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1. First US lunar lander since 1972 launched: The mission, significance

Why in news?

A spacecraft developed by a private US company and carrying a bunch of scientific instruments from NASA, took off from Florida on January 8, hoping to become the first US spacecraft to land on the Moon in more than 50 years.

The Peregrine lander module of the mission (lander module lands on surface of moon), as well as the Vulcan rocket that launched it, have both been built by private space companies in the US. The Mission is part of NASA's Commercial Lunar Payload Services (CLPS) initiative that seeks to involve private space sector in its ambitious Artemis programme that is planning a return to the Moon in a big way.



Figure 1 Vulcan Centaur ahead of its first flight

If successful, this mission would also involve the first landing of a private spacecraft on the Moon. Last year, a Japanese company had attempted a moon landing with its Hakuto-R mission but was unsuccessful. In 2019, the first Israeli attempt to land on the Moon was also engineered by a private company, but the spacecraft, Beresheet, had crash-landed.

The mission

Five payloads from NASA sat inside the Peregrine lander that was launched by the Vulcan heavy rocket. The lander has been built by Astrobotic while the rocket came from United Launch Alliance, another private enterprise.

The spacecraft will take more than 40 days to reach the Moon, and is planned to make a landing on February 23. The payloads are meant to carry out various exploratory activities, including detection of water. One of the payloads, called Laser Retroreflector Array, is a collection of several mirrors that would allow precision measurements of the distance of other orbiting or landing spacecraft by reflecting light

from them. This particular instrument would remain permanently deployed on the Moon's surface, and would act as a marker for distances on the Moon.

The other payloads would remain active for ten days after landing.

Return to Moon

No US spacecraft has landed on the Moon since Apollo 17 in December 1972. That was the last of the six Apollo missions to have made the moon-landing, each allowing two astronauts to walk on the Moon's surface. The United States reignited its interest in the Moon in the 1990s but started almost afresh, sending a few Orbiters to study the lunar surface and environment from a distance. It was only in 2018 that the US decided to make a return to the Moon, this time for longer stays.

Artemis program

The Artemis program is a robotic and human Moon exploration program led by the United States' National Aeronautics and Space Administration (NASA) along with six major partner agencies— the European Space Agency (ESA), the German Aerospace Center (DLR), the Japan Aerospace Exploration Agency (JAXA), the Canadian Space Agency (CSA), the Israel Space Agency (ISA), and the Italian Space Agency (ASI). The Artemis program is intended to reestablish a human presence on the Moon for the first time since Apollo 17 in 1972.

Over the next few years, the Artemis programme plans to send a series of Moon missions, including those carrying astronauts. The first Artemis mission was sent off in November 22. It orbited the Moon and returned to the Earth. NASA is planning to send the first crewed mission into space next year, and would attempt a human landing on Moon in 2025.

The Artemis programme seeks to establish a permanent base camp on the Moon, and send astronauts and robots for longer stays for more comprehensive exploration, and scientific studies, of the lunar surface and atmosphere. It would also explore opportunities for the utilisation of resources available on the Moon with the ultimate objective of launching deep space missions from the lunar surface.

Relevance: GS Prelims & Mains Paper III; S&T

2. Global warming, sea level rise, ageing flood defence systems: Why European countries have been flooded

Why in news?

Heavy rains have hit France, England, Netherlands and Germany for more than two weeks, causing rivers to burst their banks in many areas, flooding homes and prompting evacuations.

While rain this time of year in these regions isn't unusual, it's the intensity of the downpour that has set off alarm bells among experts. They suggest a combination of factors, including global warming, rising sea levels, and ageing flood defence systems have led to the deluge in the countries.



Figure 2View of flooded streets as the Aa river overflows in northern France

What is happening?

In France, the northern region has been the worst affected with the overflow of Aa river.

Widespread deluge has impacted central England — in Nottinghamshire County, officials declared a “major incident” due to flooding along the Trent River last week. Meanwhile, Germany and Netherlands also witnessed floods.

Why is it happening?

There are three factors at play here: rising global temperature, sea level rise, and outdated flood defence systems. Let's look at each of them.

Global Warming: Scientists have known that as the planet gets warmer, there will be more frequent extreme rainfall. With higher temperatures, there is more evaporation from land, oceans and water bodies, which means a warmer atmosphere can hold

more moisture — experts suggest for every 1 degree Celsius rise in average temperature, the atmosphere can hold about 7% more moisture. This makes storms more dangerous as it leads to an increase in precipitation intensity, duration and/or frequency, which ultimately can cause severe flooding.

Sea Level rise: The second factor is sea level rise due to which rivers frequently breach their banks to flood the adjacent areas. Take the example of northern France, where rising sea levels likely led to the recent deluge — between 1966 and 2018, sea levels rose by 4.4 cm.

Ageing flood defence systems: Lastly, ageing flood defence systems have exacerbated the situation. For instance, the outdated water management systems of France failed to tackle the large volumes of water that had entered the affected regions. Authorities had to get water pumps from the Netherlands to combat flooding. Moreover, people, both in France and England, have built infrastructure like roads and buildings on floodplains, restricting the natural routes the water would have taken to get drained into the floodplain soils. As a result, the water ends up flooding certain areas.

What happens next?

The situation is bound to get worse. Studies have shown that as the planet gets warmer, storms would get more intense, causing heavier rainfall. The frequency of extreme weather events like floods is also expected to go up.

Therefore, there is an urgent need to improve flood defences, early warning systems and resilience measures to tackle the fallout of heavy rain.

Relevance: GS Prelims & Mains Paper III; Environment

Source: The Indian Express

3. SC overturns remission given to Bilkis Bano's rapists: What happened, and what has the court ruled?

What has happened?

The Supreme Court has struck down the remission granted to 11 men convicted in the Bilkis Bano gangrape case of 2002.

The court has ruled that the Gujarat government's decision to remit their sentences and set them free was illegal. "Gujarat government had no jurisdiction to entertain the

application for remission or pass the orders as it was not the appropriate government," the court said on.

Bilkis Bano case

Bilkis was gangraped and seven members of her family were murdered during the Gujarat riots of 2002. The 11 convicts were released by the Gujarat government under its remission and premature release policy on August 15, 2022.

What was the issue before the court here?

It was essentially whether Gujarat had the authority to issue the order for the remission of the sentences.

The crime had been committed on March 3, 2002 in Chapparwad village in Gujarat's Dahod district, but the trial took place in Mumbai, where a special court convicted and sentenced the accused in 2008.

The Supreme Court noted that the appropriate government to decide remission is the state within whose jurisdiction the accused were sentenced — and not the state within whose territorial limits the offence was committed or the accused were imprisoned.

Therefore, the court ruled that the competent government in this matter would be the Maharashtra government.

What is the law on remission of sentences?

Under Articles 72 and 161 of the Constitution, the President and Governors of states can pardon a convict, and can also suspend, remit, or commute a sentence passed by the courts.

State governments too have the power to remit sentences under Section 432 of the Code of Criminal Procedure (CrPC). This is because prisons is a State Subject. (The CrPC is proposed to be replaced by the Bharatiya Nagarik Suraksha (Second) Sanhita. The law has been passed by Parliament and has obtained the assent of the President, but is yet to come into force.)

However, Section 433A of the CrPC puts certain restrictions on these powers of remission. It says:

"Where a sentence of imprisonment for life is imposed on conviction of a person for an offence for which death is one of the punishments provided by law, or where a sentence of death imposed on a person has been commuted under Section 433 into

one of imprisonment for life, such person shall not be released from prison unless he had served at least fourteen years of imprisonment.”

And what are the grounds for remission?

States set up a Sentence Review Board to exercise the powers under Section 432 of the CrPC. The Supreme Court has held that states cannot exercise the power of remission arbitrarily, and must follow due process. While the policy varies from state to state, broadly the grounds for remission considered by the Board are the same.

These factors to be considered while making a decision on granting remission are: seriousness of the crime, the status of the co-accused, and conduct in jail.

In ‘Laxman Naskar v. Union of India’ (2000) the SC laid down five grounds on which remission is considered:

- (a) Whether the offence is an individual act of crime that does not affect the society;
- (b) Whether there is a chance of the crime being repeated in future;
- (c) Whether the convict has lost the potentiality to commit crime;
- (d) Whether any purpose is being served in keeping the convict in prison; and
- (e) Socio-economic conditions of the convict’s family.

Jail manuals contain rules that allow certain days of remission in every month for good behaviour of convicts. For those serving fixed sentences, the remission days are accounted for while releasing the convict. However, convicts serving life sentences are entitled to seek remission only after serving a minimum of 14 years.

So what happened in the Bilkis Bano case?

One of the convicts, Radheshyam Shah, moved the Supreme Court in 2022 after he had completed 15 years and four months of the life term awarded to him by a CBI court in Mumbai.

Radheshyam Shah sought directions to the Gujarat government to consider his application for premature release under its 1992 remission policy.

Shah argued that the Gujarat HC had rejected his prayer on July 17, 2019 on the premise that since the trial had been concluded in Maharashtra, the application for premature release must also be filed in Maharashtra, and not in Gujarat.

In an order dated May 13, 2022, an SC Bench of Justices Ajay Rastogi and Vikram Nath asked the Gujarat government to consider Shah’s application for premature release “within a period of two months”, as per the state’s 1992 remission policy.

Gujarat was the “appropriate government” to decide on questions like remission or premature release because it was there that “the crime was committed and not the

State where the trial stands transferred and concluded for exceptional reasons under the orders of this Court”, the SC said.

What is Gujarat’s remission policy?

The remission policy that was notified in 1992 — and which was in force at the time of the crime (2002) and conviction (2008) — permitted prisoners to apply for remission “on the basis that life imprisonment is an arbitrary or notional figure of twenty years of imprisonment”.

But this policy was invalidated by the SC in November 2012. The court had said: “Before actually exercising the power of remission under Section 432 of the CrPC the appropriate Government must obtain the opinion (with reasons) of the presiding judge of the convicting or confirming Court. Remission can, therefore, be given only on a case-by-case basis and not in a wholesale manner.”

Following the SC order and instructions issued subsequently by the Union Home Ministry to all states and Union Territories, the Gujarat government formulated a fresh policy in 2014. This contained an annexure listing cases where remission could not be granted — among them were those in which the prisoners were convicted for a crime that was investigated by an agency under the Delhi Special Police Establishment Act (CBI, which was in the investigating agency in the Bilkis case), and prisoners convicted for murder with rape or gangrape.

What happened after the remission was granted?

There was outrage because the remission granted to convicted rapists was seen to represent a grave miscarriage of justice. This feeling was exacerbated after the convicts were feted and garlanded by local people.

Bilkis Bano challenged the remission order. She pleaded before the SC that “the en masse premature release of the convicts... has shaken the conscience of the society”. She said the crime was “one of the most gruesome crimes this country has ever seen” and that she was “shell shocked, completely numb...” after the convicts were released.

Relevance: GS Prelims & Mains Paper II; Governance

Source: The Hindu & Indian Express