

Space Debris, A Threat to Environment

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Article ID: 19

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Introduction

Space debris include both natural & man-made orbital debris components of space environment. It is more concern due to its very high speed in orbit even a small piece can damage or destroy satellite in collision. Since debris at high altitude can stay in orbit for decades or layer, it accumulates as more is produced & risk of collisions with satellite grows. Since currently there is no effective way to remove large amount of debris from orbit. The 62 years of space activity since the launch of Splitnik-1 has resulted over half a million pieces of orbiting debris longer than 1cm in size. They can be stay for a very long time but if they get de-orbited, they move in a very uncontrolled manner, if they are small in size they vaporizes but if not then it come & hit in a city or village & it can be life threatening. The rising population of space debris increase the potential danger to all the space vehicles as especially to International space station, space shuttles & other space craft with human abroad.



Space Debris From Spacecraft And Satellite, respectively, NASA.

Categorization of Debris

Three categories of space debris depending on their size –

- Category I (<1cm)
It make significant damage to vulnerable part of satellite.
- Category II (1-10cm)
Seriously damage or destroy a satellite in a collision.
- Category III (>10cm)
Destroy a satellite in a collision and can be traced.

Reason behind Space Debris

- In space technology many countries have lack of control.
- Cleaning up the trash in the space cost very high which is not accountable.
- Countries are launching satellite into space continuously.

Consequences of Space Pollution



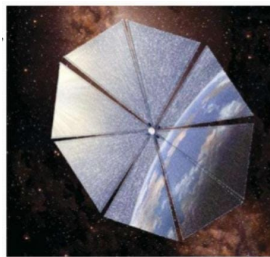
- Broken down of space craft due to collision which poses a threat to return of space scientist.
- It poses hazard to the surface of earth.
- When it gets de-orbited they come & hit in the city or village which can be a life threat.
- It can also affect's future space missions.

Methods to control

Tug like Satellites

It drags the debris to a safe altitude in order to burn up in the atmosphere. It creates an electron emission to create a difference in Potential between the debris as negative & itself as positive, then satellite uses its own thrusters to propel itself along with the debris to a safer orbit.

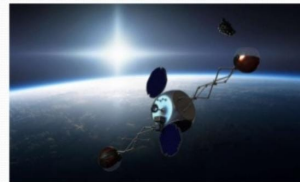
Solar Sails- The Solar Sails uses the pressure from sunlight to navigate out of orbit & burn into the atmosphere.



Space Nets- Space net are satellites which eject a huge net that fishes or collects the debris & is later disposed of into a graveyard orbit.



Collector Satellites- It has two extended arms which collect the debris as it is in action.



Measures

- Use of reusable technology for many space applications.
- Track the non-working satellite back to earth.
- Utilize intelligent design practices to minimize the effect of debris impact.

Conclusion

Space debris has an ever-growing impact on space flight & travel. It must be careful because even the smallest loose nut or bolt lost on space walking repair missions could cause



a cascade of debris. This problem might look unimportant & being realised by the people, but it is a great concern for the development in Space technology.

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