

Stars Over Surrey

Astronomy &

Spaceflight News

26th February 2021



Earth Fleet Invades Mars!



UAE: Al Amal - “Hope”

- First Arabic Interplanetary Mission
- Fifth nation/agency to get into Mars Orbit, 9th Feb
- Mission conception and lead by UAE but spacecraft built in USA at Bolder University, CO
- Launch from Japan using Mitsubishi H-IIA rocket
- Hope is in highly elliptical orbit, such that at its closest it will be effectively geosynchronous
- Study atmosphere and climate
 - atmospheric content and temperature profiles
 - leakage of oxygen and hydrogen into space



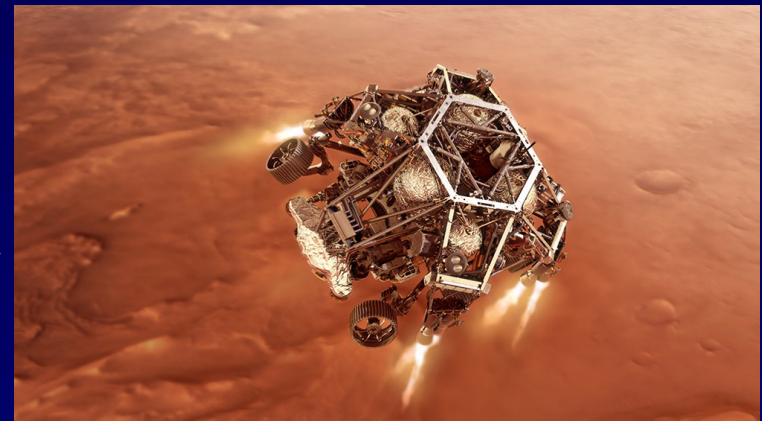
China: Tianwen-1 - "Quest for Heavenly Truth"

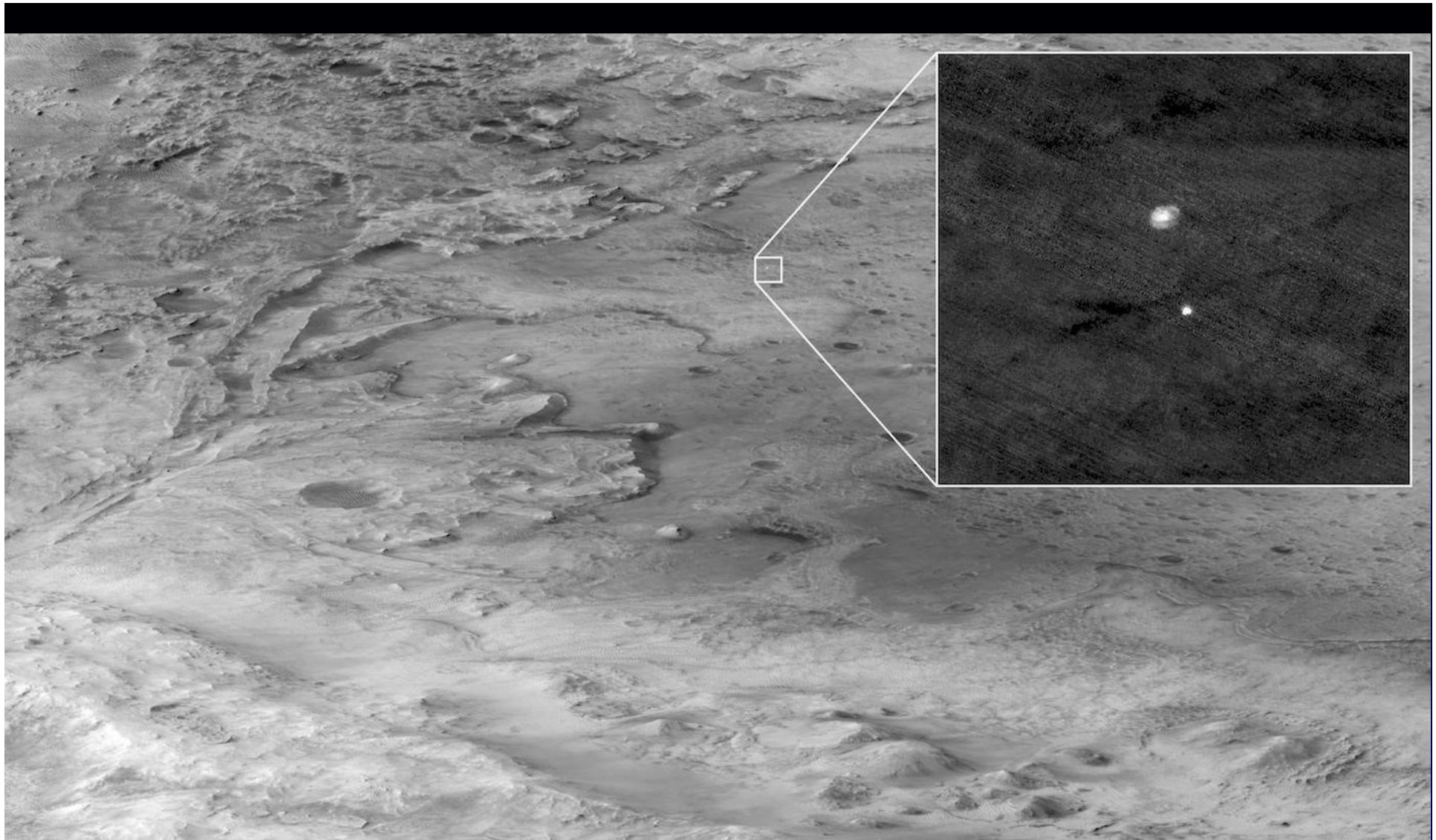
- Tianwen-1 arrived the day after Hope, 10th Feb
- Three part spacecraft - orbiter, lander, rover
- Initial orbit was 10-day elliptical egg-shape
- Series of burns over next few weeks to circularise
- Landing expected in May or June at Utopia Planitia
- Rover to last 90 days
 - only 2nd nation to operate a rover on Mars's surface
 - to study soil & rock composition, look for buried water
- Orbiter expected to operate for two years
 - studying atmosphere and magnetosphere



USA - “Perseverance”

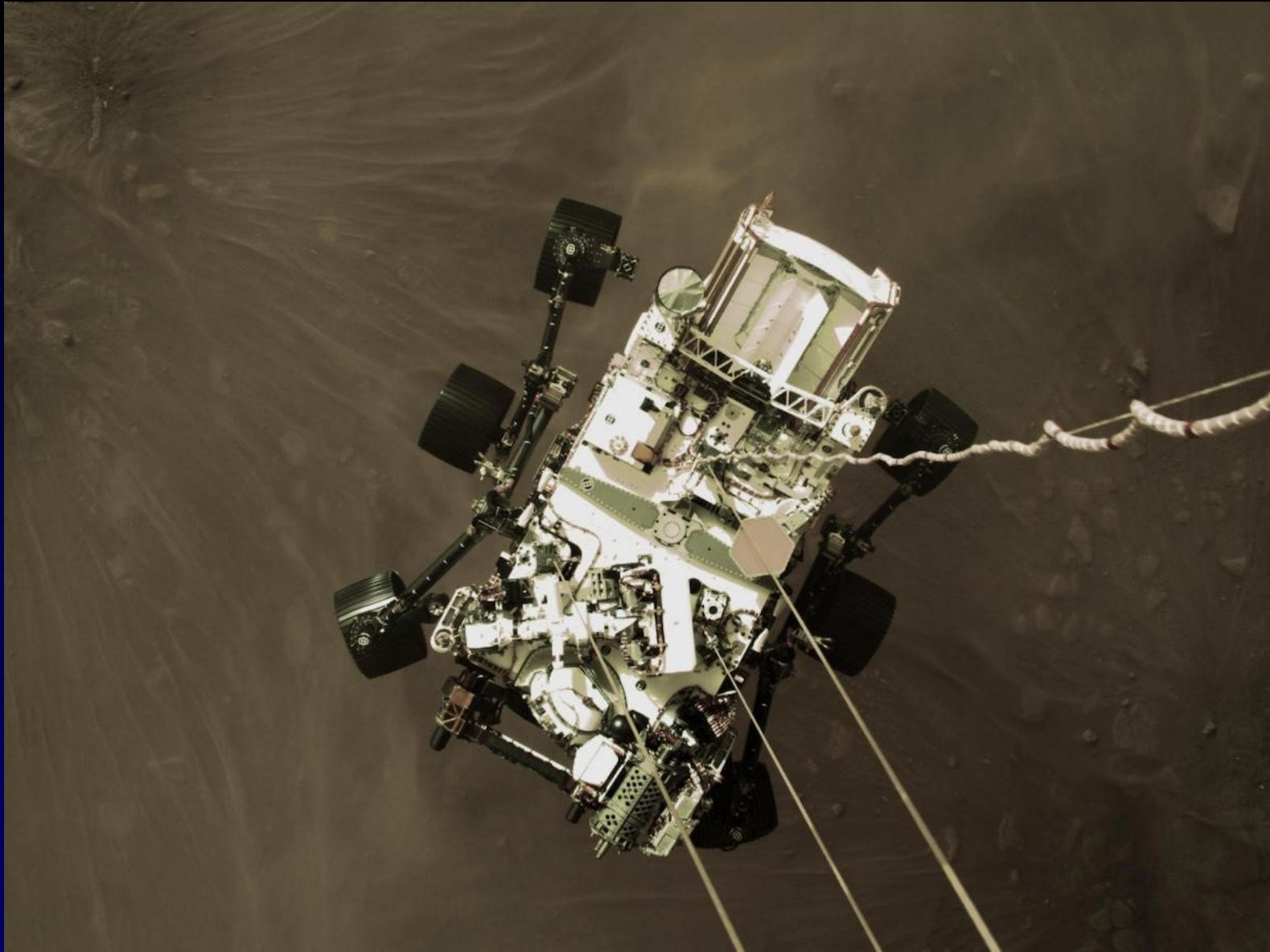
- NASA’s 5th Mars Rover arrived on 18th Feb
- Almost a twin of Curiosity, slightly longer & heavier
- Spectacular accuracy, just one mile from centre of landing ellipse, via ‘terrain relative navigation’
 - comparing images taken during descent & comparing with pre-loaded images, allowing real time steering
- Currently switching from cruise/landing software to exploration software, 1st drive expected on 27th
 - initial target is delta, just 2 miles
- *Ingenuity* to fly mid April
- Priority to collect samples for eventual return to Earth





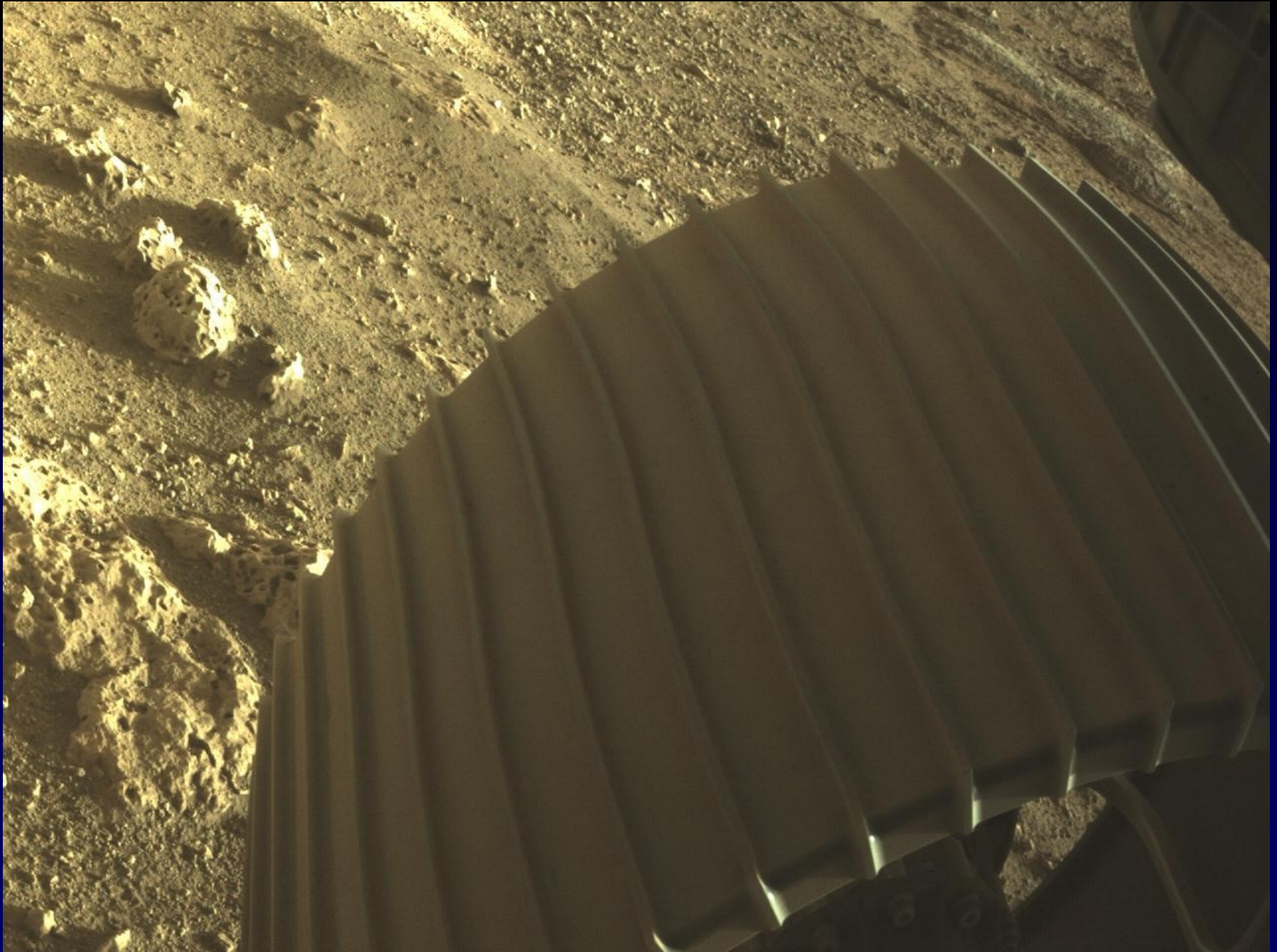
Credit: NASA/JPL-Caltech

Perseverance under its parachute above Jezero Crater
Taken by NASA's Mars Reconnaissance Orbiter
from a distance of 435 miles using its HiRISE camera



Credit: NASA/JPL-Caltech

About to land - photo taken from sky-crane descent stage,
just 2 metres above surface



Credit: NASA/JPL-Caltech

My Boarding Pass for Perseverance! 😊

NASA National Aeronautics and Space Administration **M2M518547816666**

BOARDING PASS: MARS 2020

JOHN AXTELL

LAUNCH SITE
CAPE CANAVERAL
AIR FORCE STATION, FLORIDA
EARTH

ARRIVAL SITE
JEZERO CRATER,
MARS

ROCKET
ATLAS V-541

SCHEDULED DEPARTURE
JULY 2020

AWARD POINTS EARNED [313,586,649 mi / 504,668,791 km]

MARS 2020

NASAM2M BOARDING PASS: MARS 2020 072020

MARS 2020

Boarding Pass issued before Mars 2020 was renamed "Perseverance"



BREAKING NEWS

NASA SUCCESSFULLY LAND ROVER ON MARS



This appeared on Twitter

SpaceX Looses Second Starship Prototype

- Starship SN9 performed well for the first part of its 6 mile high mission
 - its 3 Raptor engines fired as expected, shutting down one by one on schedule
- It performed its belly-flop manoeuvre as expected, using its broad body and fins for orientation control.
- Only one of the Raptors fired, instead of the two needed to slow, it hit the ground fast and at an angle, not yet vertical
 - Musk said “we should start 3 motors then shut down 1 immediately”
- SN10 already on pad and launch expected before long



Credit: SpaceX

Misc SpaceX News

- SpaceX launches another batch of 60 Starlinks
- but loses the Falcon 9 booster during re-entry
 - this ends a run of 24 straight successful recoveries
 - it was the 6th flight of this particular 1st stage
 - Investigation has caused postponement of the next Starlink launch expected the following day
 - SpaceX has 6 Falcon 9s left in its inventory
- Crew Dragon beats record flight duration for US manned spacecraft
 - Previous 84 day record was set by final Apollo mission to Skylab in 1974
 - scheduled to return from ISS in early May

Misc SpaceX News

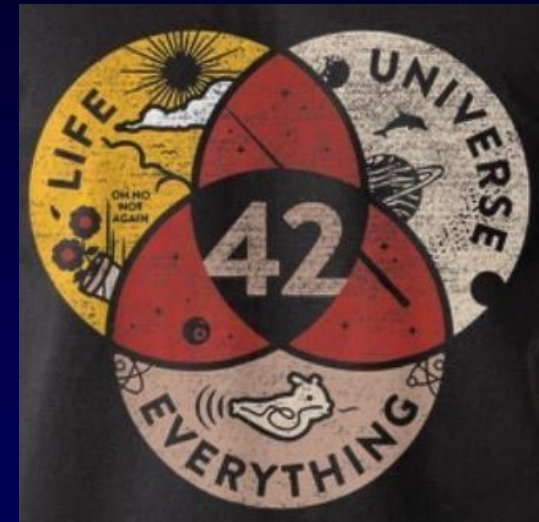
- SpaceX will operate a private Crew Dragon mission to be launched in October - "Inspiration4"
 - First completely private mission, no professional astronauts will be on board
 - 4 passengers on 4-day orbital mission, will not visit ISS
- Mission chartered by Jared Isaacman, a wealthy 38 year old US entrepreneur, a former pilot
 - to benefit St. Jude Children's Research Hospital
 - he'll act as Mission Commander and has reserved two seats to the hospital, (front line health worker, raffle)
 - Hayley Arcenaux, bone cancer survivor selected
 - aged 29 the youngest person to fly in space
 - remaining seat will be for an entrepreneur selected by national competition

Brief ISS News

- Two cargo vessels arrive at ISS within a few days
 - Russian Progress arrived 17th Feb
 - 5500 lbs cargo, will depart removing Russian Pirs module to make room for new Russian research lab
 - American Cygnus arrived on 22nd Feb
 - Northrop Grumman launched by Antares rocket, 8000lbs cargo
 - new sleeping quarters, parts for new toilet, misc experiments
- Boeing Starliner capsule 2nd unmanned test mission to the ISS has slipped from late March to April
 - avionics units had to be swapped out following damage caused by a power surge during testing
- NASA wishes to buy an extra seat on next Soyuz in case of any delays with Crew Dragon, to ensure continuity of an American occupancy of the ISS

Did a magnetic flip take out Neanderthals?

- It's postulated by a team from Uni of NSW that the last flip of the Earth's magnetic field coincided with a period of increased Solar activity
 - Studied the rings of a 42,000 year old NZ kauri tree preserved in a bog. Its rings spanned 1,700 years & captured the reversal
- This coincides with time Neanderthals are believed to have gone extinct
 - also mega fauna across Australia and NZ
- The magnetic field protecting Earth reduced to about 6%
 - ozone layer will have largely disappeared, world wide fierce electrical storms & aurorae, disruption to migration patterns of wildlife
- Homo Sapiens probably just more adaptable and resilient
- Because of the number, they've named this 'Adams Event'
- Magnetic poles moving at an increasing rate at the moment!

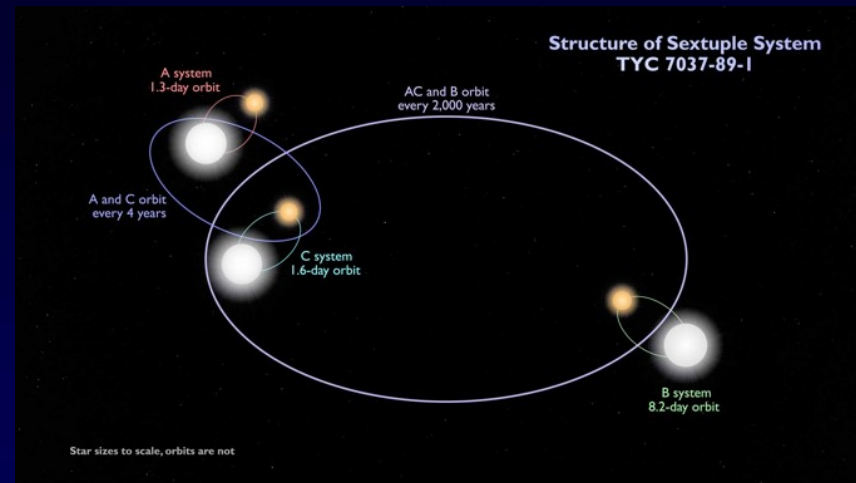


Most Distant Solar System Object

- Researchers have studied and mapped the orbit of the Solar System's most distant object
 - At the time of this body's discovery the hitherto most distant object was known as 'FarOut'
- 2018 AG37 has been tracked accurately and because it's known for sure to be even further away its nickname is 'FarFarOut'
 - It is currently 132 AU distant (Pluto is 40 AU)
 - Its orbit is highly elliptical, bringing it inside the orbit of Neptune but as far as 175 AU distant
 - it's thought to be 250 miles across, so qualifies as a dwarf planet

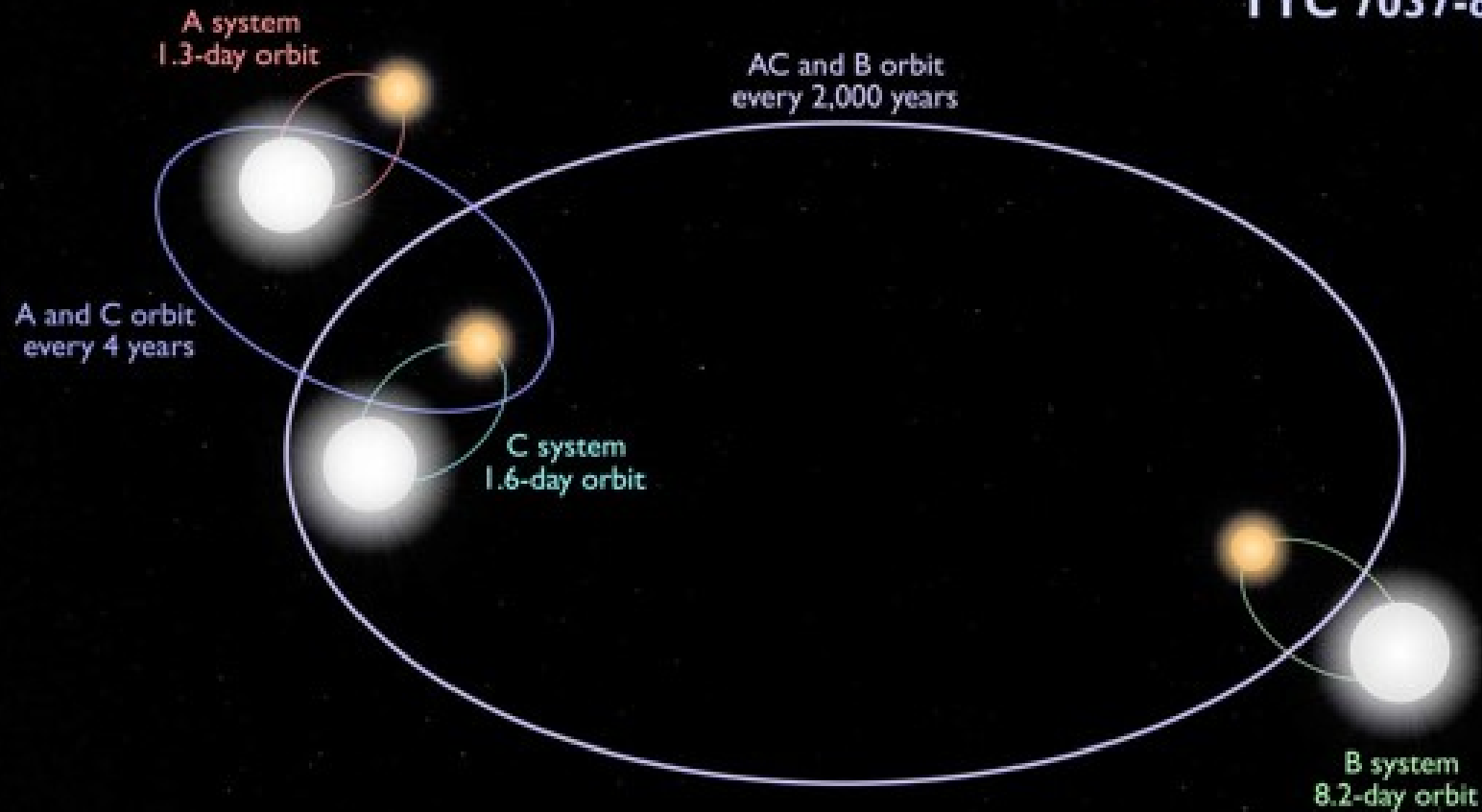
Remarkable Star System Discovered

- NASA's TESS satellite has found a star system comprising three eclipsing binary stars
 - each of the 3 main components is slightly more massive than the Sun
 - each has a smaller companion and each of these is about half as massive as the Sun
- The system TYC 7037-89-1 is the first known such system
 - 1,900 light years away in Eridanus
- The term “eclipsing binary” means that one passes in front of the other in line of sight as seen from Earth



Remarkable Star System Discovered

Structure of Sextuple System TYC 7037-89-1

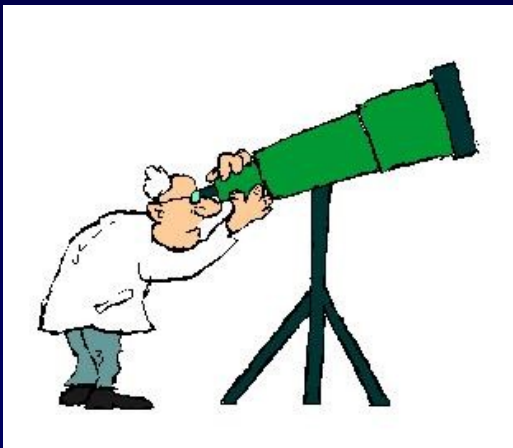


Star sizes to scale, orbits are not

Credit: Goddard Space Flight Centre

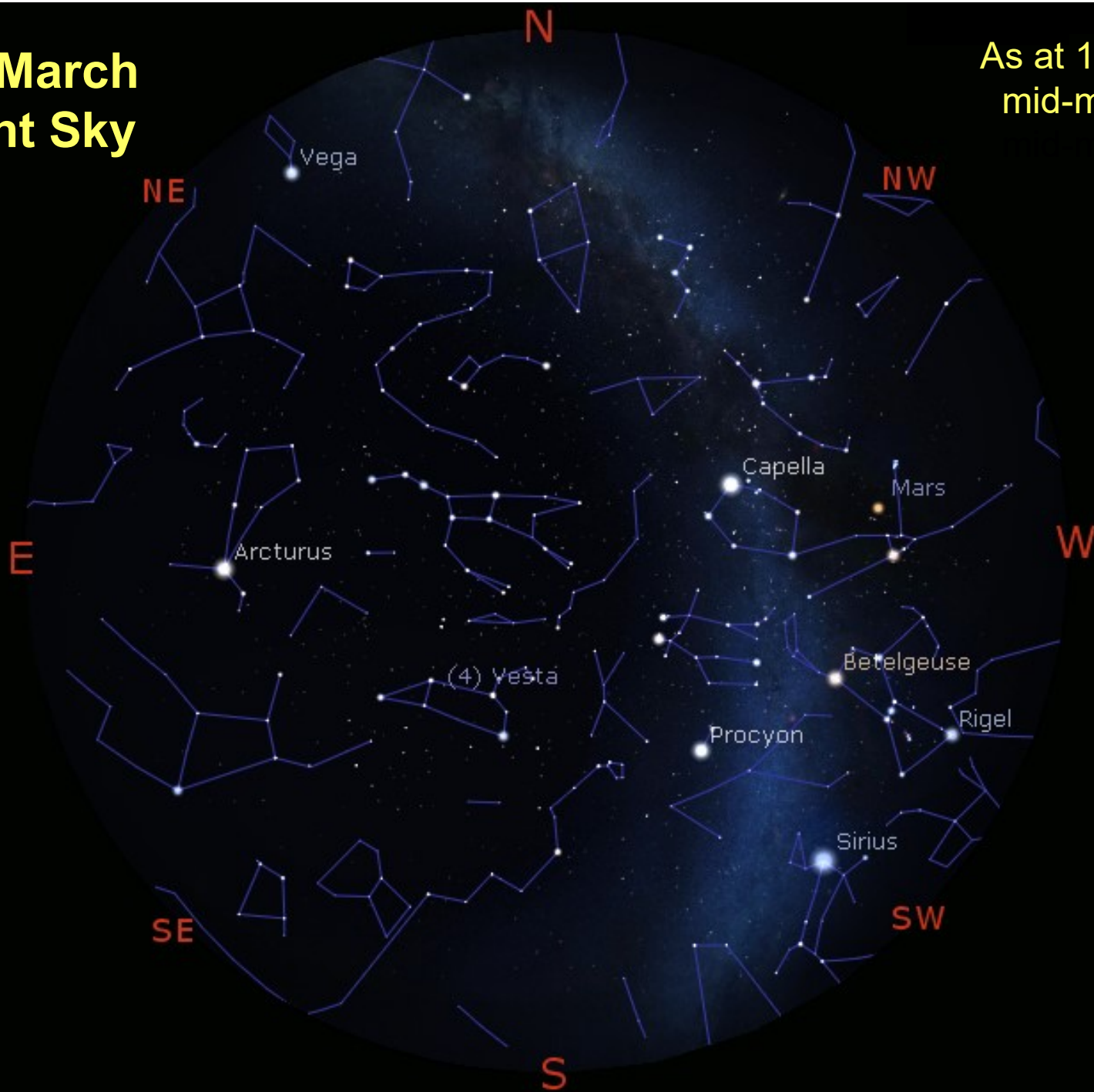
What's Up!

For March 2021



The March Night Sky

As at 10 p.m.
mid-month



Sun & Moon in March

- Third Quarter **6th**
- New Moon **13th**
- First Quarter **21st**
- Full Moon **28th**

		Sun	Moon
1 st	Rise	07.44	20.37
	Set	18.30	08.24*
15 th	Rise	08.09	07.24
	Set	19.59	20.23
31 st	Rise	07.27	23.32 (BST)
	Set	20.31	08.34*

* following day

The Planets in March

- Mercury

- Poorly placed, very low in ESE all month, 30 mins before sunrise.

- Venus

- Not visible this month

- Mars

- Continues to deteriorate but still visible all this month high in the SW, dimming from magnitude +0.9 at start to +1.3 at end.

The Planets in March

- Jupiter

- Poorly placed throughout the month but visible as a morning object, very low in the ESE, about 40 mins before Sunrise

- Saturn

- Like Jupiter Saturn is also a morning object, similarly very low in the SE but rising earlier, 1 hour before the Sun





- Uranus

- Last chance for this planet for a while, 30° high in WSW at start of month but sinking rapidly towards the evening twilight, a binocular object at mag +5.9

- Neptune

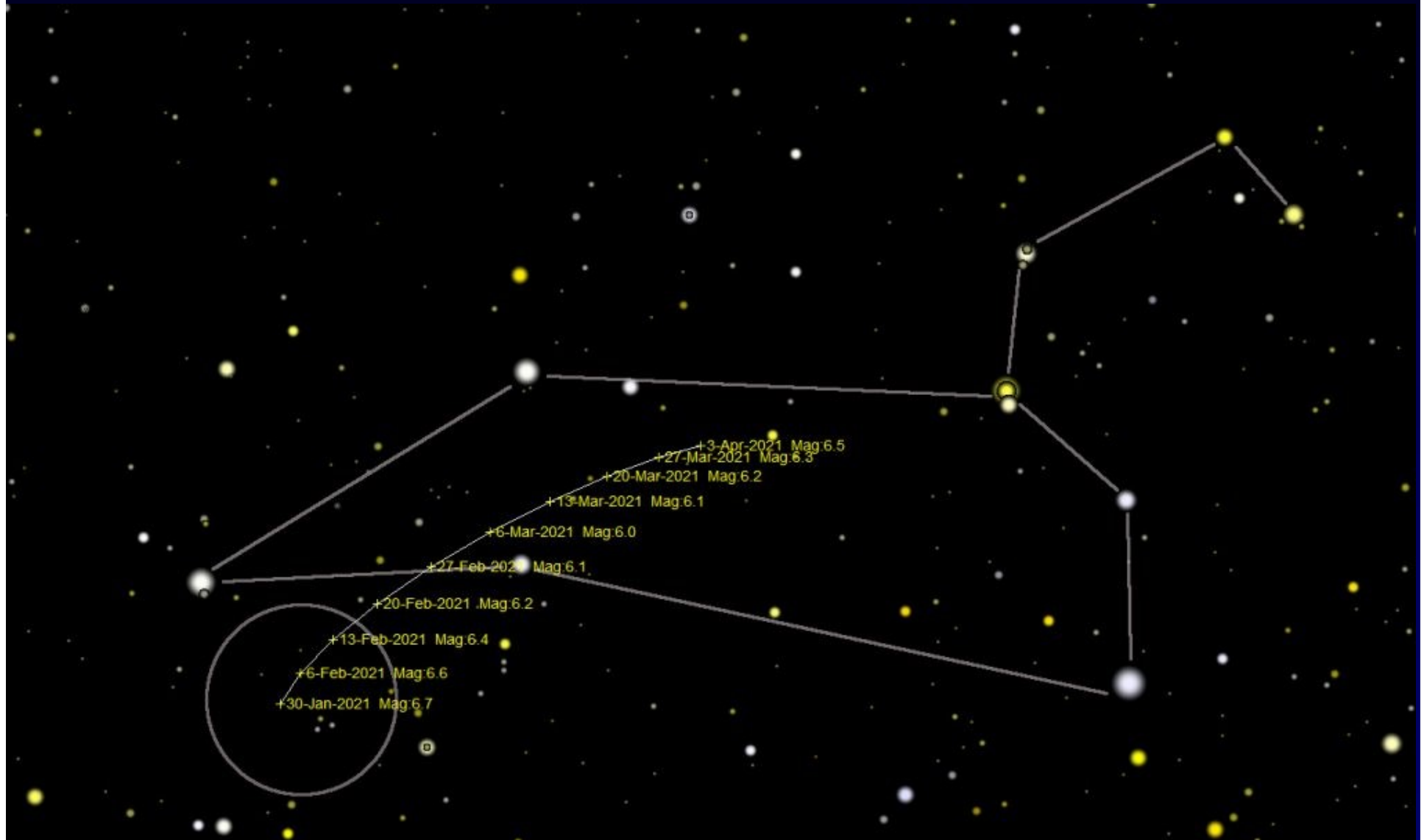
- Not visible this month

Astronomical Phenomena in March

- **3/4th** Mars passes close to The Pleiades
- **4th** Minor Planet (asteroid 4) Vesta is at opposition and therefore its brightest at mag.+5.9, today in Leo 
- **5th** Jupiter & Mercury less than $\frac{1}{2}^\circ$ apart, but very very low on ESE horizon, 40 mins before sunrise 
- **7th** The crescent Moon sits $1\frac{1}{2}^\circ$ above M8 Lagoon Nebula low in SE pre-dawn sky 
- **9th** The thin waning crescent Moon joins Mercury, Jupiter and Saturn in the morning sky, 40 mins before sunrise
- **19th** The waxing crescent Moon sits between Mars (mag +1.2) and the red star Aldeberan (mag +0.8)
- **20th** Spring Equinox; Lunar X & V claire obscura effect visible tonight at 23.15 
- **28th** Start of BST

Astronomical Phenomena in March

- Finder star chart for Minor Planet Vesta in Leo



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.waltonastrogrouop.co.uk/>

Free Meetings & Talks On-line

- **British Astronomical Association: Zoom webinars**
 - *“Two Eyes Are Better Than One
- Binocular Observing”*
 - Wednesday 17th March at 7.00 - 8.00 p.m.
 - Steve Tonkin
 - <https://www.britastro.org/node/25421>
 - (will also be viewable via BAA's YouTube Channel)

Free Meetings & Talks On-line

- **Society for Popular Astronomy:**
 - *“Friday Night Live with Vicky Video”*
 - Weekly on SPA’s FaceBook page on Fridays at 8.00 - 9.00 p.m.
 - Chat show rather than meeting

Free Meetings & Talks On-line

- **British Interplanetary Society:**
 - *“The Changes of our Planet seen from Space”*
 - Tuesday 2nd March at 6.00 - 7.15 p.m. via Crowdcast
 - Dr. Tommaso Parrinello, ESA
 - *“Flight Dynamics Operations for ESA
Deep Space Missions”*
 - Weds 17th March at 6.00 - 7.15 p.m. via Crowdcast
 - Francesco Castellini, ESA
 - *“Missions with the Scorpion”*
 - Saturday 20th March at 2.00 - 3.15 p.m. via Zoom
 - Mark Hempell FBIS, Hempell Astronautics Ltd

<https://www.bis-space.com/events/>

Meetings & talks on-line

- You can also pay £3.00 to watch these on-line talk run by **GoSpaceWatch**: (book via Eventbrite)
 - *“Robotic Missions to the Moon to support NASA’s Artemis programme*
 - Sharad Bhaskaran (Mission Director, Astrobotic)
 - Wednesday 3rd March, 7.30 - 9.30 pm
 - *“Ground Segment Communications Systems for Microsatellites”*
 - Jai Dialani, Leaf Space,
 - Wednesday 17th March 7.30 - 9.30 pm
 - www.gospacewatch.co.uk/

Astronomy on TV

The Sky at Night

Taking another break this month

But there's plenty to see on the programme's official website, including recent episodes as well as archive material. It'll be back later in the year.

<https://www.bbc.co.uk/programmes/b006mk7h>



"That's all Folks!"