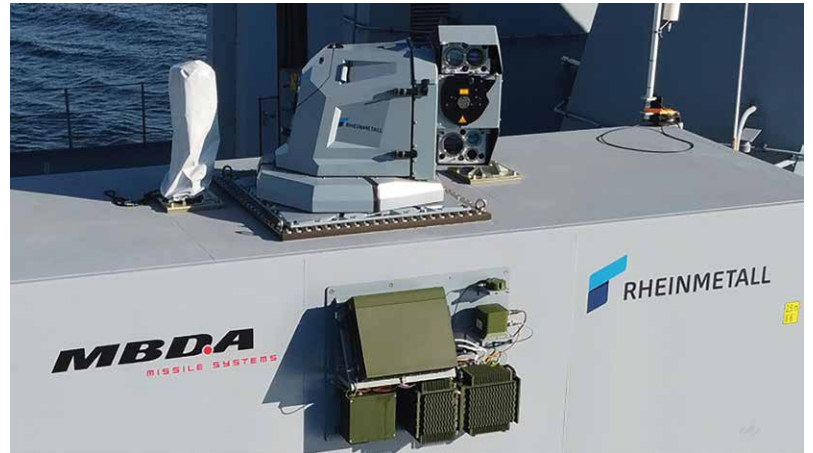


The laser revolution in defence and space



MBDA Dragonfire on the left and on the right, the high energy laser (HEL) weapon demonstrator developed by the German 'High-Energy Laser Naval Demonstrator working committee' (ARGE), consisting of MBDA Deutschland GmbH and Rheinmetall Waffe Munition GmbH.

Power laser sources are becoming increasingly essential in defence and space applications due to their unique capabilities and versatility. In defence, these lasers provide precise and effective solutions for targeting and neutralising threats such as missiles, drones and other airborne objects. Laser systems can also disrupt enemy communications and electronic systems, providing significant tactical advantages on the battlefield. In space, high power lasers have the potential to revolutionise satellite protection, space debris removal, and propulsion systems, opening new frontiers for exploration and defence.

In defence, power laser sources are explored as cost effective alternatives to traditional air defence systems like missiles, particularly for countering unmanned aerial vehicles (UAVs). With UAVs becoming more common and affordable, using expensive missiles for interception poses financial challenges. While soft kill solutions, such as radio frequency (RF) jamming, have been developed, directed energy weapons (DEWs) like lasers and microwaves offer more effective defence against drones and emerging threats like hypersonic missiles.

Similarly, in space applications, power laser sources are emerging as alternatives or supplements to RF communication systems. Ground-to-space and space-to-space communication systems are being enhanced with laser technology, promising improved performance and reliability.

Advancements in power laser sources have led to the development of systems capable of effectively countering small drones, improvised explosive devices (IEDs), and other similar threats, positioning them as crucial components of short range air defence systems. Moving forward, the focus is on enhancing scalability to achieve

even higher power outputs, ranging from 500 kW to 1 megawatt, significantly expanding their operational capabilities against larger or more distant targets.

In space applications, the scalability of power laser sources aims to achieve data transmission rates of up to 200 Gbps, enabling efficient communication systems for deep space missions. These advancements will facilitate faster and more reliable data transfer, supporting various space exploration and communication objectives with greater efficiency and effectiveness.

The report "Power Laser Sources for Defence and Space Applications – Market and Technology Forecast to 2032" offers a comprehensive and forward looking analysis of the current state of the industry and future developments. It emphasises the critical importance of high power laser sources in the defence and space sectors, where recent advancements are driving significant progress and adoption.

One key area of development is in beam combining techniques, which enable the integration of multiple laser beams into a single, high power output beam with exceptional quality. This innovation allows for increased power output while maintaining precise beam characteristics essential for defence applications like targeting and countermeasures.

The study also analyses critical raw materials essential for advancing laser technology in defence and space applications. These raw materials play a foundational role in enabling the production and optimisation of high performance laser systems. The report provides insights into the strategic implications of raw material dependencies and market trends for stakeholders in the defence and space industries, including recommendations