MUNITIONS AND GUIDED WEAPONS

TNO is an independent innovation organization that connects people and knowledge in order to create the innovations that sustainably boost the competitiveness of industry and wellbeing of society.

TNO focuses its efforts on seven themes including Defence, Safety and Security.

By creating innovations for people working in defence organizations, the police, emergency services and industry.

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YOUR PARTNER IN CO-DEVELOPMENT AND SUPPORT FOR INNOVATIONS IN MUNITIONS AND GUIDED WEAPONS

MUNITIONS AND GUIDED WEAPONS

HEALTH MANAGEMENT
RISK ANALYSIS
QUALIFICATION
AFFECT
RANGE
FLEXIBILITY
PRECISION
EFFECTS AND FLEXIBILITY

MUNITIONS AND GUIDED WEAPONS

NEEDS CALL FOR PRECISE AND FLEXIBLE DEVELOPMENT

To achieve superior effect, range, flexibility and precision in guided weapons and munitions, an integral perspective has an added value. Furthermore, whether it concerns a round for line-of-sight weapon systems, an artillery shell or a smart missile, the system design always needs to optimise safety and cost, taking into account numerous other aspects related to the expected operational life cycle. TNO supports munitions and guided weapon system manufacturers and future users to define the best functional requirements based on operational needs.

The integral system approach

TNO supports the development of munitions and guided weapons by developing integral simulation models that cover munitions of all calibres and all applications, which can contribute to the fighting power of both naval and ground artillery forces.

Effect

The direct and indirect effects of technology in modern conflicts demand more accurate, lethal and versatile combat systems. The ability to tailor the weapon system and optimise effects in all phases of the life cycle is a key enabling technology to provide range and performance improvements for the future user. The system design always needs to optimise safety and cost, taking into account numerous other aspects related to the expected operational life cycle, TNO supports munitions and guided weapon system manufacturers and future users to define the best functional requirements based on operational needs.

Precision

TNO supports the development of guided weapons and air-breathing propulsion systems. TNO has unique facilities to perform direct-connect free jet tests such as ramjet air plants. Also TNO can perform direct-connect ground tests such as 1400 m/s. The solid fuel ramjet technology offers the simplicity and robustness compatible with the harsh gun-launch environment. The effect based approach of military system design is always the key enabling technology to provide range and performance improvements for the future user.

Range

The solid fuel ramjet technology allows for an integral system approach. We use the integral approach to design and optimise munitions and guided weapons concepts and products. This is done with and for industry or for armed forces, for whom we test and evaluate their products. Our activities cover munitions of all calibres and all guided weapon systems. Existing operational needs call for flexibility and precise effects, which is why we focus our activities on:

- Effect
- Flexibility
- Precision

FLEXIBILITY

Key technologies and weapons are essential to modern day military operations and account for a large portion of the budget. TNO supports lieutenancy and armed forces to develop the capability to design, build and operate systems that allow them to perform their mission in ever more demanding operational environments.

EFFECTIVENESS ASSESSMENT

CASE: NON-LETHAL WEAPON DEVELOPMENT

The assessment of non-lethal weapon effects is largely uncharted territory. Hence, internationally agreed standards and procedures are lacking. TNO develops a range of effective tools to estimate and quantify effects ranging from physical impacts to on-board electronic charges as an effect of non-lethal weapons. Currently available capabilities include assessment of non-operating projectiles, acoustic performance of hailing devices, optical effects of lasers and other light sources, stopping power of vehicle arresting systems and the range of capabilities is still expanding. The ability to measure these effects is also applied for manufacturing requirements and specification building tests for weapon development.

EFFECTIVENESS ASSESSMENT

CASE: NON-LETHAL WEAPON DEVELOPMENT

TNO successfully co-developed a prototype 35 mm solid fuel ramjet air defence projectile that demonstrated a sustained flight speed of 1000 m/s. The solid fuel ramjet technology offers the simplicity and robustness compatible with the harsh gun-launch environment. The effect based approach of military system design is always the key enabling technology to provide range and performance improvements for the future user. Furthermore, whether it concerns a round for line-of-sight weapon systems, an artillery shell or a smart missile, the system design always needs to optimise safety and cost, taking into account numerous other aspects related to the expected operational life cycle. TNO supports munitions and guided weapon system manufacturers and future users to define the best functional requirements based on operational needs.