

Stars Over Surrey

Astronomy & Spaceflight News

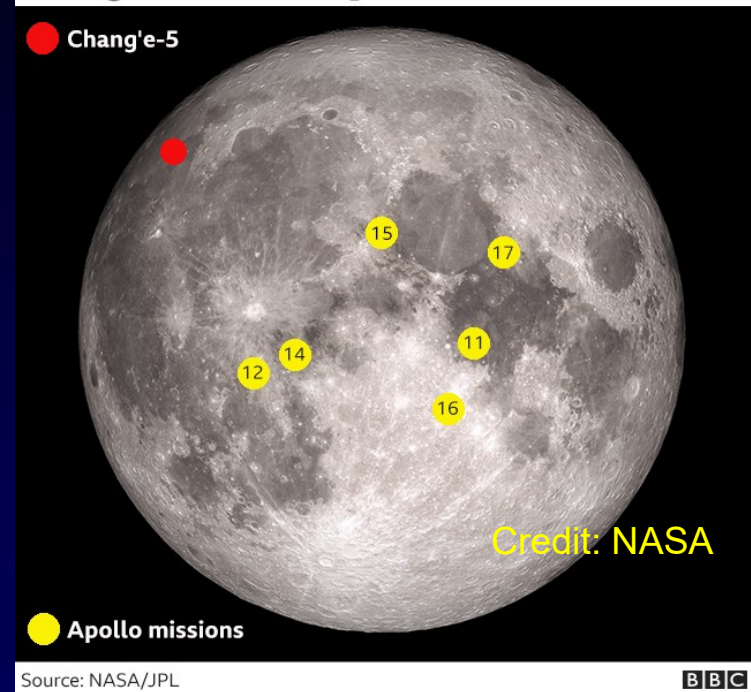
27th November 2020



Cheng'e 5 Heads For Moon

- China's Cheng'e 5 was launched last night by a Long March 5
- Objective to collect Moon Rocks for return to Earth mid December
 - first attempt at Moon Rocks since Soviet Luna 24 in 1976
 - that collected 176 grams, this one hopes for 2 kg
 - Apollo brought 382 Kg
- The lander will touch down near Mons Rümker at the north of Oceanus Procellarum
 - volcanic domes rising 1,300 metres above surrounding lava plains
- Lander will drill two metres below surface for samples aiming to learn more about how long the Moon remained volcanically active and when its magnetic field dissipated.

Chang'e-5 lunar sample return mission



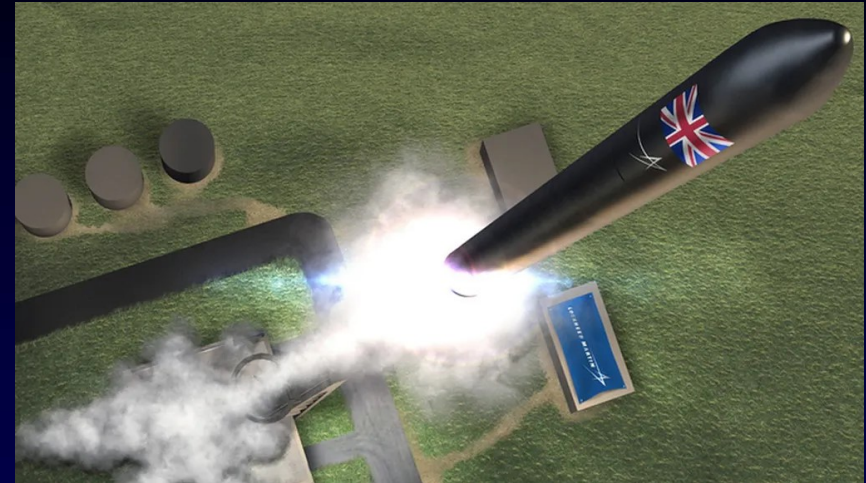
Successful Docking for Crew-1 Mission

- The first operational flight under NASA's Commercial Crew Program safely launched on morning of Sunday 5th, docking at ISS 27 hours later
 - fully automatic approach
- They'll be on board for six months and will return in the same Crew Dragon.
 - scientific work output greatly increased by having the extra person
- Normally the crew complement of the ISS is six, but that's because there's just three seats on a Soyuz
 - henceforth there'll be seven as the usual crew complement
- There's four sleeping berths in US segment, so Mike Hopkins will be sleeping in the Crew Dragon



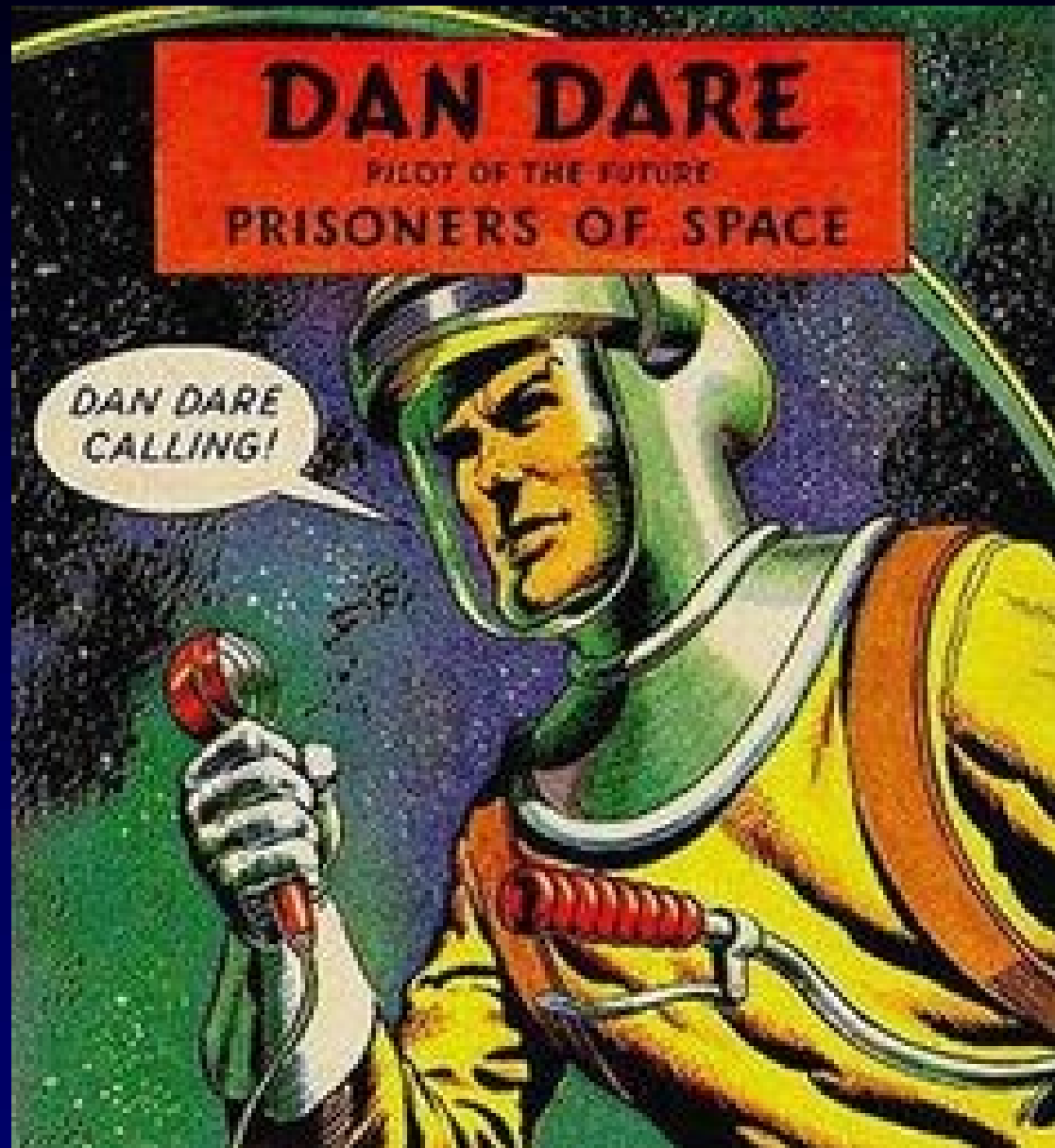
UK to get new Space Command

- PM announces *“We will establish a new RAF Space Command, launching British satellites and our first rocket from Scotland in 2022.”*
- The Space Command will apparently be joint service and based at RAF High Wycombe, beginning operations in 2021
- Apparently this announcement came as a surprise to the managers of the UK space-ports being developed in North of Scotland, who regard them as civilian operations
 - Space Hub Sutherland, launch company is Orbex
 - Shetland Space Centre on Unst - Lockheed Martin
- Welcomed by UKSpace



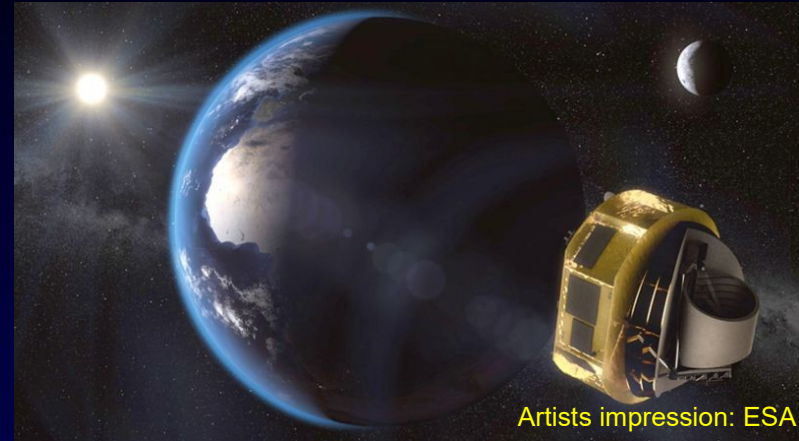
UK to get new Space Command

- The man we need to call for this is . . .



ESA gives go-ahead for UK-led ARIEL

- The ESA has approved funding for the Ariel mission to proceed to build and launch in 2029
 - Atmospheric Remote-sensing Infrared Exoplanet Large-survey
 - Ariel-1 was Britain's first satellite, launched by NASA in 1962
- The 4-year mission will study the atmospheres of 1,000 known exoplanets using spectroscopy, parked at L2 point
- The telescope and associated instruments will be built at Harwell by RAL Space (Rutherford Appleton Lab)
 - mirror and housing will be 1st built entirely of aluminium (-230°)
 - spacecraft chassis will be built in France by either Airbus or Thales Alenia
- The science will be led by Imperial College London



Sentinel launched to monitor sea-level

- The European Sentinel satellite has just been launched by a Space X Falcon 9 from Vandenberg AF Base, California
- This is part of European/US exercise to study the effects of global warming
 - Sea levels have risen by 9cm over the last 30 years and it's believed the rate is increasing (1M people exposed per 1 mm rise)
- Sentinel-6 Michael Freilich will be joined in 2025 by the identical Sentinel-6B
- The craft uses a radar altimeter and can measure to a few centimetres accuracy, a microwave radiometer adjusts measurements for atmospheric perturbations



Misc Spaceflight News

- Rocket Lab recovers Electron booster for first time following a New Zealand launch of 30 satellites
 - Important step towards aim of making these reusable
 - Booster had been instrumented in order to test the effect on the boosters structure of the descent manouvers
 - Parachuted descent to soft landing in sea
 - Plan is to eventually snatch them mid-air using a helicopter, thus avoiding salt-water contamination
- ESA Vega launch failure - cause identified as “human error” (two satellites lost)
 - two cables were inverted in upper stage's control systems causing the rocket nozzle to move in opposite direction resulting in a tumble and expensive failure

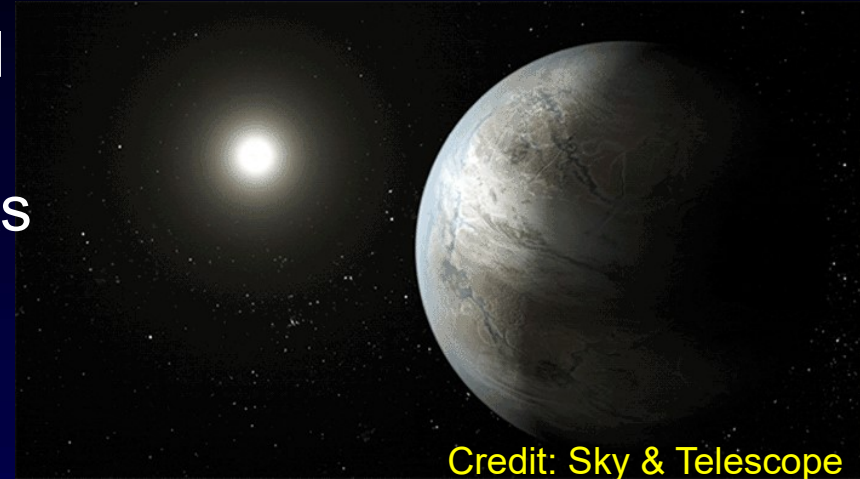
Arecibo Radio Telescope RIP

- Until recently it was the largest radio telescope in the world
 - 1,000 feet in diameter.
 - completed in 1963
 - 40,000 aluminium panels
 - dish wasn't movable but steerable receiving pallet meant it could “see” 40 degree
- It was under repair from some previous damage when one of the 3” wide supporting cables broke
- Investigation showed that this and the remaining cables were weaker than had been thought, so it's been considered too dangerous for any further repair and the decision has been made to decommission it.



Number of Rocky Planets Recalculated

- The Kepler spacecraft retired several years ago. It alone discovered 2,600+ exoplanets using the transit method
 - more are still being discovered using its data

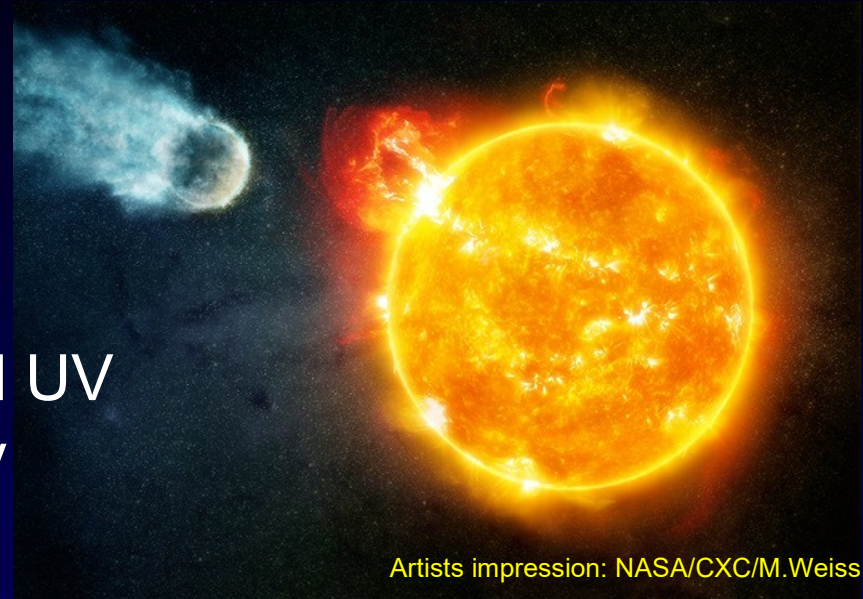


Credit: Sky & Telescope

- A research team has been combining Kepler data with that from the ESA Gaia satellite, and by using knowledge gained about identifying false positives, dips in light-levels caused by interference, equipment error etc, and have recalculated the likely chances of a sunlike star having at least one rocky planet between 0.5 and 1.5 Earth-mass within its habitable zone.
- So they calculate that within our galaxy there are
 - **300 Million** potentially Earthlike planets !

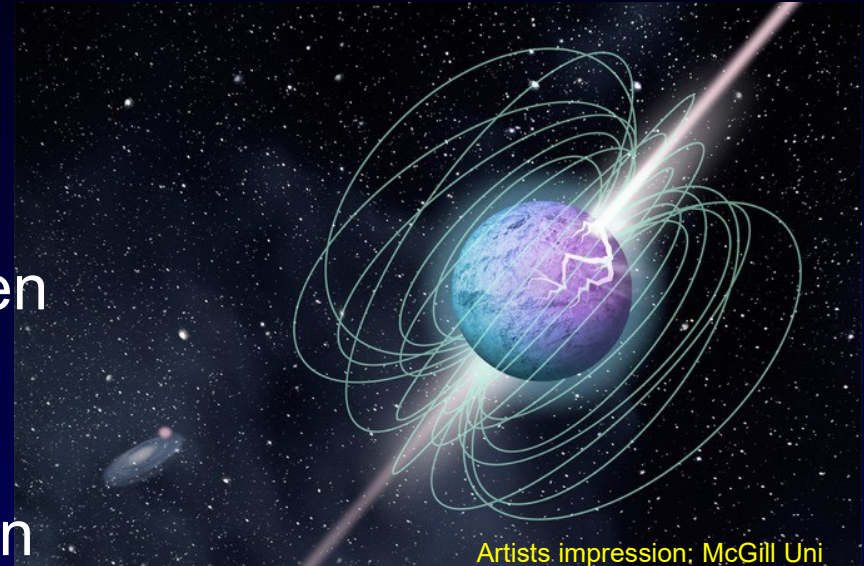
Red Dwarf Stars More Hostile to Life

- The most common type of star in our galaxy is the Red Dwarf
- Young Red Dwarfs are known to be very active, emitting dangerous levels of X-Ray and UV light that could erode planetary atmospheres & roast surfaces
- Less was known about mature Red Dwarf stars so researchers at Arizona State Uni have been studying Barnard's Star using NASA's Chandra X-Ray orbiting observatory and Hubble Space Telescope
 - Barnard's Star is only six light years away and is 10 B years old
 - It has an exoplanet 3 times mass of Earth
- The 6-month study showed it emitted periodic powerful emissions, strong enough to scour life



Fast Radio Burst linked to Magnetar

- An FRB is a gigantic output of X-Ray and radio waves in a fraction of a second.
- They have previously only been found in distant galaxies and their sources were unknown
- One has now been observed in the Milky Way
 - Somewhere between 14,000 & 40,000 LY distant, in Vulpecula
- Researchers have concluded that it is a Magnetar
 - a super-magnetised Neutron Star, formed from the merger of two previous neutron stars
 - The X-ray component equated to 1 month solar output

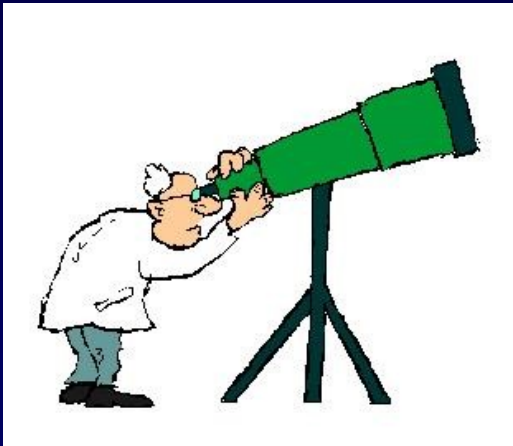


Misc Astronomical News

- Another unseen asteroid skims past Earth
 - Asteroid 2020 VT4 skimmed passed at about 230 miles on 13th November and was discovered one day later
 - This the closest known asteroid fly-by
 - Approx size 5 to 11 metres, not big enough to have survived the atmosphere and hit the surface
 - Orbit drastically affected by passage, so might return.
- Research shows the amount of radioactive materials in a planet's core may well determine whether it becomes and remains habitable
 - needs enough to generate heat and a liquid rotating core to produce dynamo effect which produces a shielding magnetic field
 - too much and it'll become volcanically violent, exterminating life
 - too little and it'll be geologically dead

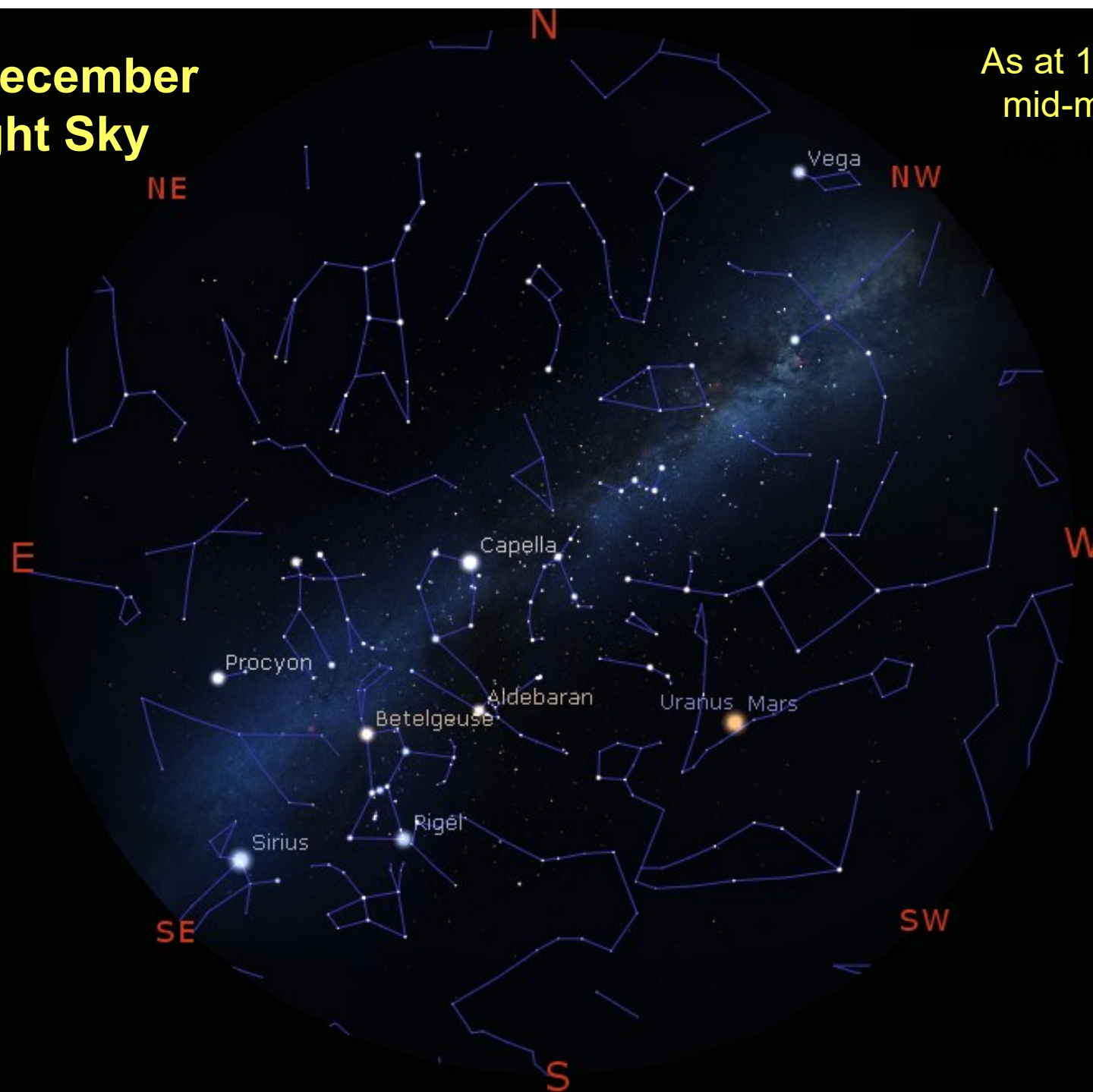
What's Up!

For December 2020



The December Night Sky

As at 10 p.m.
mid-month



Sun & Moon in December

- Last Quarter 8th
- New Moon 14th
- First Quarter 21st
- Full Moon 30th

		Sun	Moon
1 st	Rise	07.45	16.41
	Set	15.57	09.48*
15 th	Rise	08.00	08.59
	Set	15.54	16.34
31 st	Rise	08.07	17.16
	Set	16.04	10.04*
			* following day

What's Up - Planets

- Mercury

- Only visible this month during 1st week, very low in SE 30 mins before sunrise

- Venus

- Venus remains a spectacular morning object at magnitude -3.9 in the SE. At the start of the month it rises 2hrs 40 mins before the Sun, but by the end of the month this has decreased to 1hrs 30 mins.

- Mars

- Still good all this month in the South but Mars is now on the decline, dimming from magnitude -1.1 at start to -0.2 at end.

What's Up - Planets

- Jupiter

- Jupiter remains in our evening skies all month at mag -1.8 easily spotted low in the South West as darkness falls

- Saturn

- Continuing to close in on Jupiter, low in the South West at mag +0.9. The two planets will be in conjunction on 21st.




- Uranus

- Well positioned in the South, a binocular object at mag +5.7

- Neptune

- Visible all night long, well placed, but telescope needed as it is at mag +7.9

Astronomical Phenomena in December

- **4th** The Moon will pass close to the open cluster M44 Praesepe (aka The Beehive) in Cancer. 
- **12th** The Moon and Venus are just 7° apart in the morning twilight (also still near following morning) 
- **13th** Geminid meteor shower peaks in early hours of 14th, with a theoretical max of 130 per hour. Good display expected as radiant is high and there's no Moonlight
- **17th** Dusk fall sees a nice grouping of the Moon with Jupiter & Saturn in South West
- **21st** Jupiter and Saturn have a Great Conjunction, only 6 arc minutes (i.e. 1/5 of Moon's width) apart as dusk falls in SW. Closest since 1623! 
- **22nd** The Ursid meteor shower peaks today. ZHR is just 10 but there's the possibility of an outburst of hundreds.

Meetings at Local Societies

- Given the current Covid-19 situation, all physical meetings at our local astronomical societies have been cancelled until further notice, some continue via Zoom for paid-up members.
- 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.waltonastrogroupp.co.uk/>

Meetings & talks on-line

- You might find this free Zoom session of interest:
 - Royal Astronomical Society: Ordinary Meeting
 - “*Seismic reflection data and space exploration*”
 - Dr. Craig Magee , Leeds University
 - Friday 11th December at 4.00 pm
 - <https://ras.ac.uk/events-and-meetings/ras-meetings/ordinary-meeting-1>

Meetings & talks on-line

- You might find this free Zoom session of interest:
 - British Astronomical Association: Zoom webinar
 - *“Fantastic Planets and Where To Find Them”*
 - Saturday 5th December at 2.30 - 4.00 pm
 - Dr Emily Brunsden
 - <https://www.britastro.org/node/19181>
 - (Also be available via BAA's YouTube Channel)

Meetings & talks on-line

- You can also pay £3.00 each to watch these on-line talks run by GoSpaceWatch:
 - **“Myths and Legends of the Stars”**
 - Valerie Calderbank FRAS
 - Wednesday 2nd December, 7.30 - 10.00 pm
 - **“To Bennu and Back”**
 - John McLean FRAS
 - Wednesday 16th December, 7.30 - 10.00 pm
 - www.gospacewatch.co.uk/
 - Book via Eventbrite

Astronomy on TV

The Sky at Night

“The State of Astronomy”

This one hour special looks back at the last decade and its many major advances and discoveries in astronomy. The team also look forward to the next ten years and the challenges and opportunities ahead. Joining Chris and Maggie will be an ensemble of UK astronomers including the Astronomer Royal, Lord Martin Rees, to answer questions sent in by viewers

Sunday	13 th December	BBC 4, 10.00 pm
Thursday	17 th December	BBC 4, 7.30 pm



"That's all Folks!"