



Defence-related Research Action - DEFRA

ACRONYM: NEMEA

Title: Novel Energetic Materials for Efficient Ammunition

Duration of the project: 01/12/2024 - 01/03/2028

Key words: Energetic materials, explosive, propellant, warhead, ignition, obscurant

Budget: 1.910.416 €

of which RHID contribution: 1.561.905 €

PROJECT DESCRIPTION

The project consists of bringing together a significant part of the Belgian industrial and academic actors involved in energetic materials research and ammunition development, in order to develop novel energetic materials and integrate them into efficient ammunition and effectors that provide a differentiating advantage on the battlefield, mainly in terms of performance or cost-effectiveness, and in particular against emerging threats such as unmanned aerial systems, highly effective and long-range guided missiles and loitering ammunition. This project addresses key issues related to novel weapon systems and protection of personnel and platforms, supports scientific innovation, and strengthens and promotes cooperation and an integrated approach within the Belgian defence industry and research institutes.

This project is driven by the current geo-strategic situation, which has highlighted the need to develop new, highly effective munitions with differentiated performance to maintain strategic advantage on the battlefield, as well as the need for cost-effective solutions to scale up production to meet the requirements of a high-intensity conflict. New threats, such as unmanned aerial systems, have also emerged and need to be countered with new, more effective systems, such as rocket effectors. This project aims to make a direct contribution to the development of advanced weapon systems and the protection of personnel and platforms. This project will develop novel composite propellants with improved mechanical properties and safety, and enhanced high explosive formulations with improved performance to be incorporated into novel weapon systems, such as highly effective effectors against unmanned aerial systems with improved range, and enhanced warheads with high performance against infrastructure and fortifications. In the area of personnel, systems and infrastructure protection research, the novel multispectral obscurant formulation developed in this project plays a key role in protecting combat platforms against guided missiles and loitering ammunition that rely on visible and/or long-wave infrared seekers for target detection and acquisition, by generating a multispectral obscurant effect that is highly efficient and long-lasting thanks to the unique properties of the considered solution. This is of paramount importance in view of the significance of these threats in current operations. Other aspects being studied, such as ignition formulations or integration into effectors or ammunition, are also very relevant to studying the real-world impact of these innovations.

The aim of the project is to carry out innovative research into novel energetic materials with competitive advantages over the state of the art, and to integrate them into ammunition and effectors to improve their overall performance and cost-effectiveness. Within this framework, there are four main research objectives, each linked to a specific application and based on two novel technologies:

- 1. Novel and highly efficient multispectral obscurant
- 2. Novel igniting formulations for pyrotechnic ammunition and rocket motor
- 3. Novel composite propellant formulations based on advanced surface treatment
- 4. Blast-enhanced high explosive formulation based on advanced surface treatment

A generic and well-established methodology for the development of new energetic materials and their integration into ammunition will be used. Although the applications are different, the project aims to exploit the complementarities between the partners and the similarities between the materials and qualification processes in order to make the most efficient use of synergies and achieve significant results in a short time and with a reasonable use of resources. The complementarity of the consortium will enable demonstrators to be produced and tested by the end of the projects, and Thales Belgium and KNDS BELGIUM have the capacity, experience and knowledge to bring these solutions to industrial scale production in a short timeframe and make them available to Defence.

In addition to the main objectives of producing demonstrators of the technologies studied in this project, it will be valorised through scientific publications and the organisation of workshops.

CONTACT INFORMATION

Coordinator Romuald VAN RIET Royal Military Academy, Department of Chemistry <u>Romuald.vanriet@mil.be</u>

Partners Thomas GODFROID Materia Nova thomas.godfroid@materianova.be

Hugues CHARLIER KNDS Belgium hugues.charlier@knds.be

Benjamin RAHIER Thales Belgium <u>benjamin.rahier@be.thalesgroup.com</u>

Arnaud OSI NanoPyro arnaud.osi@nanopyro.be