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First-class force protection for a strong army: Rheinmetall's Air Defence competence

Ground-based air defence (GBAD) is a crucial capability not just for modern, globally operating armed forces: protecting critical infrastructure at home also calls for new concepts. After all, ground troops are vulnerable to many different forms of aerial attack not only when deployed abroad in conventional and asymmetric conflict and post-conflict situations, but on the home front too – especially in lower airspace at altitudes of up to 3,000 metres. And this applies equally to sensitive installations.

Today, owing to the ready availability of high-tech components, it is possible for a foe with limited means and limited technical know-how to fabricate small unmanned air vehicles and even cruise missiles that are able to cause considerable damage.

RAM stands for rockets, artillery and mortar. Widely available, they are often the weapons of choice for insurgent groups and terrorist organizations, capable of causing havoc and potentially devastating damage to a nation's vital strategic interests. In asymmetric warfare, a RAM-armed enemy nearly always employs hit-and-run tactics, making this kind of attack hard to counter. All too often, the enemy simply melts back into the civilian population.

The Oerlikon Skyshield MOOTW/C-RAM system is Rheinmetall Air Defence's answer to this challenge. The system is 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.

The Skyshield MOOTW/C-RAM system depends on Ahead airburst technology. Available in various configurations, the 35mm revolver gun is suitable for multiple applications. This state-of-the-art system can operate in a conventional anti-aircraft role or be used for protecting military and civilian assets from RAM threats, and is also highly effective in a naval context: known as the Millennium Gun, it is already in service with two navies.

Highly sophisticated yet extremely robust, this state-of-the-art system combines permanent airspace surveillance, automated detection and tracking of very 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.

Each Skyshield MOOTW/C-RAM system initially consists of an Oerlikon Skymaster command and control system in MOOTW configuration (man-machine interface and high power computer system) for carrying out surveillance operations and weapons assignment, which are largely automated; however, manual intervention is possible at any time. Two data-fused sensor units, each equipped with search radar, tracking radar and IR/TV trackers, ensure round-the-clock airspace surveillance. They identify incoming RAM projectiles or other threats, and control the fire unit of up to eight Oerlikon Revolver Guns C-RAM. Using two sensor units ensures complete coverage of the engagement zone and provides necessary redundancy for 24/7 operations. It also increases the system's ability to cope with saturation attacks as well as its overall readiness and reliability. The number of Oerlikon Revolver Guns C-RAM depends on the size of the area to be defended. Besides RAM projectiles, they are capable of defeating unmanned aerial vehicles, cruise missiles, guided missiles, smart bombs as well as fixed wing and rotary aircraft.

Instantly and automatically, the Skyshield MOOTW/C-RAM system is thus able to neutralize a wide variety of threats. It calculates the incoming projectile's point of impact (POI) and warns personnel in the threatened zone. Advanced fire control technology results in optimum, precisely timed target-assignment and interception. In addition, by determining the type of weapon used and its point of origin (POO), the system enables a counterattack. This rapidly deployable air defence system can be airlifted for round-the-clock, round-the-globe protection of vital assets. Owing to the high level of automation, the system's personnel requirements are negligible.

Oerlikon Ahead Ammunition Technology

The Skyshield MOOTW/C-RAM system depends on Ahead airburst technology. Each round of 35mm Ahead ammunition contains a lethal payload of heavy metal, spin-stabilized subprojectiles, unleashed in the path of an oncoming target at 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 technology 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. Rheinmetall is currently integrating payloads into Ahead rounds which are optimized for a variety of tactical roles in various calibres, with subprojectiles ranging in weight from less than one gram to more than twenty grams. 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.

Laser expertise

In recent years, moreover, Rheinmetall has been intensively exploring ways of using laser technology for countering conventional and asymmetric threats. This technology offers the major advantage of being able to neutralize threats in a scalable manner with great precision. Only a few weeks ago, Rheinmetall successfully demonstrated the effectiveness of its laser technology during a “live fire” test at its Ochsenboden proving ground in Switzerland.

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