EDF-2021-GROUND-D: Fleet upgrade and close combat

Proposals are invited against the following topics:

EDF-2021-GROUND-D-FMGV: Future modular ground vehicles and enabling technologies, including green technologies;

Budget

The Union is considering a contribution of up to EUR 41 000 000 to support proposals addressing any subject of interest for defence.

The budget earmarked on 2021 appropriations for this action will be completed by an amount of EUR 109 000 000 from 2022 appropriations. This complement is subject to the adoption of a separate financing decision.

Several actions, addressing different topics, may be funded under this call.

The evolving operational environment requires the development of next generation and the modernisation of current armoured platforms with improved robustness, agility, versatility and interoperability. Moreover, future land vehicles will require the ability to operate in adverse conditions, in digitised battlefield and network centric environments, and to obtain scalable effects, while ensuring efficient maintainability and support, high level of operational readiness and optimized life cycle cost. This topic addresses mainly technologies enhancing the mobility performance of ground platforms, making them more capable, modular and energy-efficient.

Specific challenge

Future capability and operational challenges require the development of next generation and the modernisation of current platforms, armoured with enhanced interoperability, agility, survivability, mobility, durability, versatility, security including cyber, as well as the ability to operate in adverse conditions (facing challenging threats in various environments), addressing a large range of missions, in digitised battlefield and network centric environments, and to obtain scalable effects and other ground platforms such as logistic support vehicles, engineering vehicle, while ensuring efficient maintainability and support, high level of operational readiness and optimized life cycle cost. This topic addresses different technologies enhancing ground platforms' mobility performance and core operational functions and other enabling capabilities, which will make them more capable and energy- efficient to achieve these goals.

Due to existence of a number of different armoured land platforms, the complexity of joint and logistic capabilities is increased, and the effectiveness of public investment is decreased. The lack of European system of systems approach for the development of land platform capabilities has affected and inhibited the use of potential joint capabilities. Numerous existing armoured vehicles are aging and therefore do not meet users' capability needs anymore.

Land systems vehicle upgrade programs are a cost effective and fast way of extending the in-service life of existing military vehicle fleets. Opportunities exist to simultaneously extend the in-service life of a vehicle fleet and improve vehicle performance by effective design at any stage of the vehicle life cycle. Due to new challenges in military operations the land systems,

in order to maintain their combat effectiveness, require upgrade processes to enhance both in protection (ballistic armour and protection systems) as well as mission kits, which typically increase the weight of the vehicles. Future programs provide opportunities to extend combat capabilities, to create game changers with respect to past and existing situations and to strengthen interoperability, maximizing impacts on cost-effectiveness and scale-effects. In particular, future vehicles should further protect troops through improved force protection, and stealth, extended situation awareness capability and autonomous functionalities, enhanced engagement capabilities, reduction of harmful vibrations, improved vehicle mobility through suspension upgrades, new technology for flexible tracks (elastomers) and implementation of electric/hydrogen/hybrid power packs and drivetrains.

Scope

Proposals must address the development of next generation or upgrade of current armoured platforms, in particular addressing Armoured Personnel Carrier (APC) and Light Armoured Vehicle (LAV) or developing and integrating modern and upgraded systems, subsystems like hybrid drivetrains and energy storage systems or sensors and a flexible network infrastructure into existing platforms and/or payloads improving significantly their performance. The proposals will thus possibly address other existing or future vehicles of various types and sizes such as Main Battle Tanks (MBT), Infantry Fighting Vehicles (IFV), support vehicles or Combat Engineering Vehicles (CEV).

Targeted activities

The proposals must cover the following activities as referred in article 10.3 of the EDF Regulation, not excluding upstream or downstream activities eligible for development actions if deemed useful to reach the objectives:

- The design of a defence product, tangible or intangible component or technology as well as the definition of the technical specifications on which such design has been developed which may include partial tests for risk reduction in an industrial or representative environment;
- The development of a model of a defence product, tangible or intangible component or technology, which can demonstrate the element's performance in an operational environment (system prototype);
- The testing of product, tangible or intangible component or technology.

Functional requirements

Systems engineering activities should follow ISO/IEC 15288(2015) processes.

1. Mobility

Platforms' mobility must provide a substantial improvement of mobility compared to current platforms including, when appropriate, in an extreme environment (sand, ice, heat, cold), making them more capable and energy-efficient using green technologies and reducing the logistic footprint. Same platform should have high-level tactical and operational mobility. System should also have the capability of crossing water obstacles.

2. Enabling Capabilities

Modularity and commonality

Solutions of capabilities should be based on interoperability, modularity and commonality, which decrease complexity of joint and logistic capabilities of the platforms. They should maximize standardization, offering growth potential and further incremental improvements possibilities, based on a system-of-systems approach including open architecture concepts (e.g. NATO Generic Vehicle Architecture NGVA). This includes the potential integration and interoperability of manned and unmanned aerial and ground vehicles (UAV/UGV).

Drivetrains and energy systems

New platforms will have to export sufficient electric energy for mission and role kits. Here is the need for electrical energy storage, supply and management systems, new running gear and possible new drivetrain systems e.g. hybrid to provide high levels of energy production under degraded condition. This combination should improve the operational life and the efficiency of engines and power packs.

Survivability

Platform protection should be modular by design and according to the threat and/or the specific mission. Platform must be capable of performing their missions under chemical, biological, radiological and nuclear (CBRN) conditions and counter a variety of threats such as kinetic, IED/EFP, UAV ones. Platform should have low visual, thermal, electromagnetic, noise and radar signatures. Platform must be capable of performing their missions, by day, night in extreme environmental conditions. Platforms should be cyber resilient and provide cybersecurity, given the increasing connectivity of systems expected.

Command and control

System should enable high interoperability, through use of common standards and open architectures. Systems should be prepared for optionally manned/unmanned operations. System should be able to accommodate applicable military radio transmitters and receivers during operation and when at a silent watch (not to exclude the use of any military radios due to bad electromagnetic compatibility (EMC)). Platform should integrate Battle Management Systems (BMS), SATCOM, target hand over and have an advanced Position Navigation and Timing system in contested and denied environment. The system should address the vehicles internal network and the network capabilities between vehicles. The requirements for network support for collaboration with dismounted personnel or remotely controlled/robotic elements should be covered.

Situational Awareness

Implementing emerging technologies/systems should substantially increase situational awareness of platforms compared to current versions, allowing a 360o situational awareness, automatic threat detection, tracking and identification, real time updated and shared operational picture and information. Technologies should enhance the survivability by offering to the crew situation awareness information. Implementing technologies/systems should minimize detection and response time toward entities/potential threats and/or enhance main weapons' effectors (e.g. through the use of sensors). Situational awareness system architecture should be open to facilitate integration to any armoured vehicle.

Engagement

System should enable payloads capability. The system should be optimized to carry out different role tasks according to their specific performance criteria (e.g. troop carrier or fire support or recce). For the lighter vehicles weapon systems should be removable. Remote weapon station should be considered for small and even medium calibre.

Life Cycle Support

Next generation platforms must feature such a maintainability in solution design in order to enable greater operational availability/readiness at lower total cost of ownership compared to current platform. Platforms' or systems' acquisition cost should be lower than current platforms. The target for platforms' efficient operational lifecycle should be at least 30 years.

Growth Potential

The development of modular systems and a marked open architecture will ensure agile and continuous growth, especially of higher-tech components (C2/C5ISTAR, lethality systems). System designs will include suitable availability of payload, volume and energy production in order to enable the continuous upgrade of the overall platform's performances and functions.

Expected impact

The proposed solution should

- increase EU industrial capability to produce advanced concepts and new highly innovative vehicle systems with a view to extend combat capabilities and to create game changers with respect to past and existing situations;
- provide solutions that solve future capability needs of Member States with maximum commonality and modularity;
- provide a technological building blocks useful for future vehicles or for extending the in- service life of existing military vehicle fleets;
- provide vehicle solutions, which have a reduced environmental and logistic footprint;
- provide opportunities to eliminate or limit environmentally toxic substances;
- establish European business consortia able to offer competitive solutions for global markets, maximizing impacts on cost-effectiveness and scale-effects, while stimulating industrial cross border cooperation;
- reduce strongly the dependence from non-EU technologies and products and by that increase the EU's Security of Supply of armoured vehicles and related systems.