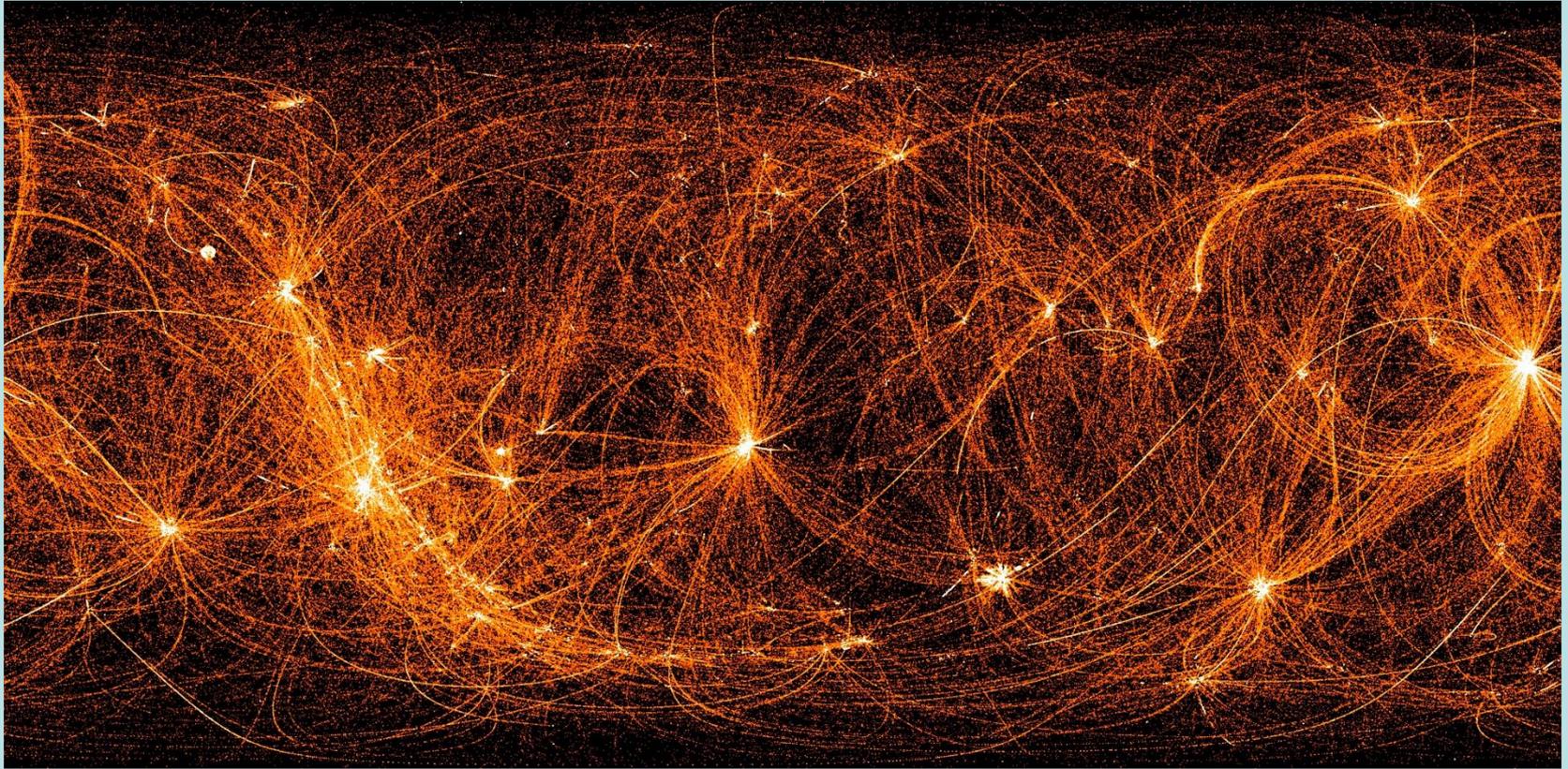


Space News

looking back over

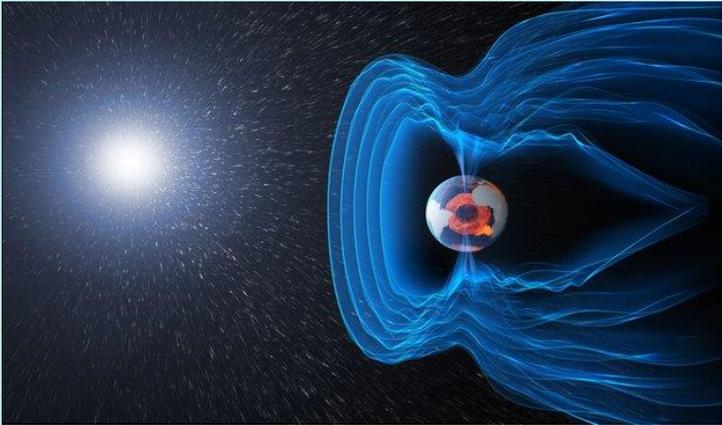
June 2019

NICE(R) View of the X-Ray Universe

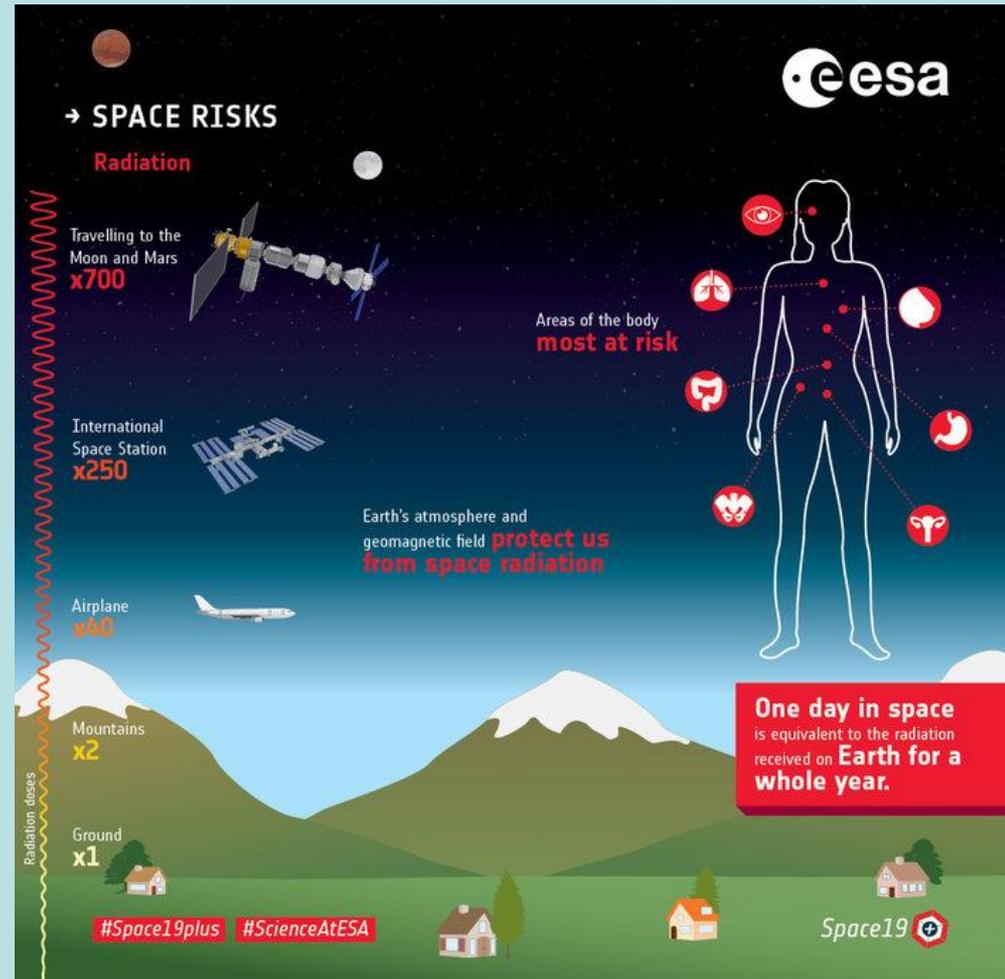


1st June: Aboard the ISS is an **X-ray detector** that orbits with the Space Station and so scans the whole universe. The Neutron star Interior Composition Explorer (**NICER**) recorded these bright arcs and loops across this all-sky map made from 22 months of data. The arcs tend to converge on prominent bright spots, pulsars in the X-ray sky. Pulsars are spinning neutron stars that emit clock-like pulses of X-rays with timing so precise it can be used for navigation, determining spacecraft speed and position

Space Exploration will be limited by Radiation Risks



1st June: Earth's magnetic field and atmosphere protect us from the constant bombardment of galactic cosmic rays - rays that could increase cancer risks during long duration missions. An astronaut on a mission to Mars could receive radiation doses up to **700** times higher than on our planet – a major showstopper for the mission unless a suitable 'shielding' system can be devised...



ESA physicists and biologists are testing materials and looking at damage to cells in order to create a risk model for 'safe' radiation dose limits for long missions.

Deep-Space Dish under new management

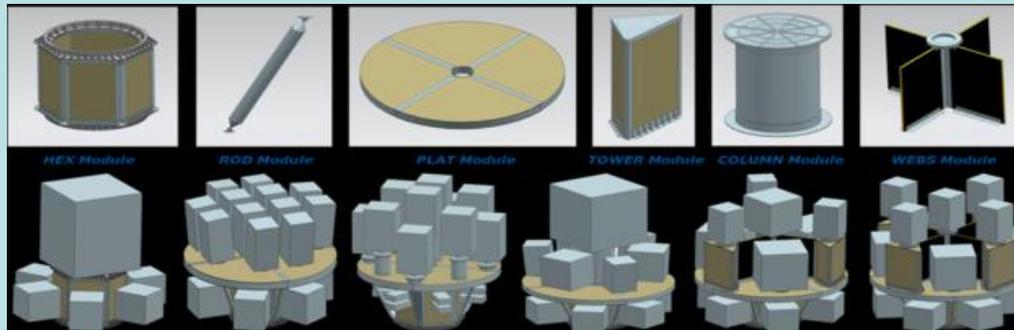
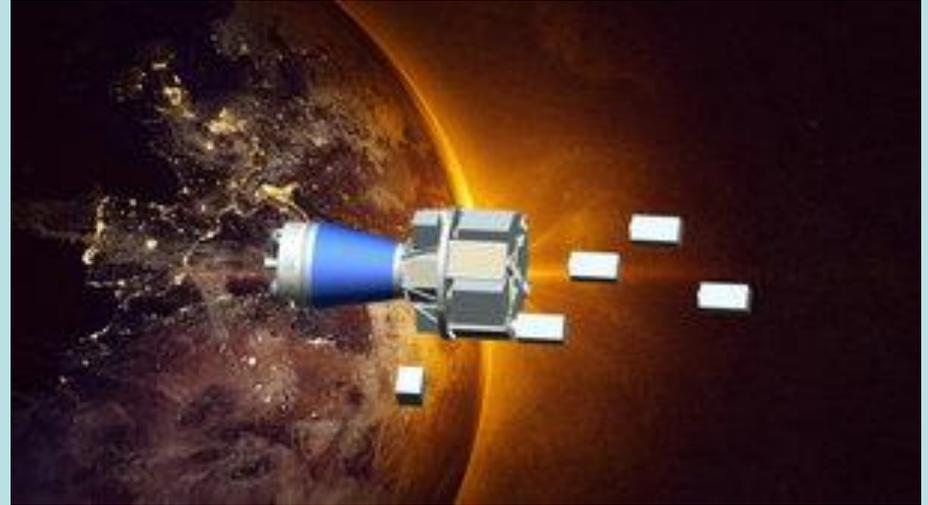
Goto: <http://estracknow.esa.int>
to see the World-wide Network



Fully powered
by the Sun

4th June: The 35-m deep space antenna in **New Norcia**, Western Australia, is being looked after by a new team from CSIRO, Australia's national science agency, which also runs NASA's **Canberra** Deep Space Communications Complex. The New Norcia station is key to communicating with Europe's missions across the Solar System and the Universe, including Mars Express currently in orbit around the Red Planet and BepiColombo to Mercury.

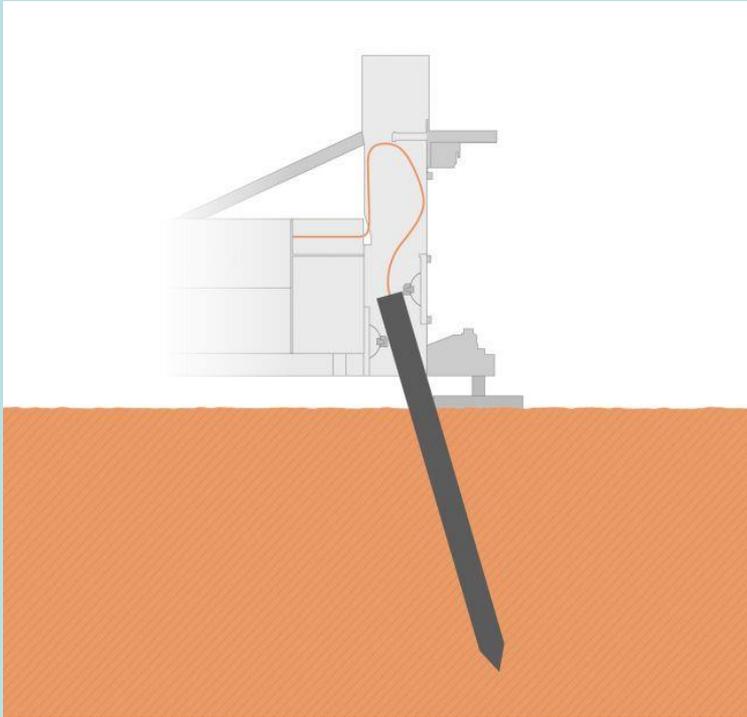
ESA's VEGA offers 'economy-class' satellite launches



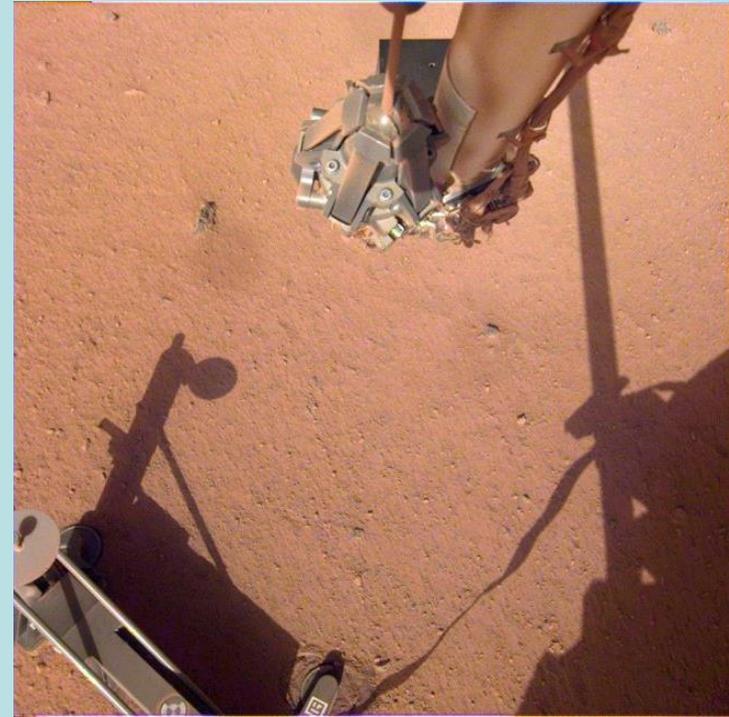
“Lego-Type” components allows for various sizes and combinations of payloads for each Vega launch.

4th June: ESA's *Small Spacecraft Mission Service* (SSMS) using their VEGA rocket will provide a 'ride-share' model, with multiple satellites being flown together, splitting the launch cost through economy class tickets. The modular SSMS dispenser – able to accept satellites from 1 to 400 kg in mass – is a response to the demand for small and micro satellite missions.

Plans to get the Mars' mole digging again



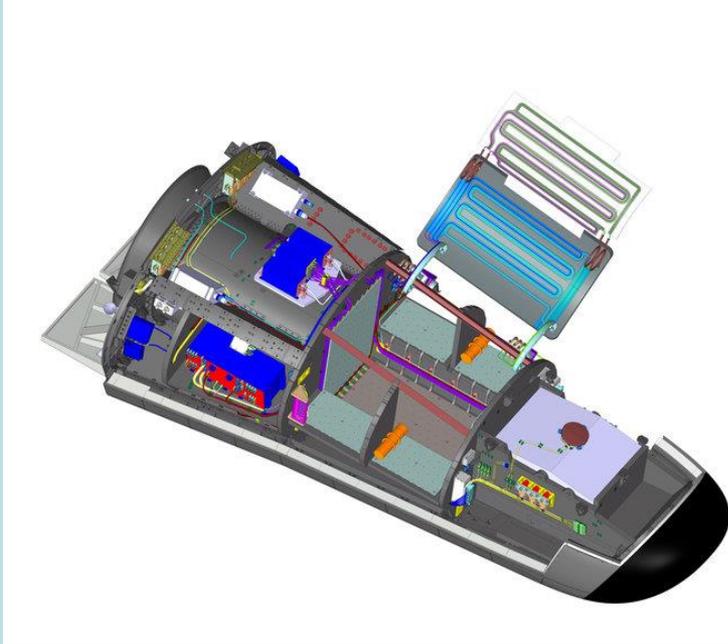
Mole is stuck at ~20 degrees off vertical



Robot arm poised over the mole's support

5th June: InSight's heat probe or 'mole' hasn't been able to dig deeper than about 12 inches below the Martian surface since Feb. 28th. The device's support structure blocks InSight's cameras from viewing the mole, so the team plans to use the robotic arm to lift the structure out of the way. Possible causes June be a large stone/rock, or the soil June be too soft to provide the friction necessary to grip the mole, so it 'bounces'.

Reusable Space Laboratory – “Space Rider”



5th June: Seen as a future orbiting *unmanned laboratory*, ESA's **Space Rider** is being developed to be launched into orbit for missions of 60 days or more; then returning to Earth with its payload and the results of its experiments. With a volume of 1200 litres and taking up to 800kg per trip, the cargo bay will provide a controlled environment, 600W of power and full data management. After touchdown and minimal refurbishment, it will be ready for another launch on a **Vega** rocket. A wide range of missions are envisioned.

ISS to be open to “Tourists” from next year



7th June: NASA is to allow *tourists* to visit the International Space Station from 2020, priced at £27,500 per night. There will be up to two short private astronaut missions per year, said the deputy director of the ISS. Private astronauts would be permitted to travel to the ISS for up to 30 days, travelling on US spacecraft (Boeing or SpaceX capsules).
Travel, training, spacesuit and other costs on top... !!

Use water for irrigation – but just *enough* for the crop



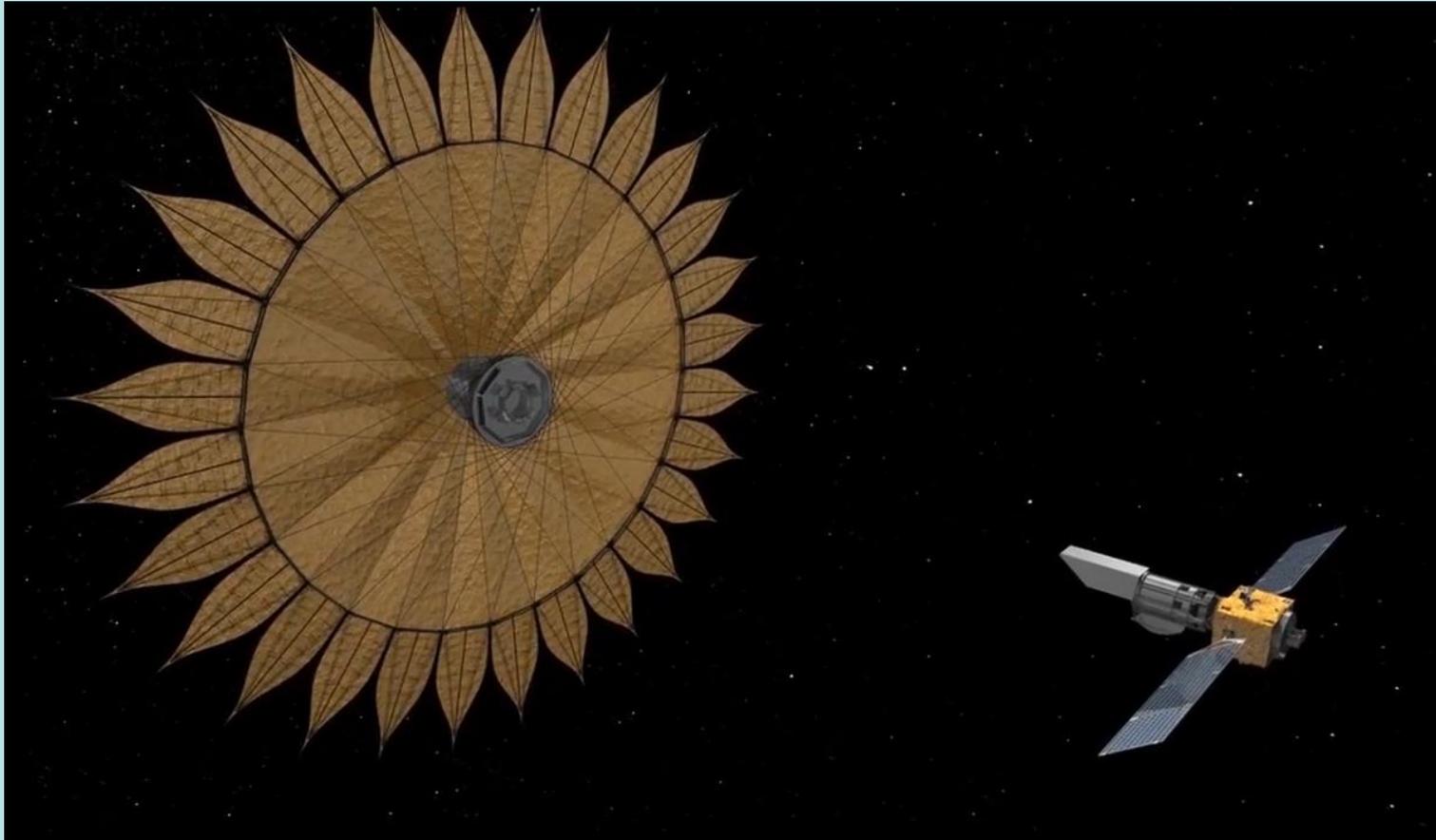
7th June: Scientists at King's College London are planning a satellite system to record the temperatures of individual fields of crops. The aim is to estimate water-use by plants and show how they transpire that water into the air. This will help to monitor how much water is available to grow crops and how they are responding to drought. The new system is being considered for inclusion in ESA's *Copernicus* programme of 'Sentinels'. Careful water use will benefit agriculture and increase crop production without taking too much so that those living downstream do not lose out on their share.

1.2 billion-year old Scottish crater?



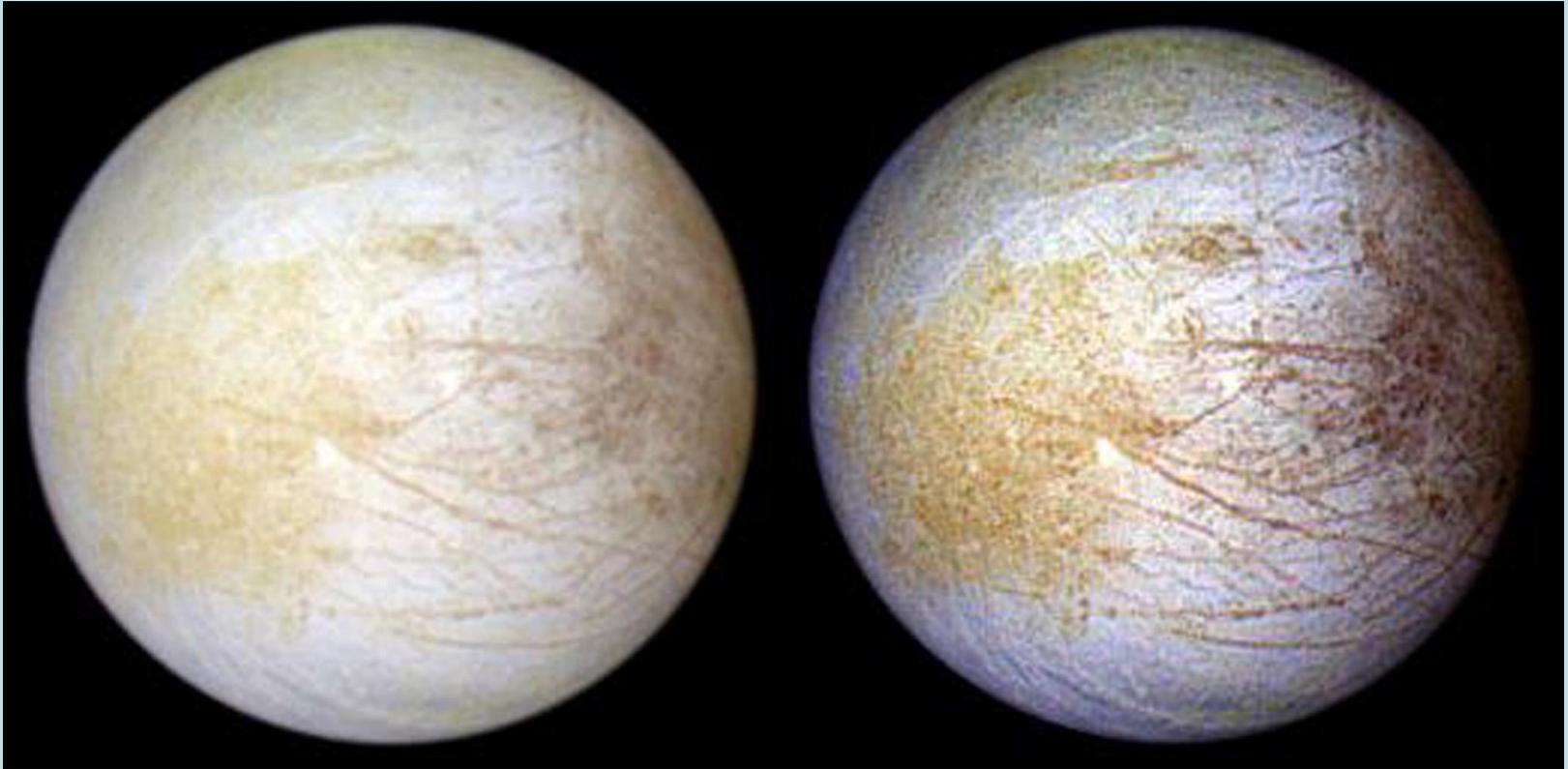
9th June: The **Minch** could be hiding an ancient meteorite crater. The idea that such a structure lies between the Western Isles and mainland Scotland was first raised back in 2008. A team from Oxford and Exeter universities believes it can pinpoint where the space object fell to Earth. They have found evidence on the Highlands' coast for the rocky debris that would have been produced by the impact of a 1-2km wide meteorite. They are looking to get funds to begin a new high-resolution 3-D geophysical survey.

Space “Parasol” planned to protect Telescopes



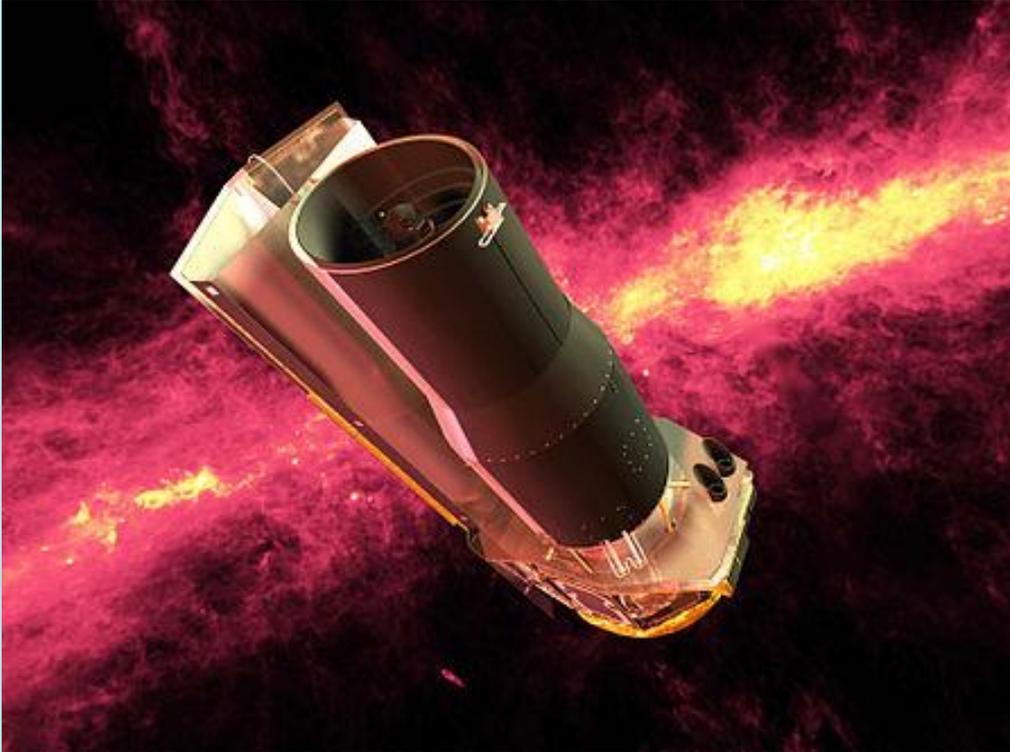
11th June: Space telescopes suffer from damage if exposed to strong light and solar radiation. This proposal creates a ‘free-flying’ parasol or “Starshade” to sit between the Sun (or any other bright source) and an adjacent telescope. Challenges in this project include unfurling the huge parasol in space and then ‘formation-flying’ with the telescope over large separation with great accuracy.

The Romans called it 'salarium'



12th June: A 'visible spectrum analysis' of Europa has revealed that the yellow parts of the surface are actually NaCl – common salt – which roman soldiers were often paid in, hence '*salary*'. This discovery suggests that the salty subsurface ocean of Europa may chemically resemble Earth's oceans much more than previously thought. Europa is covered by a layer of salty liquid water encased in an icy shell.

5-year mission to end after nearly 16 years...



Spitzer has lifted the veil on hidden objects in nearly every corner of the universe, from a new ring around Saturn to observations of some of the most distant galaxies known. It has viewed stars in every stage of life, mapped our home galaxy, captured gorgeous images of nebulae and probed newly discovered exo-planets

13th June: After nearly **16 years** of exploring the cosmos in infrared light, NASA's Spitzer Space Telescope will be switched off permanently on 30th January next year. By then, the spacecraft will have operated for **11 years beyond** its prime mission.

Managed from NASA's JPL in California, Spitzer is a small but powerful space observatory. It captures infrared light, which is often emitted by "warm" objects that aren't quite hot enough to radiate visible light.

Follow the assembly of the Mars 2020 Rover



14th June: Nasa's next Mars Rover – Mars 2020 – is being assembled piece by piece in the Jet Propulsion Laboratory in Pasadena, California.

Fortunately, they have set up a 24/7 webcam, so we can watch progress day by day... See: <https://mars.nasa.gov/mars2020/mission/where-is-the-rover/>

What's the Time, Mr Astronaut?



14th June: Early sailors needed accurate clocks in order to navigate safely across the oceans.

Now we have GPS tools to see where we are.

In deep space, beyond our own GPS systems, we will need even more accurate clocks to know where our spacecraft is.

NASA's **Deep Space Atomic Clock** is a toaster-size device that is the first GPS-like instrument small and stable enough to fly on a spacecraft. It was put into Earth orbit for testing on 25th June by a SpaceX Falcon Heavy.



Totally Metallic Asteroid = “Planetary Core”?



20th June: NASA’s Psyche mission is readying for a 2022 launch designed to explore a metallic asteroid that could be the *heart of a planet*. The mission still has three more phases to clear. Final spacecraft assembly and testing will not begin until sometime in early 2021. The spacecraft is planned to arrive at Asteroid Psyche on Jan. 31, 2026, one of the most intriguing objects in the main asteroid belt. While most asteroids are rocky or icy bodies, scientists think Psyche is composed mostly of iron and nickel, similar to Earth's core.

Volcanic Plume through Cloud – from Space



22nd June: The Kiril Islands are a part of the “Ring of Fire” around the Pacific Ocean, stretching from the Kamchatka peninsula to the northern tip of Japan.

Astronauts on the **ISS** took this photo of the eruption of the volcanic island ‘Raikoke’.

The largely dormant volcano erupted for the first time in nearly 100 years at 6 p.m. GMT on June 21st, sending a cloud of thick volcanic plumes 8 to 10 miles above sea level.

This eruption came as a surprise, and satellites have been tracking the ash and gases that rose from the volcano, since it can pose a hazard to aircraft.

Ouch! Gravity again!



NASA astronaut Anne McClain is assisted out of the Soyuz Capsule after landing

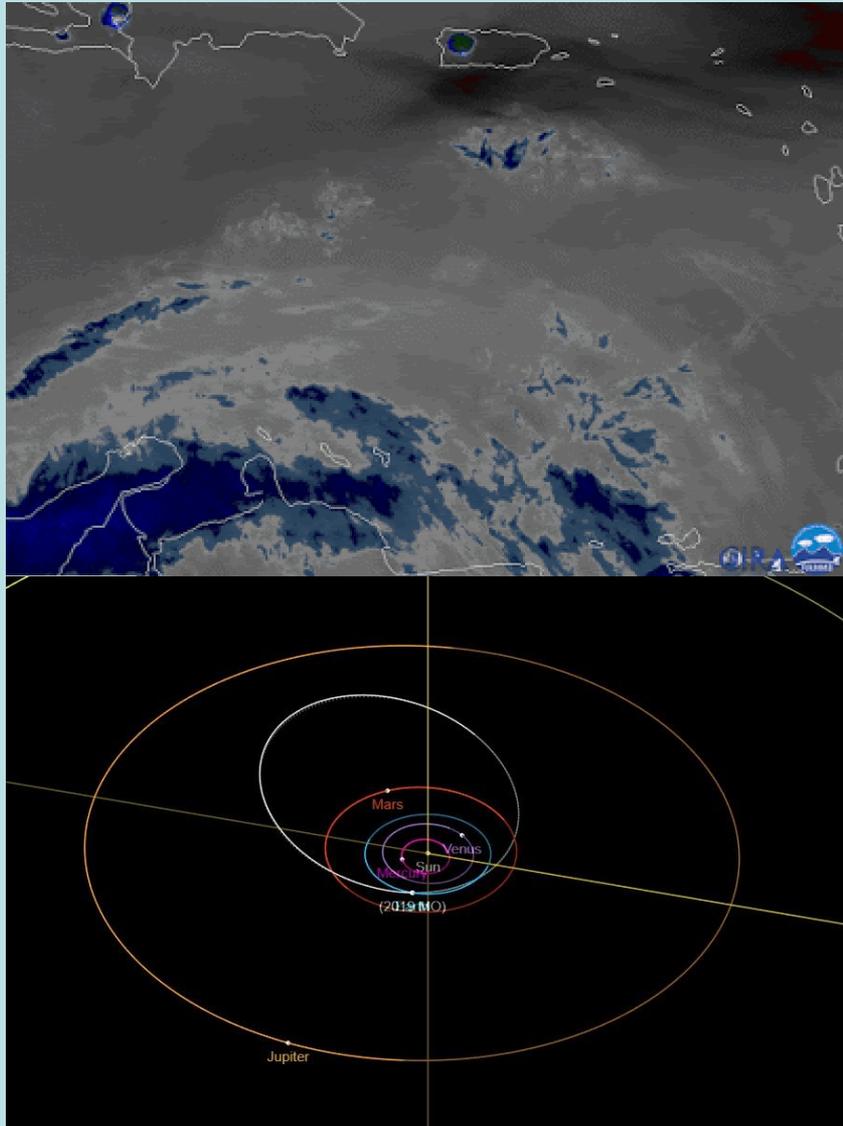
24th June: Part of the regular swap-out of space Station Crews, Soyuz MS-11 capsule brought home the team from expedition 58/59. Oleg Kononenko of Roscosmos, Anne McClain of NASA and Canadian Space Agency's David Saint-Jacques landed by parachute and braking thrusters on the steppe of Kazakhstan, completing their **204-day** mission. A new three-person crew, is scheduled to launch on Soyuz MS-13 to the space station on July 20th.

Falcon Heavy – First Night Launch/Landings (1 miss)



25th June: Launch Pad 39A at KSC saw Falcon Heavy's first night flight and third launch overall. This was part of the USAF's Space Test Program and carried payloads for universities, NASA, the National Oceanic and Atmospheric Administration and the non-profit organization The Planetary Society. A total of 24 various-sized satellites (see photo)

Everybody – Duck!!



25th June: An asteroid 13 feet long exploded in the atmosphere south of San Juan, Puerto Rico with a force equal to **6,000** tons of TNT. The object, '2019MO' was first spotted on the 22nd June, moving at 33,300mph.

This is the first time that two survey telescopes — the University of Hawaii's **ATLAS** and **Pan-STARRS** — showed that they can "provide sufficient warning to move people away from the impact site of an incoming asteroid."

Its track was plotted and an orbit calculated – until annihilation!

Passing weather satellites were able to see the explosion from above (URL link below).

To 5G – or not to 5G?



26th June: New 5G networks for internet and mobile users may disrupt satellite Weather-Forecasting data, says a group of meteorologists and other scientists. With the radio spectrum getting increasingly crowded with so many services and users, the availability of band-width for 5G services is not easily allocated. In the USA, the Federal Communications Commission has to make band-width decisions for many users – without causing interference. Forecasters point out that getting prompt weather satellite data and pictures can be a matter of life or death in these times of sudden violent hurricanes, storms and floods.

“Houston – We’re up and running again!”



28th June: Following a detailed restoration, the Apollo Mission Operations Control Room has been restored to appear as it did when astronauts first walked on the moon 50 years ago. A ribbon-cutting ceremony on Friday June 28th marked the completion of the restoration and the restart of the room's use to re-stage the Apollo 11 moon landing during public tours at NASA's Johnson Space Centre in Houston.

What's that Smell?



Curiosity at the 'clay-based' "Teal Ridge", Mid-June

29th June: The **Curiosity** rover suddenly got 'whiff' of a large quantity of Methane in the Martian atmosphere.

With 'normal' levels of the gas at 0.24 to 0.65 parts per billion, the surge to 21 was about a 30x increase.

With these measurements, there is no way of telling if the methane source is biological or geological, or even ancient or modern.

We await to see if the **TGO** (Trace Gas Orbiter) is also able to detect this 'spike' in the methane concentration.

Send anything interesting you
spot during
July to:

michael@held.org.uk