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Modern air defence: Rheinmetall “HEL-lights” a fully integrated air defence high-energy laser weapon system at IDEX 2015

A “HEL-light” at this year’s IDEX is on view at the Rheinmetall stand, where the Group is showcasing its globally leading competence in inner tier air defence: The full spectrum of today’s and tomorrow’s effectors – a 35mm revolver gun, a SHORAD missile launcher and a 30-kW high energy laser (HEL) weapon – have all been integrated into a Skyguard 3 air defence system.

Oerlikon high-energy laser gun

The HEL effector is just one part of a ground-based laser weapon system. This versatile air defence system consists of an Oerlikon Skyguard 3 fire control unit for target acquisition and weapon control and an Oerlikon high energy laser gun using a revolver gun turret equipped with laser weapon modules. Each module consists of one 10 kW fibre laser and a beam-forming unit. Commercial off the shelf fibre lasers were modified for air defence applications. The beam-forming unit provides diffraction-limited beam focusing, target imaging and fine tracking of the target.

By using beam superimposing technology, Rheinmetall has combined the power of single lasers into one multiplied laser beam. This technology not only allows superimposition of multiple lasers on a single gun platform, but also superimposition of multiple gun platforms. This enables an almost unlimited (e.g. 100kW 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.

A major advantage of HEL effectors is their outstanding flexibility with regard to escalation and de-escalation. The output power of the high-energy laser gun is eminently scalable. When fired at the optics of aircraft, UAVs, weapons or energy sources, for example, the HEL effector is able to neutralize entire weapon systems without destroying them.

In multiple tests at the Group’s proving ground, the generic laser weapon demonstrator proved highly effective against UAVs and rocket, artillery and mortar (RAM) targets in static and dynamic scenarios.

The HEL effector is controlled by the Skyguard 3 fire control unit, which also controls a revolver gun and an ASRAD 1 missile launcher. Rheinmetall's widely fielded fire control systems can thus manage the full panoply of current and future effectors.
Oerlikon Skyshield MOOTW/C-RAM System

The Oerlikon Skyshield MOOTW/C-RAM system is Rheinmetall's answer to the threat from RAM. It is specifically designed to defend high-value civilian or military assets from RAM attacks, whether in high-intensity combat scenarios or in “military operations other than war” (MOOTW). The system can also be used for protecting critical infrastructure or targets with a high symbolic value from terrorists and insurgents employing unorthodox tactics.

Highly sophisticated yet extremely robust, this state-of-the-art system combines permanent airspace surveillance, automated detection and tracking of extremely small targets, prior warning of areas under threat and the interception and destruction of approaching RAM targets. Coupled with an Oerlikon Skymaster command and control system in MOOTW configuration, the Oerlikon Skyshield MOOTW/C-RAM system is entirely up to the task.

The Skyshield MOOTW/C-RAM system depends on Oerlikon Ahead airburst ammunition technology. Reliably neutralizing a wide variety of threats, it calculates the incoming projectile’s point of impact and warns personnel in the threatened zone. Advanced fire control technology results in optimum, precisely timed target assignment and interception.

Furthermore, Rheinmetall’s Skyshield technology is by no means limited to static defence roles. Mobile applications are equally feasible. For short-term missions, a truck-mounted version is available which can be deployed without unloading the system from the truck. This is particularly useful if the mission involves protecting a succession of different sites for short periods. Mounting a Skyshield Air Defence System on an all-terrain 6x6 or 8x8 vehicle ensures maximum operational flexibility.

Visitors to IDEX 2015 can find out more about the Skyshield MOOTW/C-RAM system at the Rheinmetall stand, where different components of other air defence systems, including the Oerlikon Skyguard 3 fire control unit, an Oerlikon high-energy laser gun demonstrator and the Asrad 1 missile launcher are also on display.

Oerlikon Revolver Gun Mk2

Making its debut at Rheinmetall Medium Calibre Day 2013, the Oerlikon Revolver Gun Mk2 is one of the Group's latest development projects. It too can be viewed at the Rheinmetall stand.

The Revolver Gun Mk2 is a remotely controlled, networkable, 35 x 228mm air defence gun. It features beltless ammunition feeding. Using clips, two men can replenish the 252-round magazine in about eight minutes. This enables 14 bursts of 18 rounds each. Its rate of fire is roughly 1,000 per minute. The Mk2 is designed to use Rheinmetall's Ahead ammunition technology. Furthermore, it can be modified very easily to make it C-RAM-capable.
**Oerlikon Ahead Airburst Munition**

Each round of Rheinmetall’s 35mm Oerlikon Ahead airburst ammunition contains a lethal payload of heavy metal spin-stabilized subprojectiles, unleashed in the path of an oncoming target at a programmable, predefined point in time. A short burst of Ahead ammunition produces a dense cloud of lethal subprojectiles. These penetrate the outer skin of the target, causing catastrophic damage to its interior.

Ahead airburst ammunition can bring down targets at greater distances with fewer rounds fired, making it a much more cost-effective solution than conventional ammunition. The technology can be used in ammunition ranging in calibre from 30mm to 76mm. Ahead technology is suitable for ground, air force and naval applications. As an alternative option, Ahead rounds can also be fired in non-fused mode, in which they behave like frangible rounds upon impact and are able to penetrate and destroy hard targets very effectively. In effect, Ahead is actually two types of ammunition in one.

Existing Skyguard systems can also be retrofitted with Ahead technology. Furthermore, due to the complete modularity of its systems, Rheinmetall is able to bring additional components into play, readily creating multi-mission capabilities tailored to the needs of individual clients.

Cutaway models of Rheinmetall’s Ahead muzzle-integrated programming unit and Ahead ammunition are on show at IDEX 2015.

**About Rheinmetall**

A global leader in inner tier air defence, Rheinmetall is the world’s sole single-source supplier of battle management systems, fire control systems, automatic cannon, integrated missile launchers and Ahead ammunition. One of the company’s core competencies is the development and manufacture of advanced air defence systems as well as simulators and training systems.

Around the globe, the armed forces of more than 40 nations have come to rely on the multifaceted, automated and highly effective air defence solutions supplied by Rheinmetall. Among the company’s best-known products are its widely introduced Oerlikon Skyguard air defence system and the Oerlikon Skyshield generation with its pioneering revolver guns.

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