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Rheinmetall's high-energy laser effectors at land and at sea - a HEL-light of DSEI 2015

Highly precise, scalable in effect, versatile in tactical situations, ready for deployment on land and at sea - high energy laser effectors will play a major role in future armament concepts.

Building on a 125-year heritage, Rheinmetall has once again made good its claim to be the global leader in high-energy laser (HEL) technology. The group is "hel-lighting" its role at DSEI 2015. On show are an Oerlikon Skyshield turret with integrated HEL-effector as well as a newly developed powerful HEL effector for naval applications based on the MLG 27 lafette.

With its unique concept of multiple high-energy laser beams superimposed and focused on one spot on the target, Rheinmetall leads the way among European defence contractors in this new field. After six years of continuously demonstrating a growing capability, a new Rheinmetall air defence application has emerged that is attracting interest worldwide. There is a clear reason for this: the emerging threat from unmanned air systems. Dubbed the low, slow and small (LSS) threat, it has huge potential to create a highly unbalanced situation between conventional defenders and mainly asymmetrically operating attackers. New missions, such as the defence of high visibility events, pose unsolved challenges for contemporary air defence systems that will only be manageable with high energy lasers serving as effectors.

The Oerlikon Skyshield turret equipped with a HEL-effector instead of a conventional gun on show at DSEI 2015 took part in the Rheinmetall Live Laser Demonstration 2013. This event set a new standard for operational deployment of the Group's mobile and stationary high-energy laser effectors.

Rheinmetall's HEL effector is one part of a ground-based laser weapon system. This versatile air defence system consists of an Oerlikon Skyshield or Skyguard fire control unit for target acquisition and weapon control, coupled with an Oerlikon high-energy laser gun using a revolver gun turret equipped with HEL effectors. Each HEL effector consists of one 10 kW fibre laser and a beam-forming unit. Commercial off-the-shelf fibre lasers were modified for an air defence role. The beam-forming unit provides diffraction-limited beam focusing, target imaging and fine tracking of the target.

By using beam-superimposing technology, Rheinmetall has concentrated the power of single laser beams into one tiny spot. This technology not only allows superimposition of multiple laser beams on a single gun platform, but also superimposition of multiple gun platforms. This enables an almost unlimited (e.g. 100 kW and more) power output in line with the evolving air defence requirement. As a result, the high-energy laser gun provides efficient protection against a large spectrum of modern air threats.

Variants of the same technology are also available for ground and naval operations. For ground operations Rheinmetall has demonstrated the effectiveness of high-energy lasers in the 5 kW-class in an APC, the 20 kW class in a Boxer infantry fighting vehicle as well as the 50 kW-class in an 8X8 truck container. For naval operations, the company combined a MLG 27 and a HEL effector of the 20 kW class, which underwent sea trials in 2014.

Major surface combatants offer enough space to house the kind of generators needed to power high-energy laser effectors. Therefore Rheinmetall has also developed a new standalone HEL effector for naval applications. This innovative device is also on display at DSEI 2015.

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