press release

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Flying colours: Rheinmetall successfully tests 50kW high-energy laser weapon

Rheinmetall has successfully tested its new 50kW high-energy weapon technology demonstrator. Conducted at the end of November, the test encompassed the entire operational sequence from target detection and tracking to target engagement. Building on a 123-year heritage, the Düsseldorf, Germany-based Group has once again made good its claim to be the global leader in high-energy laser (HEL) technology.

The test was conducted at Rheinmetall's Ochsenboden Proving Groud (EZO) in Switzerland, in snowy conditions and blinding sunlight, and was initially supposed to show the increase in efficiency of the 50kW HEL weapon compared with the 10kW version demonstrated last year. A five-fold increase in laser power was thus available for the individual scenarios, which included Air Defence, Counter Rocket, Artillery, Mortar/C-RAM, and Asymmetric Warfare operations. Furthermore, the tests were intended to prove that separately located HEL weapon stations using Rheinmetall's existing Beam Superimposing Technology (BST) are able to irradiate a single target in a superimposed, cumulative manner. This modular technology approach makes it possible to maintain the very good beam quality of the individual laser modules, increasing overall performance several times over. Thus, from the technical stand-point, nothing stands in the way of a future HEL weapon system with a 100kW output.

The 50kW HEL weapon technology demonstrator consisted of two functional models: a 30kW weapon station integrated into an Oerlikon Revolver Gun air defence turret for static and dynamic tests, coupled with an Oerlikon Skyguard fire control unit; and a 20kW weapon station integrated into a Revolver Gun turret of the first-generation, patched in for static tests. There were also additional modules for supplying power.

Witnessed by leading experts, the demonstration delivered compelling evidence for the 50kW HEL weapon technology demonstrator's high stability: a massive, 15mm-thick steel girder was cut through at a distance of 1,000 metres. The successful shooting down of several nose-diving target drones at a range of two kilometres formed the second major highlight. Though they were flying at over 50 metres a second, the Skyguard radar had no trouble detecting the incoming unmanned aerial vehicles at a distance of three kilometres. Then the 30kW weapon station used the Skyguard data to carry out rough tracking mechanically. The optical tracking system in the Beam Forming Units (BFU's) in the individual leaser weapon modules performed fine tracking of the UAVs. After reaching the programmed fire sector the

laser weapon modules engaged the UAV's immediately and destroyed the incoming UAVs within a few seconds.

The third highlight: detection, pursuit and successful engagement of an extremely small ballistic target. A steel ball measuring 82 mm in diameter and travelling at approximately 50 m/sec, the target replicated a mortar round. The Skyguard fire control unit immediately detected the target, followed by mechanical tracking with the 30kW laser weapon station. At this point, the BFU of the laser weapon module took over, optically tracking the target, which was then engaged and destroyed in flight, leaving no doubt as to the tactical viability of using laser weapons in future C-RAM scenarios. Moreover, the test makes clear that the time necessary for engaging mortar rounds at long ranges can be substantially reduced. Today, the required engagement time is already low enough to be in the region needed for C-RAM applications – even when adverse weather conditions make targets difficult to detect.

These tests have silenced the sceptics, proving that Rheinmetall's HEL weapon technology demonstrators can neutralize targets even under the most difficult weather conditions, including snow, dazzling sunlight, ice and rain. Furthermore, the tests provide compelling proof that Rheinmetall leads the way in matching the energy and cooling requirements of a future HEL weapon system to the operational scenario requirements. Compared to last year, Rheinmetall has significantly increased the power density (kW/m^3) of the technology demonstrator, enabling it produce twice the laser output within the same volume.

Outlook

Rheinmetall plans to set up a company-financed 60kW technology demonstrator in 2013 with greater laser output. Besides laser weapon stations, the plan calls for integrating 35mm Ahead Revolver Guns into the system. This will enable Rheinmetall engineers to identify and study possible synergies between laser weapons and automatic cannon.

Finally, the concept for a mobile HEL weapon, which was successfully implemented with 1kW functional model mounted on a special TM170 vehicle, will also be pursued, this time with different mobile platforms. The objective here is to explore the parameters for integrating an HEL weapon on vehicles operating in the open.

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