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Threat-adequate and highly mobile: Rheinmetall's scalable hybrid solution for modern ground-based air defence

Mobile, modular, and scalable, ground-based air defence systems are gaining new importance now that NATO as well as armed forces of partner countries are focusing once again on defending national and allied territory and airspace. At Eurosatory 2022, Rheinmetall is displaying its solutions for this area of application. On show is a Boxer 8x8 wheeled armoured vehicle configured for an air defence role, topped with the Skyranger 30 turret and an integrated surface-to-air missile launcher. Also on show will be the Skynex air defence system, consisting of a 35mm Mk3 Revolver Gun, Multi Sensor Unit with AESA radar, and a Control Node 1 command centre, with a high-energy laser functioning as a future effector.

Skyranger 30

The Skyranger 30 is a hybrid solution designed to thwart the full range of future airborne threats. Here, the interplay of a 30mm automatic cannon, guided missiles, and in perspective a high-energy laser (the Skyranger 30 HEL variant) results in a mix of effectors unique in this combination. Teamed with a matching sensor mix, the Skyranger 30 can monitor airspace autonomously, while simultaneously selecting the optimum effector in response to emerging threats. The Skyranger 30 can protect mobile units on the march or critical stationary infrastructure and facilities from aerial threats. No matter what the initial situation, an appropriate response is always readily available, assuring adherence to legal requirements and the avoidance of collateral damage.



Thanks to its longstanding experience in the field of ground-based air defence and adherence to a clear technical road map for a future laser weapon system, Rheinmetall is able to integrate mechanically and systemically a full range of advanced capabilities into a wheeled or tracked mobile platforms such as the Boxer multipurpose wheeled armoured vehicle (produced in cooperation with industrial partners) or the tracked Lynx KF41 armoured vehicle. Thanks to the highly flexible Skymaster fire control system and state-of-the-art sensors, the effectors achieve maximum tactical impact.

Featuring a rate of fire of 1,200 rounds per minute, the 30mmx173 KCE revolver gun is the world's top-performing weapon in this calibre. Programmable time-delay ammunition enhances the probability of hitting even the smallest aerial targets. The Skyranger 30's guided missiles increase the system's operational flexibility and maximum range.

► Key facts



- Effector mix comprising revolver gun, guided missiles, and in perspective a high-energy laser weapon
- Autonomous surveillance of airspace and situation-driven engagement of targets
- Can be integrated into wheeled and tracked vehicles
- Function demonstrator for counter-drone operations successfully presented in Switzerland at the end of 2021

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Laser on board

Rheinmetall's HEL effectors consist of a laser source and laser guidance system, both of which are integrated into the vehicle, along with a laser weapon station built into the turret that simultaneously serves as a platform for the electro-optical sensors. The laser weapon station tracks targets automatically, neutralizing them with a laser beam. Thus, the Skyranger 30 HEL is capable of effectively defending assigned airspace with three different effectors – an automatic cannon, guided missiles, and a high-energy laser – with the appropriate level of intensity.

In live trials, current technology sample systems for laser weapon systems have successfully achieved laser outputs of 20kW. The ability to increase this figure to 100kW is already an integral feature of this technology. The laser weapon station used here has its own sensors for identifying and tracking targets. Subassemblies coordinated by Rheinmetall to interoperate harmoniously produce the outstanding beam quality of Rheinmetall laser sources even at high-output levels, meaning that they can be directed at the target with high precision. The carrier platform's sophisticated mechanical design assures 100% coverage of assigned airspace. Laser outputs of up 20-50 kW are planned for the first realization phase.



At the end of 2021, the Skyranger HEL was presented in public for the first time at a counter-drone event held by the Swiss procurement agency armasuisse in Bure, Switzerland, sparking great interest from the experts present at the event.