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Qimingxing-50 Quasi Satellite

China's Qimingxing-50 drone, which took off from an airport in Shaanxi province, had a smooth flight for 26 minutes and landed safely.

- Qimingxing-50, or Morning Star-50, is China's first fully **solar-powered** unmanned aerial vehicle (UAV).
- It is a **high-altitude, long-endurance** (HALE) UAV, which can stay airborne for long durations.
- The drone flies above 20-km altitude where there is stable airflow with no clouds. This helps these drones to make the maximum use of solar equipment to stay functional for extended durations.
- **Quasi Satellite -** As the drone can operate in near-space (20 km to 100 km above the Earth's surface), it is capable of carrying out satellite-like functions.
- These drones are also referred to as 'High Altitude Platform Stations' or pseudo-satellites.
- China already has this capacity, but the Qimingxing-50's long-endurance provides an added advantage to make this capability available over a longer period.

> *Recently, the US Army helped test a solar-powered, near-space Airbus Zephyr S drone that set a new record by being airborne for 42 days.*

- **Benefits** - Drones like the Morning Star-50 are cost-effective to build and are also easy to launch and operate.
- Being entirely powered by clean energy from the Sun, it can help boost China's capabilities to operate in near-space and over the ocean.
- It is capable of conducting high-altitude reconnaissance, monitoring forest fires, providing communication and environment relay.

Reference

1. https://indianexpress.com/article/explained/explained-global/china-fully-solar-powered-semi-satellite-drone-explained-8137035/
2. https://militarywatchmagazine.com/article/china-solar-powered-drone-satellite-network
3. https://eurasiantimes.com/chinas-quasi-satellite-avic-success-with-solar-powered-drone/

Einstein Ring

The Mid-Infrared Instrument (MIRI) of the James Webb Space Telescope Telescope has captured an image of an almost perfect "Einstein ring".

> *Einstein Ring phenomenon was first discovered in 1988 as the phenomenon of bending of the light was predicted by Alert Einstein.*

- An Einstein ring is a **ring of light** created when light from a galaxy, star or other light-emitting cosmic objects passes near a massive object before it reaches the Earth, or in this case, the Webb telescope.
- When this happens, **gravitational lensing** causes the light to get diverted and if the source, lens and the observing element are all in perfect alignment, this light appears as a ring.
- So, the ring itself not a real physical structure in space, but just a **play of light and gravity**, a result of the gravitational lensing effect.
- The Einstein ring is also known as the Chwolson ring.



- **Recent finding** - "Einstein ring" that was captured recently was formed from the light of a distant galaxy SPT-S J041839-4751.8, which is around 12 billion light-years away from Earth.
- From Webb's point of view, this galaxy is positioned directly behind another galaxy that is so massive that its gravitational pull warps space and time.
- As the light from the background galaxy travels to the Webb telescope, it has to cross the warped space-time near the foreground galaxy.
- This is what makes the light appear like a curved ring.
- **Related Links** - Gravitational Lensing

Reference

1. https://indianexpress.com/article/technology/science/james-webb-space-telescope-captures-image-of-near-perfect-einstein-ring-8134542/
2. http://hyperphysics.phy-astr.gsu.edu/hbase/Astro/einring.html
3. https://www.hindustantimes.com/world-news/james-webb-telescope-einstein-ring-a-near-perfect-einstein-ring-in-space-courtesy-james-webb-telescope-101662529659728.html

Inouye Solar Telescope

The Inouye Solar Telescope has captured an image of the Sun's chromosphere a resolution of 18 kilometres.

> *The chromosphere is the second of the three main layers in the Sun's atmosphere. It is located above the photosphere and below the solar transition region and corona.*

- The Daniel K Inouye Solar Telescope (DKIST) is located at the Haleakala Observatory on the Hawaiian island of Maui.
- The DKIST was set up by the US National Science Foundation (NSF).
- According to the NSF, the Inouye Solar Telescope is the most powerful solar telescope in the world.
- Its insights will transform how we predict and prepare for events like solar storms.

Haleakalā

- Soaring nearly three kilometers, above the Pacific Ocean, Haleakalā is Maui Island's largest volcanic mountain.
- Haleakalā is a high-elevation, shield volcano surrounded by ocean.
- This unique geography offers a site 10,023 feet above the clouds, with a clear blue sky and a stable atmosphere that is relatively free of dust.

- It is a near perfect place for solar astronomy.

Reference

1. https://indianexpress.com/article/technology/science/daniel-k-inouye-solar-telescope-sun-chromosphere-image-8137237/
2. https://nso.edu/telescopes/dki-solar-telescope/
3. https://nso.edu/telescopes/dkist/fact-sheets/why-haleakala/
4. https://www.science.org/content/article/world-s-largest-solar-telescope-takes-its-first-shot

