Send off to space debris using LASER techniques

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ABSTRACT

This is a proposal of well framed ideas to manage the ever increasing problems of space debris. Firstly the convention flight and rocket techniques are used in combination to put the apparatus to the space station. The experiment is controlled from the space station to clear out space debris. The experiment is developed based on the ablation of ultra-short laser pulses and plasma beam on different metals and other poly-materials while also discussing on the generation of high-density and high-temperature plasmas by focusing high peak power laser radiation onto solid targets in space. The experiment will be given of the main experimental techniques, namely optical emission and absorption spectroscopy, mass spectrometry, time-of-flight and charge collection measurements, devised to characterize laser-produced plasmas. The fundamental theoretical and numerical approaches developed to analyze laser-target interaction, plasma formation, as well as its expansion will also be reviewed while focusing mainly on metal target ablation and keeping in mind the continuous qualitative change in the velocity spectrum of expanding ions with increasing laser pulse length, ranging from approximately isothermal behavior from short pulse to ablative behavior from longer pulses.

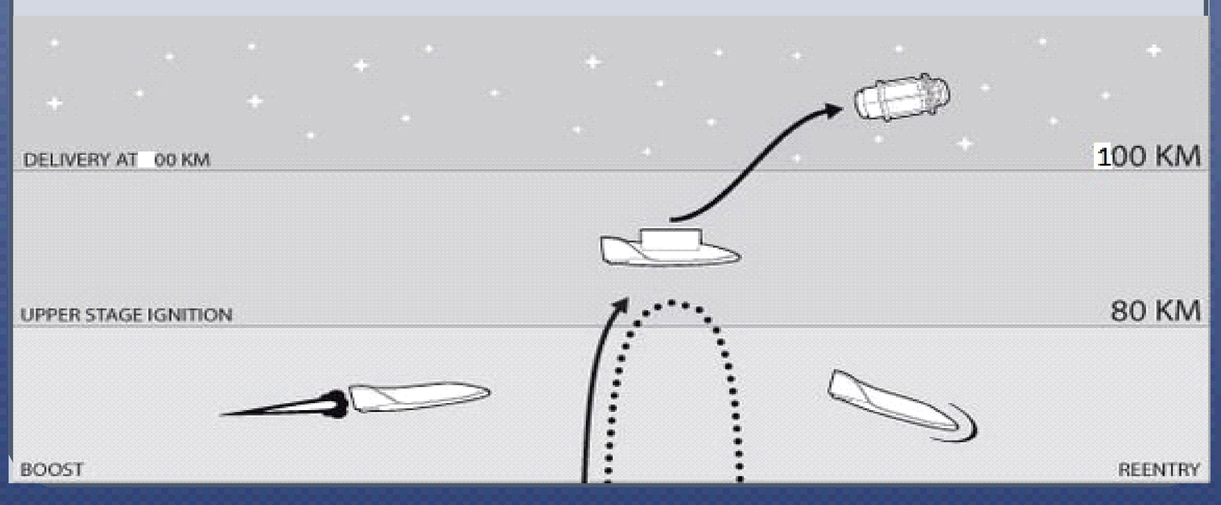
INTRODUCTION

LASER's are widely used in the modern world for various purposes without which it is hard to imagine the same everyday life. The LASER ablation techniques are also well known but, the pulsed LASER techniques are now employed. Currently, being in research and developmental stage this new study ensures the mitigation of space debris cost effective and simple. The threat of space debris is growing exponentially for every payload which faces the sky. The space environment is polluted by the debris with ever increasing threat of colliding with the international space station and damaging it, if not killing astronauts on board which will quite possibly halt future manned missions to space. The radical solution which has been an outcome of tests which can employed to this to eliminate space debris from space either with human intervention or artificial intelligence.

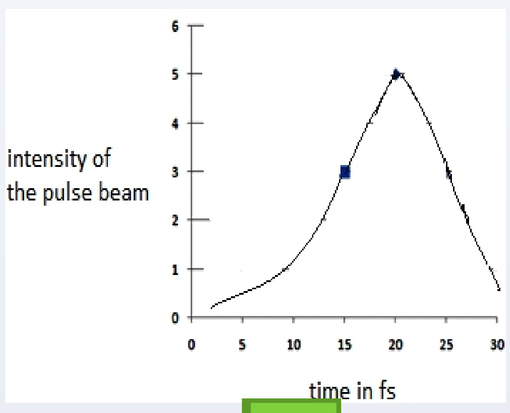
The paper is being one of the applications of the femto-second technologies, the advantage being that there is no formation of molten materials. In this paper, we apply the investigated results of the ablation of metal target by (300 fs-20 fs depending on the thickness and the metal in question) Ti-sapphire LASER at 5mJ with peak intensities of greater or equal to 50GW/cm^2 at about 800nm

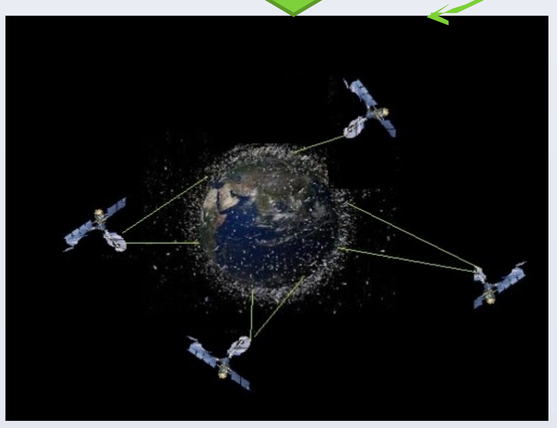
TO SPACE , OPERATIONS :-

The payload being the LASER ABLATION INSTRUMENT is carried in a hybrid space vehicle with self propulsion payload. The payload will be launched to a height of 70000 m after which the payload with self-propulsion device coupled with conventional orbital maneuvers will reach the destined orbit or ISS in this particular case.



TECHNIQUES





CONCLUSION AND REFERENCES

The above is the techniques of tracking, destroying the debris so that only fraction of their mass falls to the earth. The debris are ablated using 6 satellite -LASER systems in the higher orbit and 12 sub LASER satellite system in the LEO.

There is one tracker (LA -TRAK) of debris with capabilities to destroy them on sight. The debris then fall back into the atmosphere, before burning up on re entry . The system of 12 satellites and 6 LEO system ensures that safe ablation of space debris without any harm to the other existing satellites or their working.

The above paper represents the most economic and the safest ablation technique which will ensure long term

some of the REF:-

http://arxiv.org/ftp/arxiv/papers/1311/1311.0610.pdf

J. Opt. Soc. Am. B/ Vol. 14, No. 10/October 1997

American Physical Society 10.1103/PhysRevLett.99.195002

Olowosejeje, Samuel Ayokunle. "Transition of Space Technologies and the Spin-Off Technologies Realized: An Incentive for Continued Investment in Space Exploration." Information and Knowledge Management. Vol. 3. No. 11. 2013.

CONTACT

My hearty thanks for the opportunity to present my idea at 19th LASER ranging workshop.

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