

Prelim Bits 08-09-2022 | UPSC Daily Current Affairs

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://eurasianimes.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 Albert 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>

