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## **Leopard 2 expertise from Rheinmetall**

Assuring maximum mobility even in the toughest terrain, the Leopard 2 main battle tank combines excellent survivability and firepower with superb situational awareness and handling characteristics. Designed for high-intensity conventional combat operations, it is equally effective in asymmetric scenarios. Today the Leopard 2 forms the backbone of the mechanized formations of 18 nations worldwide – including the Polish Army.

Rheinmetall has unsurpassed expertise in all facets of the Leopard 2 family. This derives from its status as an original equipment manufacturer as well as the comprehensive maintenance and modernization programmes it has carried out -- to say nothing of its advanced armament concepts and 360° technical and logistic support for the entire fleet of vehicles, to include service performed on location during deployed operations. Moreover, training and simulation solutions for Leopard 2 crews also feature prominently in Rheinmetall's portfolio of products and services. The Düsseldorf-based tech group for mobility and security is showcasing its Leopard 2 expertise at MSPO 2016.

### **The Leopard 2 PL – Rheinmetall modernization expertise in action**

Poland has contracted with Rheinmetall to carry out a complete modernization of 128 Leopard 2 MBTs. In an industrial consortium with Polska Grupa Zbrojeniowa (PGZ) and ZM Bumar-Łabędy S.A., Rheinmetall now serves as a strategic partner of the Polish companies, contributing key technological know-how in areas such as electronics and advanced weaponry.

During the course of modernization, the 128 Leopard 2 A4 tanks – purchased by the Polish Army from surplus Bundeswehr stocks in 2002 – will be upgraded to the new Leopard 2 PL standard.

Under the contract, the consortium is to supply a prototype at the end of 2017. Then, once approval for serial production is granted by the Polish armed forces, another five tanks will follow, which Rheinmetall will overhaul in Germany. The next twelve tanks will be completed at the Bumar-Łabędy plant under Rheinmetall supervision. From this point on, the Polish side will take responsibility for project management, retrofitting the remaining 110 tanks by 2020.

Improved survivability is a further goal of the modernization programme. New AMAP armour modules from IBD Deisenroth provide enhanced protection from KE and HE projectiles. An installation of a fire extinguisher/fire suppression system will assure optimum crew protection.

The turret will be retrofitted with electric drives, which, apart from enabling improved accuracy and helping to save space, will reduce the risk to the crew. In order to

improve situational awareness to the rear of the vehicle and assist the driver, a video camera will be installed.

However, the modernization programme focuses first and foremost on upgrading the tank's main armament and fire control technology as well as expanded use of state-of-the-art electronic components and improved force protection features.

The fire control unit will be modified through software changes to handle new ammunition types, which Rheinmetall also develops and produces for the Leopard. A latest-generation thermal imaging device will significantly expand the vehicle's sensor capabilities. The Rheinmetall-made L44 main armament will be adapted to fire the enhanced-performance DM63A1 KE round. It will also be equipped with a programming capability that will enable it to fire multipurpose HE DM11 ammunition. Visitors to MSPO 2016 can inspect a demonstrator version of the Leopard 2 at the PGZ Group stand.

### **A versatile array of 120mm ammunition**

Rheinmetall Defence developed the 120mm smoothbore main armament that is used in all Leopard 2 tanks – not just the gun but the ammunition as well. Germany's foremost defence contractor continues to be the specialist of choice for upgrading this main battle tank. Viewing this as an obligation to its customers, Rheinmetall spares no effort to ensure that its 120mm technology remains commensurate to the threat.

The first potential customers for this approach are Leopard 2 user nations interested in upgrading parts of their fleet with an enhanced-performance L55 barrel. No later than 2018, Rheinmetall intends to roll out an improved version of the 120mm L55 tank gun (working title: L55A1), which, coupled with the latest generation of KE ammunition, will be significantly more effective against modern protection systems. If required, a technically similar solution could be made available for upgrading the standard L44 barrel to L44A1 status.

Besides high-performance kinetic energy rounds, Rheinmetall supplies time-delay tank ammunition. Known as the 120 mm x 570 HE Temp. DM11, this round is programmed after loading. The system modification necessary for this (a programming kit) can be readily integrated into any armoured fighting vehicle equipped with a 120mm smoothbore gun and a modern fire control unit.

The ammunition can be used in three different fuse modes:

- Impact fuse mode/point detonation, (PD); here the warhead detonates in the target medium in order to produce major breaches;
- Point detonation with delay, (PDwD); in this case the warhead detonates only after penetrating the target envelop;
- Programmable airburst mode (AB); here – at a range of up to 5,000 metres – the warhead detonates in front of and above the designated location for maximum effectiveness against area targets.

Referring to it as the "Multi Purpose (MP) DM11", the US Marine Corps uses the DM11 primarily for engaging unarmoured and semi-hard targets in asymmetric warfare scenarios. The German Bundeswehr has introduced the "120mm HE Temp. DM11" as its standard HE round. A number of other Leopard 2 user nations are currently taking delivery of initial stocks of the DM11, the world's most advanced and effective HE ammunition.

## **Family thinking: the Büffel 3 armoured recovery vehicle**

The Büffel 3 armoured recovery vehicle is a highly mobile, well-protected tracked armoured vehicle. Designed to recover main battle tanks, it can also carry out a wide range of maintenance tasks and support operations thanks to its winch and bulldozer blade. Fully integrated into the Leopard 2 supply chain, future-proof engineering and excellent growth potential characterize this cutting-edge vehicle.

Deployed in operations worldwide, the Büffel ('buffalo') is built on the same chassis as the Leopard 2 MBT, meaning that it delivers the same superb mobility and engine output. As a result, there is no need for the kind of complex, risk-fraught modification of the powerpack that would be necessary if the Bergepanzer 2 ARV were used to support the Leopard 2 fleet.

As the original equipment manufacturer of the Büffel 3, Rheinmetall is the only company worldwide that possesses the full set of technical drawings. Today the armed forces of eleven nations field the Büffel 3, benefitting from Rheinmetall's unsurpassed expertise in ARV development and design. Thanks to the armoured recovery vehicle subgroup of Leopard 2 user nations (LEOBEN ARV AG T/NU), all participants profit from this wealth of operational experience. A Büffel 3 ARV is on display at the PGZ Group stand.

## **Training and simulation**

Rheinmetall is also modernizing Poland's Leopard 2A4 simulators. The Group is currently upgrading the Polish Army's existing ASPT and AGPT gunnery and combat simulators to state-of-the-art standard, employing its advanced TacSI technology in the process. Here, Germany's foremost supplier of ground forces systems and equipment is drawing not only on its Leopard 2 expertise and superb simulation capabilities, but also incorporating serious game technologies into the simulation. Rheinmetall's approach combines the virtues of the game engine in the field of visualization with the high-fidelity accuracy of modern simulators.

A further advantage of the Rheinmetall system: multiple simulators can be networked together, enabling tactical training at platoon and company level.

The armed forces of Germany, Switzerland, Spain, Canada and Indonesia already place their trust in Rheinmetall technology for training their Leopard 2 crews. The Group's Simulation and Training business unit supplies and modernizes a variety of gunnery and combat simulators like the Leopard Gunnery Skills Trainer (LGST) and driving simulators such as the Driver Training Simulator (DTS). Here, the emphasis is squarely on gunnery and combat training for tank commanders, gunners, loaders and drivers.

This order demonstrates once again the high degree of trust the international defence community places in Rheinmetall simulation and Leopard 2 technology.

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