **2033**. End-of-month finds the Warrior rising at **1925**, transiting at **0144+**.
- **Jupiter:** On the first of the month Jove rising at **1619** and transiting at **2118**. There is a Full Moon to the east of Jupiter. By mid-month Jupiter is rising at **1523** with no Earth Moon in sight.

Saturn is about 8° to the east of Jupiter. Come the end of month Jupiter is peaking above the horizon by **1426**. However the Moon is Full. But you'll have a great grouping of Jupiter, Pluto and Saturn – you just won't be able to see it very well.

- **Saturn:** Saturn is trailing Jupiter and Pluto; rising about **1649** on the 1st. The moon is Full. Saturn by mid month is rising by **1553**. You'll have a good grouping of Saturn, Pluto and Jupiter, so cameras should be ready and working. By the end-of-the-month Saturn is rising at **1453** and transiting at **1957**. See Jupiter for the Moon interference.
- **Uranus:** On the first Uranus rises at **2150**. The apparent magnitude is 5.72 so we're on the ragged edge of being naked-eye visible. The Astronomer's Bane will be Full to the west so you may not be able to eek out a view. By the ides Uranus is rising at **2054**. End of the month and the "sky god" is rising at **1954** while a Waxing gibbous 99% illuminated Moon glares away 39° to the west.
- **Neptune:** Neptune is leading Uranus. Neptune is rising at **1935** in the beginning of the month. There is a Full Moon 57° westward of Neptune. By the 15th Neptune is rising at **1935** and transiting at **0125+**. By the end of the month Neptune is rising at **1935**. The Moon is 13° westward with 99% illumination.
- **Pluto:** On the first of the month Pluto is lost to the glare of them Moon. By mid-month Pluto is rising by **1545** and is half-way between Saturn and Jupiter . Pluto transits at **2045** (see Jupiter above) but the apparent magnitude 14.29 will make it difficult to see.. By the 31st Pluto is transiting at **1945** but the pesky Moon is right where you do not want it to be, shinning at 99%.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2020 with a reasonable magnitude; say less than or equal to +10 in September there are a few beyond the regulars: Juno, Vesta. Hebe, Eros and Herculina. So consult your local planetarium software for more or try: https://www.asteroidsnear.com/year?year=2020

(1) Ceres Dwarf Planet in Aquarius 1st -- 30th rising: mag 7.7 – is the largest and most massive asteroid in the inner Solar System.
(2) Pallas Asteroid in Hercules 1st – 30th rising: mag 10.0 – the second largest asteroid in the inner Solar System and the largest body in the Solar System not to be rounded by its own gravity.
(129) Antigone Asteroid in Sagittarius 1st – 30th rising: mag 11.1 – orbiting the sun every 4.9 years at an average distance of 2.9 AU. Antigone is a large object at 125km in diameter and is a main belt asteroid orbiting the Sun between Mars and Jupiter.

Meteors:

- See Highlights above for more details. (SeaSky.org) (American Meteor Society)

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 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.

ESTIMATES ONLY

Local time 2100 PDT

C/2020 F3 (NEOWOSE)

September 01 Mag: 10.8 Rises: 1037 Sets: 2222 comet in Virgo

September 15 Mag: 12.2 Rises: 1016 Sets: 2134 comet in Libra

September 30 Mag: 11.4 Rises: 0907 Sets: 1618 comet in Centaurus

289P/Blanpain

September 01 Mag: 10.0 Rises: 0921 Sets: 2109 comet in Virgo

September 15 Mag: 10.2 Rises: 0849 Sets: 2021 comet in Virgo

September 30 Mag: 10.5 Rises: 0815 Sets: 1935 comet in Virgo

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ
R/D abbreviation for Right Ascension/Declination
α is right ascension
δ is declination
In each case, unless otherwise noted, you should look for the following on or about the 15th Day of September 2020 at 2100 PDT and you will have about 20 minutes of viewing time total.

- Epsilon Lyrae (ε Lyr, ε Lyrae)

By Nikolay NIkolov - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=90751656

- Also known as the Double Double, is a multiple star system of at least five stars approximately 162 light-years away in the constellation of Lyra.
  The widest two components of the system are easily separated when viewed through binoculars, or even with the naked eye under excellent conditions. The northern component is called ε1 (ADS 11635 AB in multiple star notation) and the southern ε2 (ADS 11635 CD); they lie around 160 light years from Earth and orbit each other over hundreds of thousands of years. Their separation of 208″ is about one hundred times that of the sub-components. When viewed at higher magnifications, each intuitively likely "star" proves to be a set of

shorter-term, close-orbiting binary stars. Ability to view these sub-components is a common benchmark for the resolving power of telescopes, since they are so close together: the stars of ε1 were 2.35 arc-seconds apart in 2006, those of ε2 were separated by about the same amount in that year. Since the first high-precision measurements of their orbit in the 1980s, both binaries have moved only a few degrees in position angle. (Wikipedia)

- **M17 Omega Nebula**

By ESO/INAF-VST/OmegaCAM. Acknowledgement: OmegaCen/Astro-WISE/Kapteyn Institute - http://www.eso.org/public/images/eso1119a/, CC BY 4.0, https://commons.wikimedia.org/w/index.php?curid=26367295

- **Messier 17** or **M17**, Omega Nebula, also known as the Swan Nebula, Checkmark Nebula, and the Horseshoe Nebula (catalogued as Messier 17 or M17 or NGC 6618) is an H II region in the constellation Sagittarius. It was discovered by Philippe Loys de Chéseaux in 1745. Charles Messier catalogued it in 1764. It is located in the rich starfields of the Sagittarius area of the Milky Way. The Omega Nebula is between 5,000 and 6,000 light-years from Earth and it spans some 15 light-years in diameter. The cloud of interstellar matter of which this nebula is a part is roughly 40 light-years in diameter and has a mass of 30,000 solar masses. The total mass of the Omega Nebula is an estimated 800 solar masses. (Wikipedia)

September is great for both viewing and imaging. Spend some time outside with your scope. Summer is waning and fall nebulae are coming.

For now – Keep looking up.

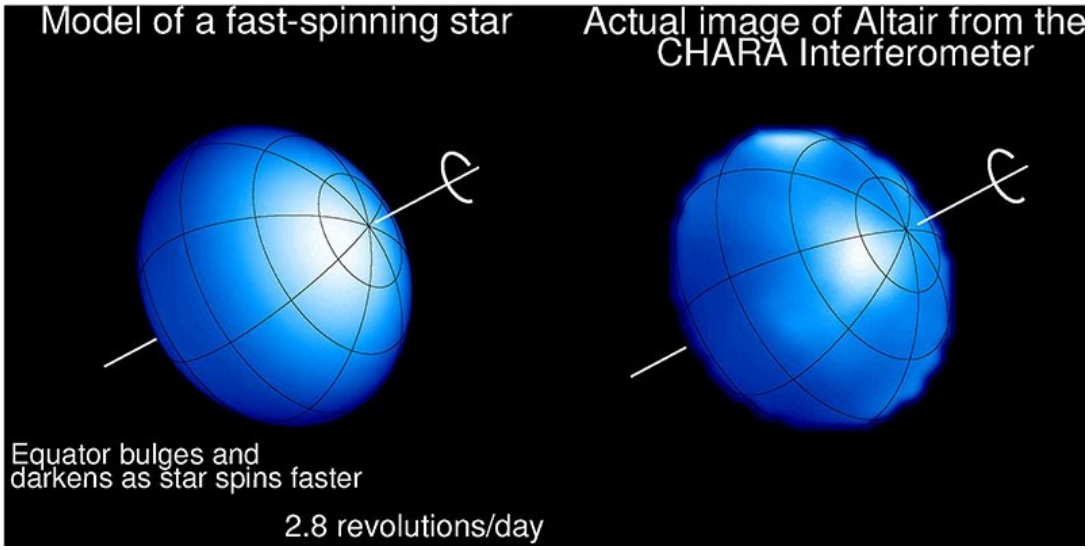
Summer Triangle Corner: Altair
by David Prosper

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star spins so rapidly that it appears "squished."

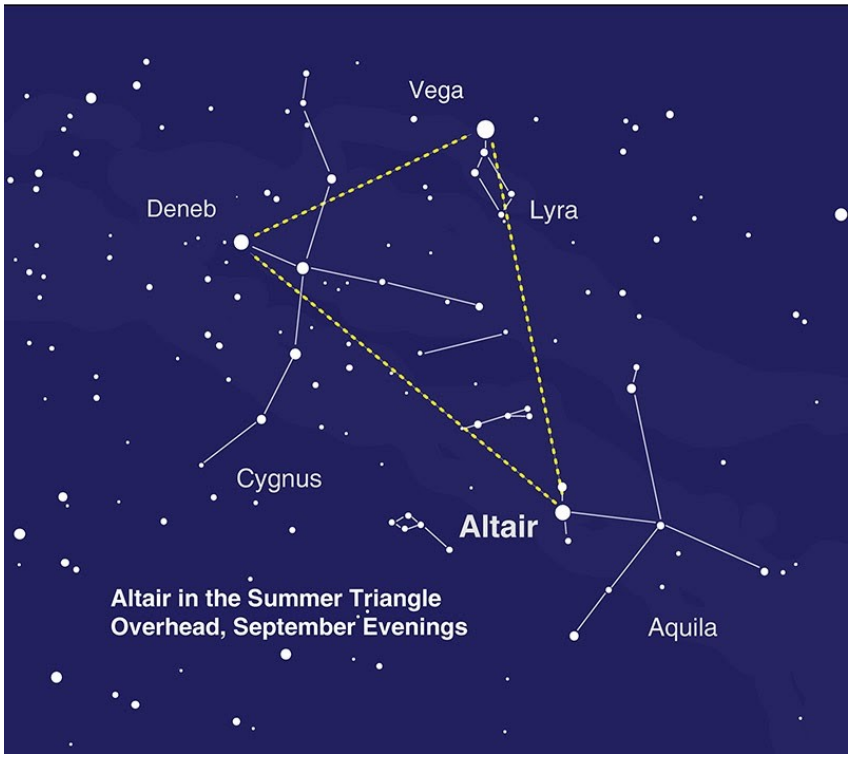
A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the "Cowherd and the Weaver Girl." Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedge-tailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800.

Altair's rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star's shape and surface by using a technique called *interferometry*, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost "pumpkin-like" shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called *gravity darkening*. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star's mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn't mean that the equator of Altair or other rapidly spinning stars are actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

As summer winds down, you can still take a Trip Around the Summer Triangle with this activity from the Night Sky Network. Mark some of the sights in and around the Summer Triangle at: bit.ly/TriangleTrip. You can discover more about NASA's observations of Altair and other fast and furious stars at nasa.gov.



The image on the right was created using optical interferometry: the light from four telescopes was combined to produce this image of Altair's surface. Image credit: Ming Zhao. More info: bit.ly/altairvsmodel



Altair is up high in the early evening in September. Note Altair's two bright "companions" on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?

This article is distributed by NASA Night Sky Network The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit https://nightsky.jpl.nasa.org to find local clubs, events, and more!

The TVA is a member club of The Astronomical League.