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Satellite with Directed Energy Weapon to Eleminate Space Debris

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Abstract:- This is the idea on how to solve the space debris which is occurring around our earth. A lot of space agencies are planning to deal with this issue and ESA is right now the leading one. They are planning to launch a satellite by 2025 which can capture the space junk by picking them with their four arms and burn with it while descending back to earth. I am here proposing the different idea which is sending a satellite which has directed energy weapon (DEW) and a sweeping net (made by nano-technology) attached to it. The idea is simple we just have to slow burn the debris and turn them into tiny dusts and then collect the dust by sweeping net. This will reduce the volume of space debris and then we can capture more space debris with one satellite(I call it orbital sweeper).

I. INTRODUCTION

Space debris (also known as **space junk**) is a term for defunct human-made objects in space—principally in Earth orbit—which no longer serve a useful function. Once the fuel runs out, the satellite eventually drifts into space and out of operation, become **Space debris.** Recently people have been discussing about this new alarming topic and all the space agencies are addressing it especially European Space Agency.

More than 34,000 man-made objects in space and there is no international regulation to bring them back. When Chris Hadfield talked about fixing the hole in ISS by duct tape people start taking this issue even more seriously and then plenty of solutions were suggested and still going on.

II. RECENT APPROACH

ESA has come up with a solution by sending a four arm or leg satellite which will capture it and burn by the atmospheric pressure while descending towards the earth. I think this is a great idea but it will cost huge amount every time we want to capture a debris and it can only capture those debris which is huge in size but not small. ESA is planning to launch this satellite by year 2025. They have been analysing the space debris for very long time and according to DISCOS database their is currently about 38,700 man-made objects in outer space since sputnik-1.

III. ALTERNATE SOLUTION

I have a one time investment but long-time running plan to deal with the space debris.

I am proposing an idea of creating a satellite (I call it Orbital Sweeper) which has directed energy weapon attached to it's body. Directed energy weapon is a highly focused energy emitter which laser, microwave and particle beam to burn the object.

Here is the idea of how we can create such satellite:

We should make a spherical shape satellite with necessary communication and power propulsion systems and then we will attach a directed energy weapon(DEW), with our convenient type, no need to use the military ones. The structure of upper spherical layer of satellite should be built in such way that DEW can freely movie and have a 360 degree rotation so that it can have more degree of freedom to target the debris and we can to use our thrusters less.

The DEW will first attack the target and turn them into tiny pieces, mind that we need to have right accuracy so that we don't hit any other satellite or object. We can use short range DEW for this purpose. When the debris will turn into the tiny particles then we will use our next weapon which is a sweeping net made by nano-technology. The sweeping net will be part of our satellite and it will be drop down when we have to sweep the debris dust. Reason why it should be made by nanotech is so that it can sustain the high temperature of burnt debris and also so that it can capture every tiny element. After sweeping the dust it will simply take them to the dust storage chamber of our satellite. This method will capture small as well as large debris. By converting them into dust we will decrease their volume and then we can capture more debris. When satellite will be full with debris dust then we will simply descend it back to earth and burn it with atmospheric pressure.

Just to give an idea I would like to give a pictorial 2D view of our satellite.

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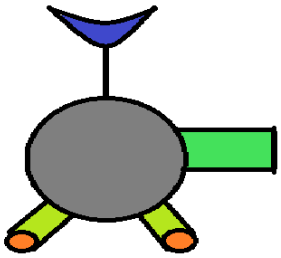
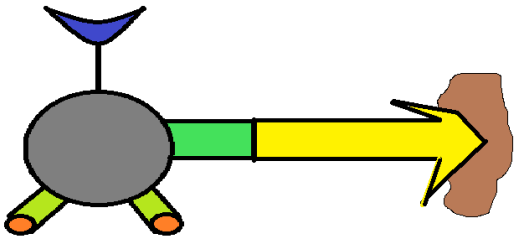
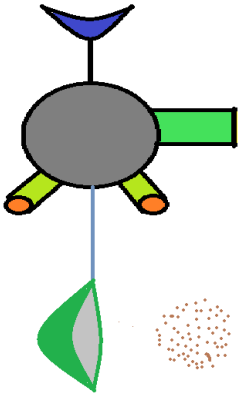


This would be the ORBITAL SWEEPER



This is hitting the target



This is sweeping the dust

I know this doesn't give the whole idea but this methodology is worth to think. With this method we don't have to use a lot of rocket to send multiple satellites to capture space debris.

Business aspect:

This is a real interesting part because now a lot of private space agencies are looking for the opportunity to clean the space. This is the data given by website SPACE VENTURES INVESTORS

2013+: Astroscale has been set up for debris monitoring and tracking, plus eventually developing innovative solutions for debris removal. They raised $25m in 2017.
2015+: DARPA needs to, now and then, create something that generates a profit. Perhaps DARPA's Futuristic Phoenix Satellite Recycling Project will not only harvest satellites, but save the space industry a lot of time and money avoiding orbital debris collisions.
2017+: D-Orbit is developing a proprietary solid-propellant technology for the commissioning and decommissioning of satellites.
2017+: Launchspace Technologies proposes sending platforms as large as football fields into low Earth orbit to sweep up space debris. The platforms, equipped with sensors, could help the U.S. government detect and track orbiting satellites and debris.
2019: Space Ventures Investors has signed a MOU with Obruta - Space Debris Removal. Obruta Space Solutions is developing tethered-net technology to target space debris and end-of-life deorbiting satellites.
2020: According to Fast Company, Russia has a $2billion plan to remove about 600 satellites out of orbit and into a fatal decline into the atmosphere. Expect some expensive shooting stars.

IV. CONCLUSION

This problem of space debris is giving us an alarming situation. It makes us wonder will there be space in space to send our new satellites? The world is discussing this topic and ESA has come up with an idea too. I have given an alternate solution which I think is a futuristic solution to deal with the space junks. I proposed the idea of satellite with directed energy weapon. This problem also welcoming the business ventures.

REFERENCES

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