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## Earth and Moon Based Directed Energy Systems for Planetary Defense

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**Keywords:** Short Period Warning, Short Range Intervention, Directed Energy Systems, High Energy Lasers

### ABSTRACT

While it is well established that the first and critical pillar of an economically viable and reliable Planetary Defense architecture is timely detection, it is also clear that until such time observatories and networks with enough capability and redundancies are fully functional, the threat of a small, low albedo short warning period “city killer” type impactor appearing along a terminal trajectory is still possible. This is also a reason the IAA/PDC group continues to build awareness and refine impactor exercises.

In the United States, the Federal Emergency Management Agency(FEMA) is also fully aware that certain aspects of Planetary Defense may be still inadequate and that we need to be prepared for recovery options in the aftermath of such a natural disaster brought on by an extraterrestrial impactor.

*What can we do if a threat is detected very late ?i.e., the object is on a terminal trajectory with only months to weeks before impact.*

This paper presents the case for employing High Energy Lasers(HELs), a fast maturing and highly capable Directed Energy(DE) technology that is already being field tested and readied for strategic and tactical national defense purposes.

Basing such systems in orbit poses certain technological challenges and international policy problems. Basing such systems terrestrially and on the lunar surface offer potential advantages, since such facilities could primarily derive power from the fast evolving global grid on Earth or use stored power from lunar surface based platforms.

Directed Energy systems, specifically High Energy Laser Systems could accelerate forward-looking plans and projects in Planetary Defense, specifically for neutralizing short period warning threat based on current actionable intelligence.

HELs may be more amenable as a short warning period, short range intervention technology and strategy than nuclear detonation. Both technical and policy related issues of HEL systems for Planetary Defense need further investigation. HEL systems offer versatility, offering a range of other peaceful uses as well. Merits and limitations of HELs for Planetary Defense are discussed.

The seminal work being done systematically and diligently by the IAA/PDC group as well as recent progressive activities by the world's space agencies and the evolving global Planetary Defense community, all being spurred on by the United Nations is noted as vital to addressing this very real threat to our species and civilization, not to mention the havoc such an event, if not thwarted in a timely manner, poses to our fragile biosphere.

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