

# Stars Over Surrey

## Astronomy &

## Spaceflight News

31<sup>st</sup> July 2020



Variety | Personality | Companionship

# Comet Neowise

- Comet c/2020 F3 (NEOWISE)
  - Near Earth Object Wide-field Infra-red Survey Explorer
- Discovered in March 2020 and rounded the Sun on July 3<sup>rd</sup>
- It survived and became perhaps the best Comet for about 25 years, reaching naked eye visibility for a while.

Image: by John Axtell



Image: by John Axtell Comet Neowise seen across the water meadows  
next to the Wey Navigation between Pyrford and Ripley



2020 July 19

Zixuan Lin

- Comet Neowise as Photographed by Zixuan Lin from the Gobi Desert and selected by NASA's Astronomical Image of the Day
- The dust tail clearly shows striations caused by the rotation of the comet's core.
- The blue second tail is called an ion tail, and comprises gases blown away by the solar wind and pointing directly to the Sun.

## SpaceX & NASA prepare for Crew Dragon return

- Bob Behnken and Doug Hurley will undock the Crew Dragon at 00.34 BST on 2<sup>nd</sup> August, splashing down at 7.42
  - live coverage throughout on NASA TV
- Sequence:
  - short autonomous burns draw capsule away from ISS
  - 6 minute burn to put capsule on course for landing zone
  - trunk separates from capsule (will burn up on re-entry)
  - longer de-orbit burn to begin re-entry
  - drogue parachutes deployed at 350 mph at 18,000 feet
  - larger parachutes deployed at 120 mph at 6,000
  - splashdown in Atlantic, off Florida coast
- Next Crew Dragon Mission is Crew-1 (1<sup>st</sup> fully operational mission), and will take 3 NASA & 1 JAXA astronauts to ISS
  - Earliest launch date is mid-September
  - Astronauts will spend 4 months on ISS



## Misc Space X News

### • Two Firsts for Space X in July

- The Falcon 9 that launched the Crew Dragon with Benkhen and Hurley to the ISS was turned round in just 51 days to launch a South Korean military comms Satellite

- This beat the 35 year old turnround record set for S.Shuttle Atlantis

- The same mission saw both halves of the fairing captured for the first time by the two net-equipped catch boats

- Reusing the fairings saves \$6 million per launch

### • Starlink

- One scheduled originally for June now expected July 31<sup>st</sup>

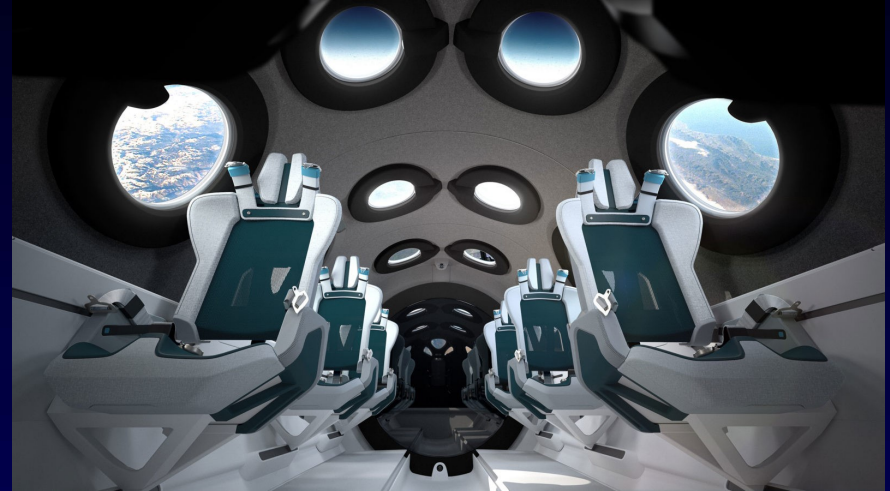
- 58 Starlinks plus 2 BlackSky Earth observations satellites (Rideshare)

- Two launches are scheduled in August, both dates TBC

- These will be the 11<sup>th</sup> and 12<sup>th</sup> batches of Starlinks, each of approx 60 satellites

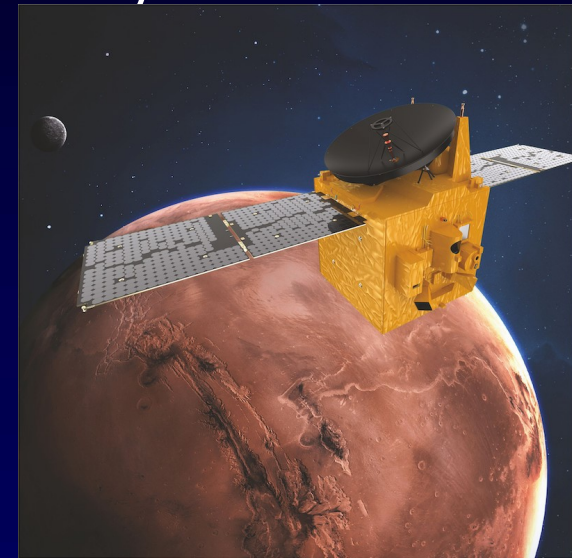
# Virgin Galactic

- Virgin Galactic has revealed the cabin layout of its SpaceShipTwo
  - London design agency
- Individually sized seats automatically adjust position for differing phases of flight.
- Seatbacks display live flight information
- Large mirror at back of craft allows passengers to watch themselves during weightlessness.
- Seats can be removed and replaced by instrument racks for scientific experimental flights
- Powered test flights imminent at Spaceport America, NM



# Missions to Mars: 1 -UAE

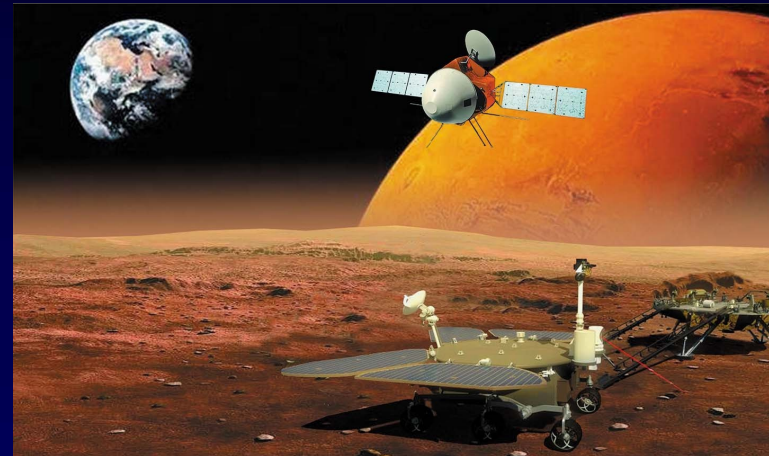
- Three missions will be heading for the Red Planet arriving in Feb of 2021 - this is because of the suitable alignments of the Earth and Mars which happens every 26 months.
- The first was from the UAE - “Hope”
  - launched from Japan on 19<sup>th</sup> July
  - designed in UAE, built in USA and carries experiments from 3 US univ's
  - budget of only \$200 million
- When it arrives at Mars it will enter a high semi-synchronous orbit, similar to those utilised by Earth weather satellites, so that it studies the same area of Mars over a long period
- It will study weather patterns and in particular how Mars's remaining atmosphere is being stripped by the solar wind.





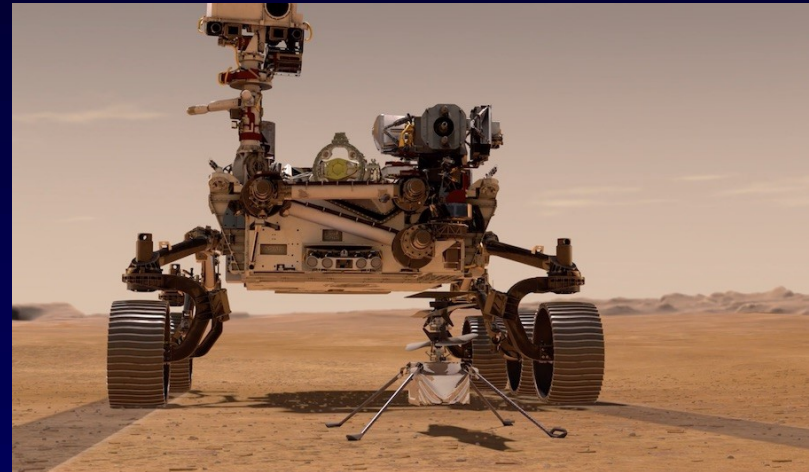
## Missions to Mars: 2 - China

- China's mission to Mars is a complex one, consisting of an orbiter, a lander plus deployable rover.
- It's called Tianwen-1 and was launched on Long March 5
  - “quest for heavenly truth”
  - launched on 23<sup>rd</sup> July
  - 5 metric tons
  - will be China's 1<sup>st</sup> national attempt at a planetary mission
- Once in orbit it will monitor the landing site and only separate the lander in April
- Lander cocooned in aeroshell, then will deploy parachute, finally using a rocket to slow its descent to landing speed
- Landing site is Utopia Planitia, an area believed to have much subsurface ice (Lake Superior equivalent!)
- Rover will study soil composition etc.



## Missions to Mars: 3 - USA

- Perseverance was launched on an Atlas V, Thurs 30th.
  - \$2.7 billion mission, nuclear powered
- Rover will descend inside a cocoon comprising a back shell and heat shield, deploying a parachute when 7 miles high
- At 1.3 miles the back shell and parachute are discarded and the descent stage's 8 rockets will slow it to near zero, about 60 feet high, then it will find its own safe landing site and the sky crane will lower it to the surface, release & depart.
- Landing site is Jezero Crater, site of an ancient river delta and lake - prime site to find signs of ancient life
- Ingenuity Mars Helicopter / core samples to be drilled and deposited for collection / camera, laser, spectrometer



# US Space Force unveils its new logo

- The new US Space Force has unveiled its new logo and also its official motto
  - the design released in January was in fact its seal, rather than logo
- They deny it is inspired by Star Trek! 😊
- The Motto is “Semper Supra” , i.e. “Always Above”
  - Explained in a Tweet that this "represents our role in establishing, maintaining, and preserving U.S. freedom of operations in the space domain."



## Russia tests anti-satellite weapon

- The US Space Force & UK Govt. have stated that Russia has tested a space-based anti-satellite weapon in orbit, in contravention of international agreements.
- A Russian military satellite, Kosmos 2453, fired a projectile close to another Russian satellite with which it had rendezvoused.
  - the projectile's speed was measured at 400mph (relative)
  - that is not consistent with the usually gentle deployment of a sub-satellite
  - it's not proof, but is characteristic of a kinetic energy weapon.
- A similar satellite, Kosmos 2452, caused concern by manoeuvring near US 245, a classified US surveillance satellite operated by National Reconnaissance Office

# Israel Launches Spy Satellite

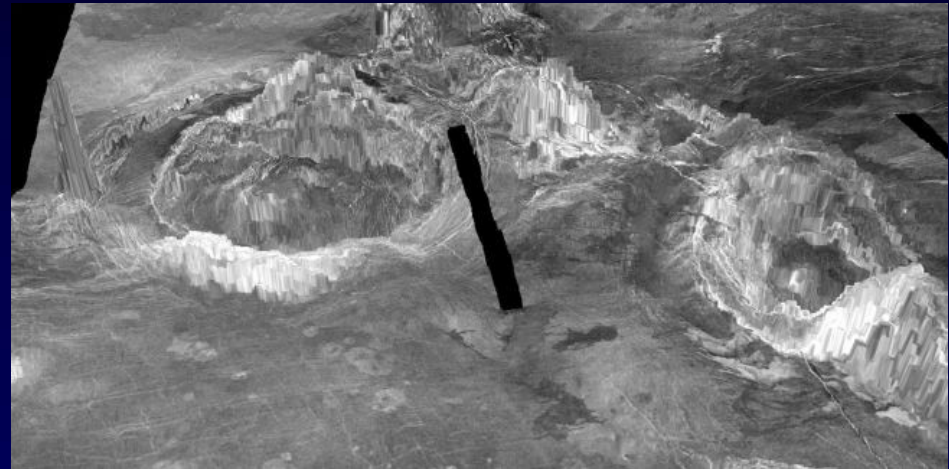
- 5<sup>th</sup> July a 3-stage Shavit 2 rocket launched a military surveillance satellite into orbit from an Israeli Air Force base south of Tel Aviv.
- The Ofek 16 satellite was built by Israel Aerospace Industries who were also the prime contractor for the Shavit launcher
  - 4<sup>th</sup> launch of an Israeli satellite on an Israeli launcher
  - 1<sup>st</sup> since 2016
- The orbit is retrograde so that any debris wouldn't fall on populated areas in either Israel or any any other nearby country





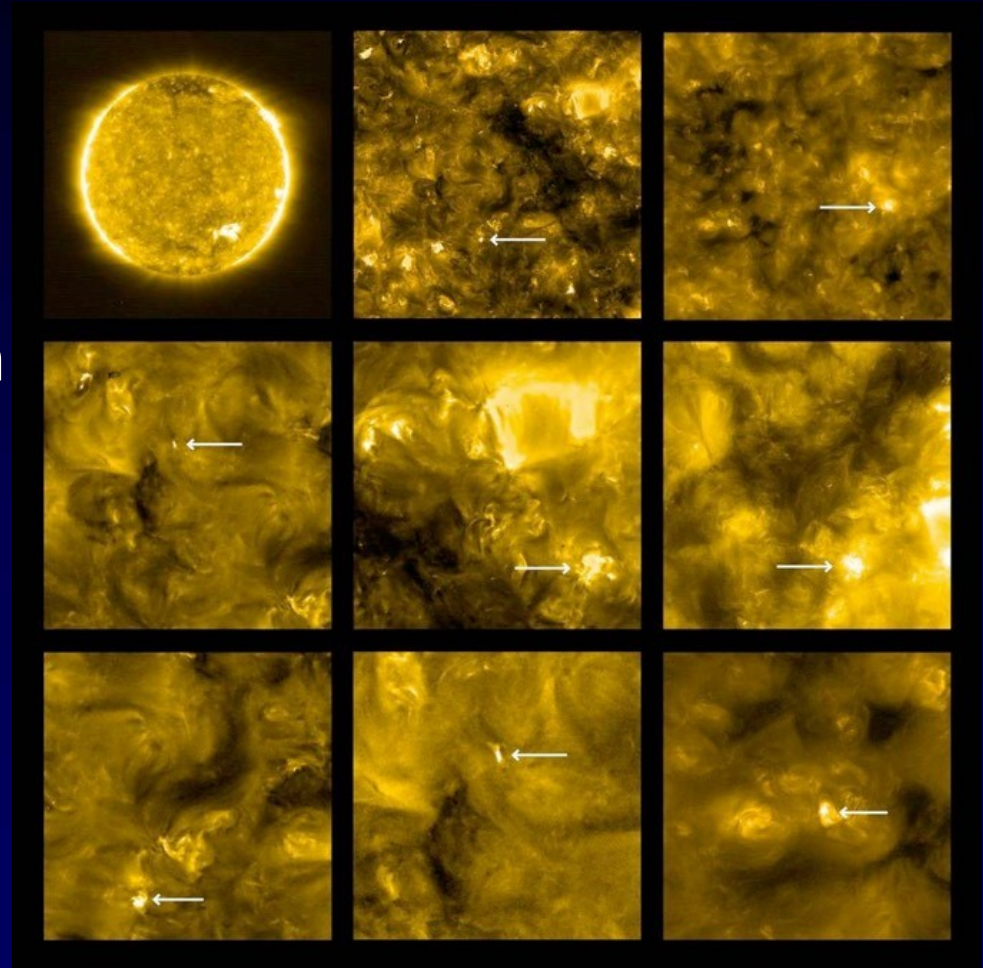
# Venus might be geologically active

- A Swiss led research team has concluded that Venus may still be geologically active.
- It's known that the planet's surface was resurfaced by volcanism approx 500 million years
  - there are very few craters
- Re-analysed data from NASA's Magellan probe
  - 1990-1994, radar mapping
- Identified 37 “coronae” - ring shaped structures that indicate “recent” volcanism.
  - plumes of molten material rising from below, like in Hawaii
- Conclusion - Venus's many volcanoes should be considered dormant, rather than dead.



# ESA's Solar Orbiter snaps Sun

- The ESA Solar Orbiter probe is still manoeuvring into its final orbit
- During this it has reached closer to Sun since launch
  - 48 million miles
- From this distance it has taken the closest ever images of Sun's surface
- Captured nano-flares called “campfires”
  - caused by process called “magnetic reconnection” when filaments stress, snap, reconnect
- Heat released by these could explain why Sun's corona is so much hotter than its surface; 1 million degrees > 5,000



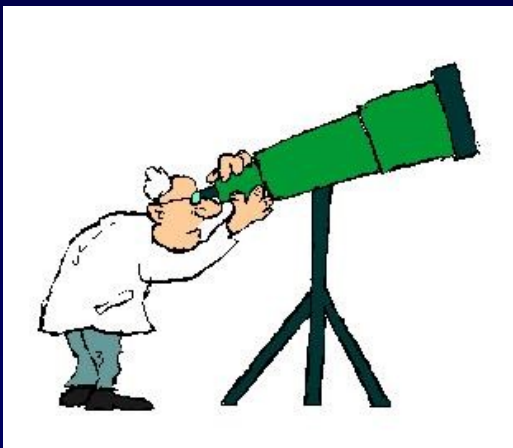
# Two giant exoplanets directly imaged

- For the first time two giant exoplanets have been directly imaged orbiting another star
  - star, which is sunlike, is 300 LY away in constellation Musca
- SPHERE instrument of ESO's Very Large Telescope used a coronagraph to block out the light from the star
  - Superficially similar to our own gas giants Jupiter and Saturn but the larger is 14x more massive than Jupiter and the smaller is 6x.
    - both orbit their star much further out than our two giants which are at 5 & 10 AUs respectively, these are at 160 & 320 AUs.
- System is very young, thought to be just 17 million years old
  - compared to our 4.6 billion years



# What's Up!

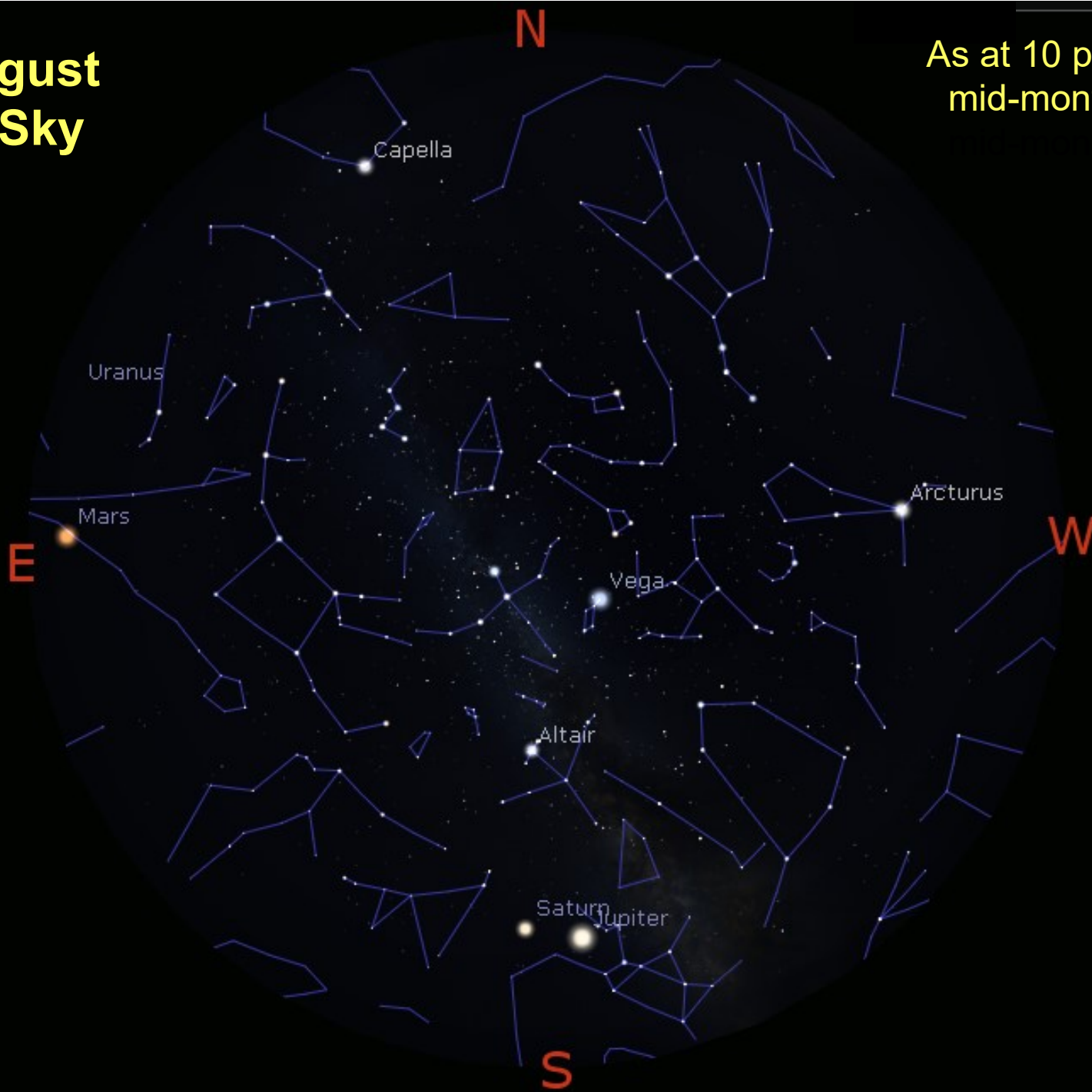
For August 2020





# The August Night Sky

As at 10 p.m.  
mid-month





# Sun & Moon in August

- Full Moon 3<sup>rd</sup>
- Last Quarter 11<sup>th</sup>
- New Moon 19<sup>th</sup>
- First Quarter 25<sup>th</sup>

		Sun	Moon
1 <sup>st</sup>	Rise	05.27	19.50
	Set	20.48	03.37
15 <sup>th</sup>	Rise	05.48	01.16
	Set	20.23	18.21
31 <sup>st</sup>	Rise	06.14	19.41
	Set	19.49	04.54

# What's Up - Planets

- Mercury

- At the start of the month Mercury is a morning object low in the North East an hour before sunrise, but just for the first week, after which the planet disappears into the dawn twilight before reappearing as an evening object.

- Venus

- Venus is a brilliant morning object shining at mag -4.3 in the East. It rises 3 hours before sunrise at the start of the month, 4 hours at month end.

- Mars

- At its best at the very end of the month in the South in the early hours, but the red planet can be seen low in the East rising about 10.15 pm at the start of the month, 9.30 mid month and 8.30 by the end. Reaches mag -1.8 this month.

# What's Up - Planets

- Jupiter

- Best seen around midnight in the South, quite dominant at mag -2.6, low amongst the stars of Sagittarius. It remains an evening object all month.

- Saturn

- Following on behind Jupiter, i.e just to its East, low in the South, late evening and early hours, at mag +0.5

- Uranus



- Visible in the South in the early hours, climbing higher to almost  $50^\circ$  by month end.

- Neptune

- Another of the month's morning objects. Can be found in Aquarius in the South East at mag +7.8 approx  $30^\circ$  high

–

# Astronomical Phenomena in August

- **1<sup>st</sup>** Jupiter is just  $1\frac{1}{2}^{\circ}$  above the full Moon
- **2<sup>nd</sup>** Probably best night to try to see all five naked eye planets over the course of one night
- **9<sup>th</sup>** The Moon (waning gibbous) will be  $3\frac{1}{2}^{\circ}$  from Mars
- **11-13<sup>th</sup>** The annual Perseid meteor shower can be seen all three nights, but best in the early hours of 12<sup>th</sup> & 13<sup>th</sup>. The waning crescent Moon will be less intrusive on the 13<sup>th</sup>. Theoretical max is 100 meteors per hour
- **12<sup>th</sup>** The Moon is close to the V-shaped Hyades in Taurus 
- **15<sup>th</sup>** The waning crescent Moon is just  $1.3^{\circ}$  below the open cluster M35 in Gemini, and makes a splendid naked eye sight with Venus, which is just  $6^{\circ}$  below. 
- **28<sup>th</sup>** The waxing gibbous Moon is just  $4^{\circ}$  from Jupiter in the evening sky
- **29<sup>th</sup>** Saturn gets a visit from the Moon, again just  $4^{\circ}$  away

# Meetings at Local Societies

- Given the current Covid-19 situation, all meetings at our local astronomical societies have been cancelled until further notice.
- You might like however to see their websites for items of interest:
  - **Guildford AS** <http://www.guildfordas.org/>
  - **Farnham AS** <https://www.farnham-as.co.uk/>
  - **Croydon AS** <http://www.croydonastro.org.uk/>
  - **Ewell AS** <https://ewellastronomy.org/>
  - **Walton AG** <http://www.waltonastrogrouop.co.uk/>



# Meetings & talks on-line

- You might find these of interest:
  - **GoSpaceWatch: Zoom talk “*The Art of Remote Observing: Social Distancing at its Best*”**
    - Wednesday 19<sup>th</sup> August, 7.30pm
      - book via Helm Tickets, £3.00
    - [www.gospacewatch.co.uk/](http://www.gospacewatch.co.uk/)
  - **British Astronomical Association: Zoom webinar: “*Neptune At Opposition*”**
    - Wednesday 19<sup>th</sup> August at 7.00 pm
      - free
    - <https://www.britastro.org/node/23439>

# Astronomy on TV

## The Sky at Night

*“Mars: A Planet of Wonder”*

This month the team looks at a planet that has fascinated us through centuries - Mars. Since the first probes flew past the Red Planet in 1965 the BBC has been reporting on every venture to Mars. In this episode the team take a look through the archives and look at how our perception of the Red Planet has changed over the last 50 years.

Sunday

9<sup>th</sup> August

BBC 4, 10.00 pm

Thursday

14<sup>th</sup> August

BBC 4, 7.30 pm



*"That's all Folks!"*