

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

Proposals are invited against the following topics:

EDF-2021-GROUND-D-3CA: BLOS collaborative close combat architecture

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 availability of mobile precision systems able to provide the necessary high degree of accuracy and efficiency, avoiding widespread collateral damage, and reducing exposure of friendly forces is a priority for Member States' armed forces. In this context, some requirements are becoming increasingly important, e.g. to provide the land and naval combat units with the ability to defeat at medium and long ranges, and with a very high degree of accuracy and reliability. In order to meet these requirements, research activities on a Beyond Line Of Sight (BLOS) collaborative close combat architecture are required.

Specific challenge

The EU is facing increased geostrategic instability. Land and naval combat units of EU Member States have to address on the battlefield a complex set of conventional and new threats. They have to intervene in a high intensity and in asymmetric engagement, facing a wide range of threats including potential technically advanced adversaries.

To succeed in BLOS-firing mission, reconnaissance, intelligence and adequate preparations will be essential. A technical system design (incorporating C2, mobility, survivability, lethality, intelligence and endurance) for BLOS will need to be versatile against future alterations pending an evolving hostile threat. A BLOS system design will need to be robust and secured against the future to motivate investments in resources and funds for the anticipated period of life.

In this context some requirements are becoming increasingly important: provide the land and naval combat units with the ability to defeat at medium and long ranges, with a very high degree of accuracy and reliability, selected threats that are not always clearly identified and visible or defeat targets that may mask or unmask at the last moment; reduce exposure to enemy fire; avoid widespread collateral damage; allow concentrating fires without concentrating means, providing autonomy, reactivity and freedom of action at the level of the combat units on the battlefield.

Scope

Development of a BLOS collaborative close combat architecture based on BLOS native missile systems (with full Lock-On After Launch (LOAL) and Man-In-The-Loop (MITL) capabilities through a seeker back-image):

- Multi-domains (land/air/sea);
- Multi-platforms integration (air/land/naval, manned/unmanned);
- Multi-sensors (alert, detection, target designation, engagement);
- Explore and define system architecture;
- Study and develop an enhanced BLOS concept according to defined system architecture;
- Define, study and develop interfaces for supporting systems, hardware and applications serving to enhance BLOS-capability;
- Extended range;
- Cooperative engagement;
- Enhanced performances and functional capability;
- Increased robustness to aggressions (cyber, jamming);
- Innovative technologies insertion;
- Mission planning and decision-making supported by AI;
- Design and develop concept for training and evaluation of BLOS capability involving interoperability among Member States.

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:

- Studies, such as feasibility studies to explore the feasibility of new or improved technologies, products, processes, services and solutions;
- 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

The BLOS Effect – Collaborative Close Combat Architecture must provide the following Capabilities:

A1. The system must have the capacity to be operable day and night;

A2. The system must be compatible with climates met in Europe as well as in Africa and other continents, in winter and summer conditions;

- A3. The missile must have the possibility to engage targets at 400 m in LOS Fire & Forget mode;
- A4. The missile should have the possibility to engage targets at 200 m in LOS Fire & Forget mode;
- A5. The BLOS system must have an effective range of at least 4000 m;
- A6. The system must be a close combat capacity with minimal reaction time (platoon coordination);
- A7. The BLOS system must be both man-portable as well as integrated on vehicle platforms;
- A8. The BLOS system must have a capability to engage targets in a direct fire mode. The system must also be able to engage targets in an indirect fire mode using target coordinates and/or associated image;
- A9. The BLOS missiles must have a back-image capability (image sent from the missile to the user) for target acquisition and lock on during flight on operator action in the platform;
- A10. The BLOS system must have the possibility to stream the real-live images (the back image of the missile flight as well as of the drone) as well as to record it on a specific man-portable and ruggedized connected device that is standard equipment of the BLOS Firing Team;
- A11. The ruggedized connection device must allow the simultaneous livestream of both missile image and drone feed. The image screen and resolution must be good enough to allow a qualitative display of the backward images;
- A12. The BLOS system must be transportable by road (logistic, tactical transport and on launch pod), sea & air;
- A13. The negative influence of the transport on the lifespan of the system must be less than or equal to existing comparable systems;
- A14. The BLOS systems levels of safety, functionality and reliability must not be decreased from logistical and tactical transport corresponding to the Member State's needs;
- A15. The UAV must have the capability to designate a target, in terms of coordinates in the referential common to the platform with the required accuracy (sensor and software payload adaptation on micro drone to reach the required accuracy);
- A16. The UAV must be able to navigate and designate targets in a GPS-denied environment;
- A17. The time to transport the UAV, to deploy and to operate must be minimized by the design;
- A18. UAV must be used and recovered from a moving or a fix vehicle;
- A19. Operational range of the UAV must be beyond 4000 m from its remote pilot, taking into account that the targets are partly dissimulated and only visible from 3500 m;

A20. The UAV must be operable without line of sight between the remote pilot and the UAV to assist BLOS missions;

A21. The speed of the UAV must be compatible with the CONOPS of the Member States;

A22. The data links must be cyber robust (to its control base), the cyber aspects being fully controlled by Member States;

A23. The technologies and components of the system must be built with a European design authority, must not contain any IPR generated outside Europe and must be free of any third party control regime.

The initial BLOS capability must be enhanced:

B1. The BLOS system must be man portable, able to operate on ground, as well as mounted on various platforms such as vehicle, naval platform and UGV;

B2. The BLOS system must re-inforce its protection capability such as peripheral observation, target designation and response to threats directed at the BLOS-system itself;

B3. The BLOS system must be able to receive targets cueing from several sub-systems (recce team, UAV, UGV etc.);

B4. Manoeuvre and engagement of the BLOS system must be prepared, the BLOS system must integrate a system to manage immediate mission planning and engagement; the mission planning system must be fully interoperable with the battlefield management systems of participants;

B5. The BLOS system must have an associated battlefield training system for indoor and outdoor exercises;

B6. The BLOS battlefield training system must support realistic live training force on force (f2f) for all user scenarios, incorporating collaborative uses of target designation (recce team, UAV, UGV etc.);

B7. The BLOS battlefield training system must include an outdoor training system capable of training the full BLOS capability;

B8. The BLOS Battlefield outdoor training system must have the possibility to make use of enhanced reality targets;

B9. The BLOS Battlefield outdoor training system must as much as possible make use of the BLOS Combat Systems components;

B10. The BLOS battlefield trainer must have a terrain representation enabling it to pre- evaluate a fire mission. The BLOS training system must propose a tool to support evaluation of tactics for the system;

B11. The study must explore the possibility of a common architecture for the BLOS training system (indoor, outdoor & pre-mission);

B12. The BLOS battlefield trainer must have a terrain representation enabling it to pre- evaluate a fire mission, including good level of representation of trajectory and sensors parameters;

B13. The BLOS training systems must be connected to exercise control structure (EXCON) for monitoring players during f2f live training;

B14. The study must explore the possibility to display a realistic signature effect (flash & bang effect) in the BLOS training system;

B15. The BLOS system must be coordinated at platoon and squadron/company level, it must operate with cooperation means such as communication network or participants or European Battle Management System;

B16. Interoperability of the BLOS system with a set of existing weapon stations must be studied;

B17. UAV system must have the ability of integration into collaborative combat threw BMS interoperability;

B18. The study must explore the possibility to include a device that informs that the aerial is entering an opponent's jamming zone.

The initial BLOS capability must be extended to BLOS Extended Range (BLOS ER) & BLOS Next Generation (BLOS NG) capabilities:

C1. Compatibility of the BLOS ER & BLOS NG systems with the BLOS launching station (man portable as well as platform integrated) must be studied;

C2. The BLOS ER system must operate with an operational range up to 8 km and detection, recognition and identification capability up to 10 km;

C3. The BLOS ER missile must have a hand-over functional capability from SAL to back image;

C4. The BLOS ER system must operate with different platforms such as helicopter, naval, UAV (e.g. MALE), on the ground and mounted on ground vehicle;

C5. The BLOS ER & BLOS NG systems must improve the over-all engagement functions and associated sub-systems (optical and inertial sensors, UAV ...);

C6. The BLOS NG architecture must integrate new technologies such as ATR (Automatic Target Recognition), potentially using Artificial Intelligence (AI), sensors data fusion and robust navigation functions;

C7. The BLOS NG system will be compatible with the initial BLOS system.

Expected impact

- Contribute to the defence and security interests of the EU and its Member States;
- Contribute to the EU strategic autonomy level of ambition;

- Address the EU ground combat capability development priority identified as part of the revised 2018 CDP and contribute to the objective of the PESCO BLOS capability project which is to develop under a European design authority a new generation of BLOS missile systems family;
- Bring a significant operational differentiator to the land and naval combat units of the Member States by providing an engagement capability with a very high degree of accuracy while avoiding widespread collateral damage, and reducing exposure of friendly forces;
- Contribute to enhanced interoperability between armed forces of the Member States, stimulate European doctrine and European standards;
- Contribute to Europe's resilience and European technological sovereignty;
- Contribution to European industrial autonomy;
- Contribution to excellence with the demonstration of a significant advantage over existing products or technologies;
- Contribution to innovation through the application of technologies and concepts previously not applied in the defence sector;
- Contribution to strengthening the competitiveness of the EDTIB by creating new market opportunities;
- Contribution to relocate some technologies and expertise in Europe and under a European design authority in line with the EU industrial autonomy and technological sovereignty ambitions.