Experimentation of the first digital twin demonstrator for a ground combat system

- The French MOD’s procurement and technology agency (DGA), with the support of its Defense Innovation Agency (AID), entrusts the KNDS-ARQUUS consortium with the experimentation of the first digital twin demonstrator for a ground combat system.
- This digital twin demonstrator is the first to be applied to a ground combat vehicle.
- The development of this demonstrator will lead to a full-scale deployment on 20 VBCI vehicles, and to the experimentation of predictive maintenance for an initial fleet of Army’s vehicles.

The first digital twin for ground combat systems

The defense technology project "Digitization of maintenance" (NumCo) aims to develop and experiment with a digital twin demonstrator of the VBCI infantry fighting vehicle. It will be the very first digital twin in the field of ground combat systems.

Thanks to advanced modeling and simulation capabilities, the technology developed by KNDS and ARQUUS will enable the industry, the DGA, and the Army to jointly implement a virtual twin of the VBCI vehicle to support engineering and maintenance activities.

The NumCo digital twin builds on the experience gained over several years by the KNDS-ARQUUS consortium, particularly within the framework of the European Commission’s FAMOUS defence industrial development programme. These innovative technological developments are at the heart of the digital architectures of future combat vehicles.

The future of maintenance

The NumCo digital twin demonstrator will be developed through an incremental and agile approach over two years and then improved over two years with the training data from 20 instrumented VBCI. The experimentation could be extended to an additional batch of 20 VBCI.

As part of this experimentation, several Health and Usage Monitoring System (HUMS) sensors will be deployed on the physical vehicles to collect large amounts of data, analyze them, and transcribe them into digital models and virtual representations. The system will rely on multiple predictive algorithms that will determine the lifespan of a variety of mechanical parts based on vehicle usage, anticipate breakdown risks, and personalize maintenance operations for each vehicle, facilitating failures diagnosis.

Ultimately, the NumCo digital twin technology is expected to be the central element of KNDS's and ARQUUS's offers for the modernization of maintenance of the Army's vehicle fleets.

About KNDS

KNDS (KMW+NEXTER Defense Systems) is the result of the combination of Krauss-Maffei Wegmann and Nexter, two of Europe's leading manufacturers of military land systems based in Germany and France. KNDS is a group of around 9,000 employees, with sales of 3.2 billion euros by 2022, an order backlog of around 11 billion euros and order intake of 3.4 billion euros. Its product range includes tanks, armored vehicles, artillery systems, weapon systems, ammunition, military bridges, customer services, information and command systems, training solutions, protection solutions and a wide range of equipment. The creation of KNDS marks the beginning of the consolidation of the land defence systems industry in Europe. The strategic alliance between KMW and Nexter strengthens the competitiveness and international positioning of both groups, as well as their ability to meet the needs of their respective national armies. In addition, it offers European and NATO customers the possibility of greater standardisation and interoperability for their defense equipment, with a reliable industrial base. KNDS is headquartered in Amsterdam.

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About Arquus

Arquus is a French defence company and a leader in land mobility solutions. A long-standing partner of the armed forces, Arquus has nearly 25,000 vehicles of all types in service with the French army, of which 20,000 are supported by the company. Arquus is involved in the production of the French army's new generation of front-line vehicles, the VBMR Griffon and the EBRC Jaguar, produced by a Groupement Momentané d'Entreprises. Arquus is in charge of supplying the powertrains and remotely-operated self-defence systems for these two vehicles. Arquus also handles all logistics for spare parts and components for the VBMR and EBRC vehicles in the Scorpion program, thanks to its logistics platform in Garchizy. As a support specialist, with nearly 20,000 vehicles supported on a daily basis, Arquus offers comprehensive support solutions based on the company's long-standing expertise. These solutions are supported by an international logistics network based on that of the Volvo Group, of which Arquus is a member. As an innovative company, Arquus invests in major areas such as architecture, survivability, mobility, energy, robotisation, fire support and support. A complete system integrator, Arquus also offers remote-operated turrets (Hornet range, developed as part of the Scorpion program), vetronics solutions (Battlenet), and mobility (4x4, 6x6 and 8x8 chassis). Arquus is present in over 60 export markets.

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