# Space Junk in Moon

## Why in news?

There is going to be a lot of space junk on lunar surface and in Earth's orbit as countries around the globe traveling to the Moon.

## What is a space junk?

- Space debris is any *piece of machinery or debris* left by humans in space.
- Dead satellites can refer to big objects such as dead satellites that have failed or been left in orbit at the end of their mission.
- It can also refer to smaller things, like bits of debris or paint flecks that have fallen off a rocket.
- Some human-made junk has been left on the Moon.

| Data on Space Debris |
| --- |
| • While there are about 2,000 active satellites orbiting Earth at the moment, there are also 3,000 dead ones littering space.<br>• **Disaster-**There are around 34,000 pieces of space junk bigger than 10 centimetres in size and millions of smaller pieces.<br>• In 2022, over 2,160 objects were launched into space, about 300 more than 2021 and 900 more than 2020.<br>• **Private players-** The surging number of rocket launches and the increasing number of payloads carried in recent years have made the space junk problem acute.<br>• It is especially after private companies such as SpaceX launched thousands of satellites to provide Internet access.<br>• **Country wise -** Around 13,953 debris are orbiting Earth and the countries responsible for them.<br>• Close to *35% originated from the Soviet Union/Russia, 31% from the U.S., and 29% from China*.<br>• **China**- Over 2,700 pieces of debris from a Chinese anti-satellite test in 2007, marked as the single worst contamination of space in history, are still in orbit.<br>• **India**- Its contribution is *0.5%.* India added to the problem in 2019 by testing an ASAT missile which targeted a live satellite in Low Earth Orbit.<br>• The country has 103 active or defunct spacecraft and 114 objects categorised as 'space debris' in orbit and it has embarked on research to reduce such fragments from outer space |

## Why is the space crowded?

- **Moon exploration**- As many as 100 lunar missions are planned over the next decade by governments and private companies.
- **Space congestion-** Near-Earth orbit is even more congested than the space between Earth and the Moon.
- It's from 100 to 500 miles straight up, compared with 240,000 miles to the Moon.

*Currently there are nearly 7,700 satellites within a few hundred miles of the Earth.*

- **Utility-**Many of these satellites will be used to deliver internet to developing countries or to monitor agriculture and climate on Earth.
- **Low cost-**Companies like SpaceX have dramatically lowered launch costs, driving this wave of activity.

To know more about the role of moon in the development of life on earth click here

## How space junk is created?

- **Launch-** Space junk is the result of us launching objects from Earth, and it remains in orbit until it re-enters the atmosphere.
- **High altitude**- Some objects in lower orbits of a few hundred kilometres often re-enter the atmosphere after a few years and, for the most part, they'll burn up, so they don't reach the ground.
- But debris or satellites left at higher altitudes of 36,000 kilometres where communications and weather satellites are often placed in geostationary orbits, continue to circle Earth for hundreds of years.
- **Anti-satellite test**- Some space junk results from collisions or anti-satellite tests in orbit. When two satellites collide, they can smash apart into pieces, creating lots of new debris.

To know more about space junk click here

## What are the risks posed by space junk?

- **Collision-** These satellites have to move out of the way of all this incoming space junk to make sure they don't get hit and potentially damaged or destroyed.
- **Creation of debris**- It creates hazards and debris. Humans have left a lot of junk on the Moon.
- **Lack of responsibility-** No one owns the Moon, hence no one is responsible for keeping it clean and tidy.
- **Speed of debris**- Tiny pieces of junk might not seem like a big issue, but that debris is moving at 15,000 mph (24,140 kph), 10 times faster than a bullet.
- At that speed, even a fleck of paint can puncture a spacesuit or destroy a sensitive piece of electronics.
- **Kessler syndrome**- This is an idea proposed by NASA scientist Donald Kessler in 1978.
- If there was too much space junk in orbit, it could result in a chain reaction where more and more objects collide and create new space junk, to the point where Earth's orbit became unusable.

## Why there is lack of responsibility of space junk in moon?

- **Outer space treaty 1967**- It says that no country can “own” the Moon or any part of it, and that celestial bodies should only be used for peaceful purposes. It is established

by *United Nations (UN)*
    - The treaty is silent about companies and individuals, and it says nothing about how space resources can and can't be used.
- **UN Moon Agreement of 1979** - It held that the Moon and its natural resources are the common heritage of humanity.
    - United States, Russia and China didn't sign the agreement.
- **Artemis Accords-** It is created by *NASA* which is a *nonbinding* principles for cooperating peacefully in space.
    - They have been signed by 28 countries, but the list does not include China or Russia and private players.
- **Poor regulation**- Because of its lack of regulation, space junk is an example of a "*tragedy of the commons*".

## What lies ahead?

- Hundreds of collision avoidance manoeuvres are performed every year, including the International Space Station (ISS), where astronauts live.
- Scientists argue that to avoid a tragedy of the commons, the orbital space environment should be seen as a global commons worthy of protection by the United Nations.

## References


1. The Hindu- Increase in space junk in future
2. The Hindu- Small debris threat to space assets



SHANKAR IAS PARLIAMENT
Information is Empowering