

Photonic Laser Thruster Propels Simulated Spacecraft

Successful laboratory demonstration validates propellant-free, high-impulse spacecraft propulsion

TUSTIN, CA — May 14, 2015 – Y.K. Bae Corporation announces their proprietary Photonic Laser Thruster (PLT) has successfully accelerated a 450 gram (~1 lb.) spacecraft simulator with pure laser light for the first time in history. The project was funded by a Phase II grant of NASA Innovative Advanced Concepts (NIAC), which funds the most promising ideas for the next generation NASA space missions.

Conducted in a Class 1,000 cleanroom, Y.K. Bae's demonstration amplified photon power 400-times to achieve photon thrust up to 1.1 milliNewtons by bouncing photons several hundred times between two laser mirrors. The amplified thrust successfully propelled a gliding platform along a 2 meter frictionless air track, simulating zero-gravity.

"Moving a 450 gram platform unequivocally validates the useful power-to-thrust ratio of PLT," said Dr. Claude Phipps, Chair of International High Power Laser Ablation and Directed Energy Symposium. "I can see future development that includes optical cavities that span many kilometers achieved with precise mirror alignment to enable maneuvering spacecraft many kilometers apart, and propellant-free propulsion of satellites in formations."

The PLT demonstration simulated beaming thrust between vehicles, which also included slowing and stopping the simulator. Benefits of a PLT spacecraft system include a dramatic reduction in fuel consumption in a wide range of space applications, such as orbit adjustments, drag compensation, and rendezvous and docking. The thrust-beaming capability of PLT further enables a distributed multivehicle approach, a revolutionary departure from the "all-in-one" single-spacecraft approach.

View Photonic Laser Thruster Propels Simulated Spacecraft video demonstration at <https://www.youtube.com/watch?v=eHCb-ty3EBU>

"PLT technology has the potential to revolutionize space mission designs," said Dr. Mason Peck, Associate Professor in Mechanical & Aerospace Engineering at Cornell University, who has also served as NASA's Chief Technologist. "Fully developed PLT could serve current commercial and non-commercial needs by increasing the life of LEO satellites, and therefore reducing mission costs. For the future, this unlimited-impulse technology opens doors to applications that are currently impractical, like persistent, precision formations of multiple satellites."

Y.K. Bae Team is currently developing space-qualifiable PLTs, and scaling up PLT in thrust and operation range. "Our next milestone is a flight demonstration in low earth orbit, which will prove the technology of PLT-enabled precision formation flying and stationkeeping with small satellites," according to Dr. Bae, CEO of Y.K. Bae Corporation.

Background:

Y.K. Bae Corp was founded by Dr. Young K. Bae in 2007 to develop innovative space propulsion and x-ray generation technologies that enable more cost-effective and commercially viable enterprises in space. Since then, Y.K. Bae Team has discovered, researched and proven several revolutionary technologies, including the Photonic Laser Thruster and the ultra-high-energy molecule, Metastable Innershell Molecular State (MIMS) primarily under grants and contracts by NASA and DoD. Their work has been widely published in the scientific press, and presented at numerous science and industry meetings.

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