Tiangong-1 Downing and Space Debris

What is the issue?

\n\n

\n
- The recent downing of Tiangong-1 ended concerns about where the debris from the space station would fall.
\n
- It has however reignited the larger debate about space debris itself.
\n

\n\n

What is Tiangong-1?

\n\n

\n
- Tiangong-1 is China's space station.
\n
- Launched in 2011, it made China just the third country to launch a space station.
\n
- The Chinese used it to demonstrate spacecraft docking capabilities.
\n
- Six astronauts visited Tinangong-1 in 2012 and 2013 in two crews.
\n
- It included China’s first woman astronauts, Liu Yang and Wang Yaping.
\n

\n\n

What happened to it?

\n\n

\n
- Chinese lost control of the station in 2016.
\n
- After losing control, China notified the United Nations Office for Outer Space Affairs and the Inter-Agency Space Debris Coordination Committee.
\n
- Much of Tiangong burnt up in the atmosphere, until it finally splashed into

the ocean.
\n
- Weighing 8.5 tonnes, it dropped out of orbit and splashed into the South Pacific Ocean, just northwest of Tahiti.
\n
- Tiangong-2 continues to be operational.
\n
- This lab was launched the same year the Chinese lost control of the now-downed space station.
\n

\n\n

What are the concerns with space debris?

\n\n

\n
- At least 500,000 pieces of space debris, of various sizes, are orbiting the Earth.
\n
- Nearly 7,500 tonnes of estimated amount of defunct, artificially created objects are currently in space.
\n
- The speed up to which space junk travel is 28,000 kph.
\n
- This is fast enough to destroy a spacecraft.
\n
- Probability of an individual on Earth being hit by falling debris is 1 in 1 trillion.
\n
- **ISRO** - PSLV-C19 had launched radar imaging satellite RISAT-1 in 2012.
\n
- Recently, PSLV-C19’s 4th stage burnt up over the Central Atlantic.
\n

\n\n

What is a spacecraft graveyard?

\n\n

\n
- There are larger space objects that may not entirely burn up before reaching the ground.
\n
- Spacecraft operators can thus plan for the final destination of their old satellites to make sure that any debris falls into a remote area.

\n
- A 1,500 sq km area in Southern Pacific Ocean is said to be the spacecraft graveyard or spacecraft cemetery.
\n
- This is suitably far from any coast and human habitations thereby.
\n
- Notably, more than 260 satellites were brought down there so far.
\n

\n\n



\n\n

\n\n

What could be done?

\n\n

\n
- **Passivation** - Satellite explosions are reduced by deactivating various systems.
\n
- **Design for demise** - Designing with material that burn up on re-entry.
\n
- **Deorbiting systems** - Under international guidelines, satellites are brought down within 25 years after mission life.
\n
- **Design for servicing** - Grips or handles can be caught by a robotic arm or astronauts for repairs.
\n
- **RemoveDEBRIS** - An innovation led by University of Surrey’s Space Centre, UK.
\n
- It was launched on a SpaceX flight to International Space Station recently.
\n
- It will be released into low-earth orbit, where it will release a smaller satellite that will recapture space junk with a harpoon.
\n
- **ISRO** - ISRO is looking to develop reusable launch vehicles.
\n
- It had notably conducted a space capsule recovery experiment in 2007.
\n

\n\n

\n\n

Source: Indian Express

\n\n

\n\n

Quick Fact

\n\n

United Nations Office for Outer Space Affairs (UNOOSA)

\n\n

\n
- The UNOOSA works to promote international cooperation in the peaceful use and exploration of space.
\n
- The Office assists any United Nations Member States to establish legal and regulatory frameworks to govern space activities.
\n
- It also strengthens the capacity of developing countries to use space science technology and applications for economic and social development.
\n
- It does this by helping to integrate space capabilities into national development programmes.
\n

\n\n

Inter-Agency Space Debris Coordination Committee (IADC)

\n\n

\n
- The IADC is an international governmental forum.
\n
- It works for worldwide coordination of activities related to the issues of man-made and natural debris in space.
\n
- The primary purposes of the IADC are to -
\n

\n\n

\n

i. exchange information on space debris research activities between member space agencies
\n
ii. facilitate opportunities for cooperation in space debris research
\n
iii. review the progress of ongoing cooperative activities
\n
iv. identify debris mitigation options
\n

\n

