SAVUNMA VE HAVACILIK SANAYİ İHRACATÇILARI BİRLİĞİ

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Konu: KUVVET ÖLÜMCÜLLÜĞÜNÜN ARTTIRILMASI ÜÇÜNCÜ DİLİM PROJELERİ HK.

Sayın Üyemiz,

T.C. Cumhurbaşkanlığı Savunma Sanayii Başkanlığı'ndan alınan yazıda, NATO Müttefik Dönüşüm Komutanlığı (NATO ACT) bünyesinde yürütülen "Kuvvet Ölümcüllüğünün Artırılması (Force Lethality Enhancement)" çalışmaları kapsamında, FLEX Üçüncü Dilim (Tranche-3) projelerine ilişkin bilgi paylaşılmaktadır.

Ekte detayları yer alan projeler kapsamında, "NATO Küçük/Orta Ölçekli Ölümcül Tugay Yapısı (NATO Lethal Light/Medium Brigade Composition)", "Teknoloji Destekli Tugay ve Tümen Seviyesi Muhabere Destek ve Muhabere Hizmet Desteği (Technology-enabled Brigade and Division Level Combat Support and Combat Service Support)" ve "Eşlik Eden Savaş Uçağı (Collaborative Combat Aircraft- CCA)" alanlarında kapsamlı araştırma ve geliştirme faaliyetlerinin yürütülmesinin öngörüldüğü, projeye ilişkin ihale sürecinin **03 Ağustos 2026** tarihinde başlatılması ve projeye kabul edilen şirketler için icra sürecinin ise **15 Eylül 2026 ile 10 Şubat 2027** tarihleri arasında gerçekleştirilmesinin planlandığı belirtilmektedir.

Bahse konu yazıda, "Eşlik Eden Savaş Uçağı (CCA)" alanındaki çalışmaların, ülkemizin milli imkanlarıyla geliştirdiği KIZILELMA ve ANKA-3 gibi sistemler sayesinde savunma sanayimiz için önemli bir fırsat teşkil ettiği ve bu alanda güçlü bir varlık gösterilebileceği değerlendirildiği bildirilmektedir.

Savunma sanayimizin NATO nezdindeki görünürlüğünü artırmak amacıyla; projeyle ilgilenen firmalarımızın https://www.act.nato.int/opportunities/contracting/ adresi üzerinden ihale sürecini takip etmeleri gerekmektedir

Bilgileri ve gereği rica olunur.

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FLEX Sprint 3 Topic 1

NATO Lethal Brigade Composition (Light/Medium)

Why and What

1. The purpose of this research is to identify design options for cutting-edge light and medium infantry manoeuvre brigades, optimised for operations on the contemporary battlefield. The intent is to develop alternative brigade structures that integrate both existing and emerging technologies to achieve significant advancements in lethality, survivability, mobility, and situational awareness in a multi-domain operations environment[1]. Underpinning these structures is the requirement to aggressively optimize affordability, specifically reducing personnel numbers as well as acquisition and life cycle costs. Data associated with current army modernization efforts should be leveraged, including alternative brigade structures proposed by Allies. A critical objective of this design is to reduce risk to personnel while maximizing operational effectiveness in complex and contested future operating environments.

2. The research will concentrate on light and medium infantry brigades operating in eastern European terrain. The optimised brigades must be able to achieve all effects of reconnaissance, manoeuvre, fires, engineering, support and maintenance. They must be fully interoperable and capable of operating as an integrated component of advance NATO multidomain operations C2, while retaining the resilience to operate in isolation (with no or limited communication with superior echelons or adjacent brigades) for up to 3 days. The ability to conduct operations in denied, degraded, intermittent and limited conditions is an inherent requirement.

Capability Options for Allies

3. The research will employ unclassified, realistic contractor supplied scenario-based mission analysis supported by modelling and simulation to compare options, trade-offs and cost-sustainability implications. Options identified shall be realistic, interoperable and implementable by Allied forces within approximately five years. The output aims to provide tangible findings to inform NATO's Defence Planning efforts and will identify options for Allies to deliver Capability Targets differently, in alignment with a realistic assessment of industrial capacity, national decision-making and capability development. The study will not define detailed acquisition programmes or system-level designs.

4. The design for a future light and medium land manoeuvre brigade should include, but not be limited to the following:

a. Brigade Organizational Structure. Propose an organization and equipment table setting a typical NATO benchmark structure and outlining composition options for alternative organization structures, including the number and type of manoeuvre battalions, companies, combat support (e.g., fires, engineers), and

[1] As defined in the Alliance Concept for Multi-domain Operations (ACT/TT-5856/SER:NR:288, 10 March 2023).

combat service support elements. The options should be assessed against NATO-provided Capability Codes and Statements with appropriate effectiveness and cost metrics identified by the contractor.

b. Technology Integration Plan. Offer realistic options for integrating modern and emerging technologies at each echelon within the brigade to achieve thestated objectives. This could include:

i. Next Generation Combat Vehicles. Types and quantities of future combat vehicles and their integration within manoeuvre formations.

ii. Robotics and Autonomous Systems. Roles and integration strategies for unmanned ground and aerial vehicles across the brigade for reconnaissance, fire support, logistics, and other tasks.

iii. Precision Fires. Including: Longer-range fires at higher echelons. These fires will influence how brigades operate, providing them with extended-range artillery and missile support; Organic loitering munitions to provide the brigade commander with organic, precision fires; and Automated target prioritization for immediate engagement by massed fires.

iv. Logistics and Sustainment. Consideration of a modernised logistics approach that leverages technology to address current sustainment challenges and heavy personnel requirements, which place an unsustainable burden on brigade logistics. Propose a modernised logistics approach, as highlighted by the recent FLEX study on Robotics in Land Warfare, leveraging targeted technology to minimize personnel requirements while ensuring agile, efficient support.

v. Soldier Lethality Enhancements. Which modern soldier systems and arms could be incorporated to improve individual and squad effectiveness, and how.

vi. Network Modernization. Tactical network architectures (including SATCOM), command post design, and data management systems to ensure seamless communication, data integration and information sharing with both military and non-military instruments of power[2].

vii. Electromagnetic Operations and Cyber Capabilities. Necessary organic EMO and cyber elements within the brigade and their integration into manoeuvre operations. Signature management, to minimize thermal and electromagnetic signatures of the brigade.

viii. Intelligence and Information Technologies. Leverage cutting-edge ISR solutions, including AI and autonomous systems, (whether organic to

[2] As described in the Alliance Concept for Cross-domain Command (ACT/TT-0552/SER:NU:264).

the brigade; identified as best provided by higher echelons; or from other domains) to enhance situational awareness and enable faster, more informed decision making.

ix. Air and Missile Defence. Integration of, or with appropriate layered air and missile defence systems, to protect the brigade from aerial threats.

x. Engineering and Survivability Measures. Self-sufficient brigade designs equipped with modern engineering technologies to ensure survivability without relying on higher-echelon support.

xi. Mountain and Urban Warfare. While not the focus of this study, options for conducting and sustaining operations in both mountainous and urban terrain should also be considered.

c. Personnel Implications. Identify the personnel requirements of the proposed brigade structures, highlighting areas where technology can reduce personnel needs and the potential impact on personnel training and management.

d. Risk. Identify potential risks associated with the adoption of new technologies and consider mitigation strategies to minimize risk to personnel and mission success.

e. Cost Considerations. Offer a high-level overview of the potential costs associated with acquiring and sustaining the proposed technologies and brigade structure.

f. High-Low Mix. In addition to integrating both existing and emerging technologies, different combinations of exquisite solutions, lower-cost uncrewed platforms and effectors, as well as consumable mass should be considered to achieve the required effect.

g. Phased Implementation Plan (Conceptual). Outline an approach for transitioning from current brigade structures to the proposed future design.

Systems to be Augmented or Replaced

5. To achieve the required advancements in lethality, survivability, mobility, and situational awareness while optimizing affordability, the proposed brigade designs must identify specific legacy systems to be augmented, phased out, or entirely replaced. The contractor shall evaluate and propose options to transition from current-generation platforms to modern, high-low capability mixes across the following areas:

a. Legacy Infantry Fighting Vehicles (IFVs) and Armoured Personnel Carriers (APCs). Identify options to augment or replace current light/medium armoured fleets with next-generation combat vehicles. This includes evaluating the shift

toward platforms featuring reduced physical and thermal signatures, integrated active protection systems (APS), and the structural capacity to host organic uncrewed systems.

b. Manned reconnaissance assets. Transition from traditional, heavily manned scout and reconnaissance formations to automated, lower-risk sensor networks. Legacy crewed reconnaissance platforms could be augmented or replaced by a combination of organic Uncrewed Aerial Systems (UAS), Uncrewed Ground Vehicles (UGVs), and AI-driven intelligence-gathering tools.

c. Conventional, towed, or short-range artillery. Replace or augment legacy close-support artillery with longer-range, highly mobile precision fires, organic loitering munitions, and automated target prioritization systems capable of executing rapid, massed counterstrikes.

d. Heavy, vertically integrated logistics and sustainment lines. Replace personnel-heavy, legacy maintenance and supply chains with a modernized, technology-enabled sustainment framework. This includes replacing traditional just-in-case logistics with AI-driven predictive maintenance, real-time digital telemetry, and distributed advanced/additive manufacturing solutions.

e. Legacy analogue or rigid command posts. Augment or replace vulnerable, static C2 setups with modernized, highly mobile tactical networks (including multi-orbit SATCOM) and dispersed digital backbones capable of operating seamlessly even during complete higher-echelon isolation.

f. Traditional combat engineering platforms. Augment legacy manned engineering and breaching vehicles with autonomous engineering, route-proofing, and de-mining systems to dramatically reduce personnel exposure in high-threat environments.

Research Questions

6. To guide the modelling, simulation, and scenario-based mission analysis, the contractor shall address the following primary research questions:

a. High-low mix optimization. What is the optimal combination of exquisite, high-end platforms and lower-cost, attritable uncrewed systems and consumable mass (Hi-Low Mix) required to maximize lethality and survivability in contested Eastern European terrain?

b. Autonomous integration. How can Robotics and Autonomous Systems be integrated into light and medium infantry formations to successfully assume high-risk tasks (e.g., reconnaissance, de-mining, last-mile resupply) and measurably reduce risk to personnel?

c. Signature management. Which active and passive signature management technologies are most effective at concealing brigade formations from pervasive adversary ISR on a transparent battlefield?

d. Air and missile defence integration. What is the ideal organizational mix of organic, layered air and missile defence systems required to protect the brigade from modern aerial threats without overloading the brigade's command structure?

e. Isolated operations. How must the brigade's tactical network and C2 architecture be designed to ensure the formation can fight and survive in isolation, with zero communication to superior echelons, for up to 3 days in a denied, degraded, intermittent, and limited (DDIL) environment?

f. Cross-domain sensor fusion. How can the brigade best ingest, process, and exploit ISR data provided by higher echelons or other domains (such as space or cyber) to enable faster, AI-driven tactical decision-making?

g. Logistics footprint reduction. To what extent can a modernized logistics approach, leveraging AI, predictive telemetry, and tactical additive manufacturing minimize the brigade's physical sustainment footprint and reduce organic personnel requirements?

h. Affordability and lifecycle costing. What are the high-level acquisition and lifecycle cost trade-offs associated with transitioning from legacy structures to the proposed tech-integrated brigade designs?

i. DOTMLPFI and transition pathways. What are the specific DOTMLPFI implications for Allied nations, and what is the most realistic phased conceptual plan to transition current national brigade structures to this future design within a five-year horizon?

Analytical Focus and Required Outputs

7. The final written report will provide the following, inter alia:

a. Brigade Design Document. A document outlining the proposed brigade structures, technology integration plan, operational concepts, and risk assessment.

b. Visual Representations. Organizational charts, equipment layouts, and conceptual diagrams illustrating the brigade structures, relative to the benchmark structure and key technological integrations.

c. Defence Planning Recommendations. Evidence-based DOTMLPFI[3] assessment of the proposed design options. Tangible findings that suggest the alternative options can deliver the related NATO Capability Targets, are operationally suitable and industrially achievable.

d. Quantitative and qualitative assessments which should include:

i. The degree to which the proposed designs incorporate modern and emerging technologies and innovative operational concepts.

ii. The degree to which the proposed designs incorporate different combinations of exquisite and lower-cost platforms and effectors (Hi-Low Mix).

iii. A description of the notable improvements in lethality, survivability, mobility, and situational awareness in a multi-domain operations environment.

iv. Affordability cost metrics for each of the structures that optimize affordability, specifically reducing personnel numbers as well as acquisition and life cycle costs.

v. The effectiveness of the design in reducing risk to personnel.

vi. The realism and practicality of the proposed designs, considering technological maturity, integration challenges, industry capacity and potential cost implications.

FLEX Sprint 3 Topic 2

Technology-enabled Brigade and Division Level Combat Support and Combat Service Support

Why and What

1. The purpose of this research project is to enhance and augment standing organic Combat Support (CS) and Combat Service Support (CSS) capabilities at the Brigade (BDE) and Division (DIV) level echelons.[4] The purpose is to achieve advancements in

[3] Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, Interoperability.

[4] The main elements of **CS** include Fires / Artillery; Combat Engineering; Intelligence Surveillance and Reconnaissance; Signals & Communications; Cyber & Electromagnetic Operations; Chemical, Biological, Radiological, and Nuclear (CBRN) Defence; and Military Police (MP). The main elements of **CSS** include Logistics (Supply, Maintenance and Recovery, Transportation, Engineering); Medical (Casualty Care, Medical Evacuation (MEDEVAC); Medical Logistics); Personnel Services (Human Resources, Financial Management, Legal Support, Religious / Chaplain Support); Operational Contract Support (Contracting).

lethality and effectiveness, survivability and mobility of these support functions and supported BDE and DIV formations in a multi-domain operations environment[5]. The objective is to eliminate the persistent shortage, bottlenecks and legacy limitations of these support functions, directly enhancing the speed, manoeuvre, reach, and combat effectiveness of BDE and DIV. Underpinning options to enhance and augment these support functions is the requirement to aggressively optimize affordability, specifically reducing personnel numbers as well as acquisition and life cycle costs. Data associated with current army modernization efforts should be leveraged, including alternative options under consideration by Allies. A critical objective of this design is to reduce risk to personnel while maximizing operational effectiveness in complex and contested future operating environments.

2. The research will concentrate on CS and CSS elements operating in support of Allies' land formations on eastern European terrain against pear adversary in high-intensity combat. The optimised elements must be able to achieve all effects as described in relevant NATO capability statements. They must be fully interoperable and capable of operating as an integrated component of advance NATO formations including multidomain operations C2, while retaining the resilience to operate in isolation (with no or limited communication) for up to 3 days. The ability to conduct operations in denied, degraded, intermittent and limited conditions is an inherent requirement. The project shall identify realistic pathways, blending legacy capabilities and novel solutions into hi-low force mixes, through which Allies could augment and enhance CS and CSS functions.

Capability Options for Allies

3. The research shall employ unclassified, realistic contractor supplied scenario-based mission analysis supported by modelling and simulation, and other supporting analytical approaches to compare options, trade-offs and cost-sustainability implications. Alternative capability options identified shall be structured in high(legacy/exquisite)-low (novel/inexpensive mass) mixes and shall be realistic, interoperable and implementable by Allied forces within next five years. The output aims to provide tangible findings to inform NATO's Defence Planning efforts and will identify options for Allies to deliver Capability Targets differently, in alignment with a realistic assessment of industrial capacity, national decision-making and capability development. The study will not define detailed acquisition programmes or system-level designs.

4. Previous FLE and FLEX projects that addressed elements of CS and CSS include:

a. CS:
   i. 2025 FLE Project on Combat Engineering Mobility/Counter Mobility,
   ii. 2025 FLE Project on Combat Reconnaissance, and
   iii. 2026 FLEX Project on Robotics in Land Warfare (155mm Artillery - Ammunition to Effect);

[5] As defined in the Alliance Concept for Multi-domain Operations (ACT/TT-5856/SER:NR:288, 10 March 2023).

b. CSS:

i. 2025 FLE Project on Land Medical (Role 2).

These projects could potentially be drawn upon for this study.

5. The options for technology enabled CS and CSS will be focussed on the following area(s):

Note to SME Reviewers: We will need to limit the scope of this project. CS and CSS are broad functional areas. Looking to SME recommendation on the most important area(s) to focus on. This could be one area or multiple areas. Four possibilities provided in the sub-paragraphs below. Are these the right areas, are we missing an area of higher importance. Which area(s) should we focus on in this FLEX project to make it most meaningful. Request SMEs to offer views on limiting the scope of this FLEX project.

a. **Robotics and autonomous distribution**. This effort focuses on maximizing the survivability of high-risk CS and CSS functions by fielding semi-autonomous and fully autonomous systems integrated into a resilient, distributed mesh network architecture. The project targets critical BDE/DIV enablement and tactical sustainment tasks to reduce human exposure in highly contested areas. Specifically, the project will explore capability options across three primary lines of effort:

i. Uncrewed last-mile tactical resupply utilizing Uncrewed Ground Vehicles (UGVs) and Uncrewed Aerial Systems (UAS) to execute rapid, point-to-point deliveries of critical supplies (such as Class V ammunition and medical payloads) directly to forward tactical units.

ii. Semi-autonomous and autonomous sustainment convoys. Automated convoy capabilities engineered to penetrate contested rear-area threat zones and the forward drone-line (extending 10–15 km) where persistent aerial and kinetic threats deny traditional logistics movement.

iii. Autonomous combat engineering and mine countermeasures. Employing robotic systems for high-threat tasks such as obstacle clearance, route proofing, and automated de-mining/breaching to minimize the battlefield exposure of combat engineers.

b. ***AI-Driven Maintenance and Operations***. This effort focuses on reducing operational reliance on heavy, vertically integrated maintenance footprints and vulnerable logistic tails that expose Combat Service Support (CSS) elements, slow tactical tempo, and restrict the operational reach of BDE/DIV formations. It will identify alternative, agile capability options utilizing highly dispersed logistics chains, AI-enabled predictive maintenance (including advanced digital telemetry and real-time component monitoring), and a resilient, AI-enabled digital

backbone/C4 infrastructure. To support a highly distributed maintenance network, the project will explore cutting-edge advanced manufacturing solutions—specifically tactical additive manufacturing—to drastically shorten logistics lines. The ultimate objective is to enable just-in-time, point-of-need fabrication and delivery of critical components, ensuring continuous divisional manoeuvre while minimizing the physical and electromagnetic signature of support assets.

c. ***Survivability and deception***. This effort addresses the critical requirement to enhance and augment BDE/DIV-level CS through advanced Electromagnetic Operations (EMO) and counter-EMO capabilities. The project will identify a balanced mix of active and passive systems designed to drastically reduce the electromagnetic and physical signatures of supported formations while executing sophisticated multi-domain deception. The primary goal is twofold: first, to conceal friendly forces in highly contested EMO environments, and second, to deploy active decoys that disrupt and confuse adversary Intelligence, Surveillance, and Reconnaissance (ISR), baiting kinetic strikes away from actual personnel and equipment. To maximize lethality, these tactical options must compel the adversary to activate their own sensors, exposing their positions and effectors to immediate, high-speed counterstrikes. All proposed solutions must feature structural flexibility; engineered to either organically augment the standing BDE/DIV Order of Battle (ORBAT) via optimal high-low capability mixes, or serve as modular, cross-domain assets task-organized from higher echelons.

d. ***Wide wet gap crossing and logistic bridging***. This effort addresses the critical requirement to enhance Wide Wet Gap Crossing and tactical logistics bridging for BDE/DIV formations. Identify modern options to augment the organic assault, protect, secure, and sustain phases of crossing operations. Deliverables must provide alternative, rapidly deployable crossing options that disperse force concentration, protect vulnerable engineering and CS assets, and generate the organic security required to hold contested banks. Research will focus heavily on distributed, networked systems capable of maintaining operational tempo and ensuring crossing survivability despite ubiquitous adversary sensing and high-intensity precision fires.

Systems to be Augmented or Replaced

6. To eliminate persistent shortages, bottlenecks, and legacy limitations within Combat Support (CS) and Combat Service Support (CSS) functions, the proposed designs must identify legacy platforms and practices to be augmented, phased out, or replaced. The contractor shall evaluate and propose transition paths leveraging high-low capability mixes across the following areas:

a. Manned last-mile resupply vehicles. Transition away from traditional, crewed utility vehicles for high-risk, forward-edge logistics. These should be augmented or replaced by UGVs and UAS capable of executing rapid, point-to-point deliveries of Class V ammunition and medical payloads.

b. Conventional crewed logistics convoys. Replace or augment traditional, manned sustainment convoys that are highly vulnerable in rear-area kill zones. Instead, transition to semi-autonomous and fully autonomous convoy systems designed to safely penetrate the forward "drone-line" (extending 10–15 km).

c. Manned combat engineering and de-mining platforms. Augment or replace legacy manned engineering assets to reduce the battlefield exposure of combat engineers. Legacy systems should be phased out in favour of robotic and autonomous systems dedicated to high-threat tasks like obstacle clearance, route proofing, and automated breaching/mine countermeasures.

d. Heavy, vertically integrated maintenance footprints. Replace traditional, footprint-heavy maintenance structures and vulnerable legacy logistic tails that slow tactical tempo and restrict divisional manoeuvre. These could be replaced by agile, dispersed logistics chains supported by AI-enabled predictive maintenance, real-time telemetry, and tactical additive manufacturing.

e. Signature-heavy CS and CSS assets. Replace or augment legacy support assets that lack electromagnetic shielding and signature control. These systems must be replaced or augmented with advanced active and passive signature management technologies, EMO/counter-EMO capabilities, and active decoys designed to spoof adversary ISR.

f. Legacy exquisite platform centric EW and counter-EW systems. Augement or enhance legacy EW and counter-EW systems, that realise on exquisite platforms. Instead, the systems explored should be distributed and expendable, utilising mass to create A2AD bubbles around the supported formations and to penetrate through adversary own A2AD means.

g. Concentrated tactical bridging systems. Augment or replace traditional, slow-to-deploy bridging assets that force dangerous concentrations of personnel and equipment. These could be replaced by alternative, rapidly deployable, and distributed networked crossing systems to maintain operational tempo during Wide Wet Gap Crossing operations.

Research Questions

7. To guide the modelling, simulation, and scenario-based mission analysis on Eastern European terrain, the contractor shall address the following primary research questions:

a. Autonomous last-mile logistics. What are the most effective payload capacities and operational profiles for UGVs and UAS executing uncrewed last-mile resupply of Class V ammunition and medical assets?

b. Penetrating contested zones: How must semi-autonomous and fully autonomous logistics convoys be architected to successfully navigate and survive the 10–15 km "drone-line" and contested rear-area kill zones?

c. Hazard mitigation. What is the optimal integration of robotics in combat engineering to achieve rapid obstacle clearance, route proofing, and de-mining/breaching while minimizing human casualty risks?

d. Predictive diagnostics. How can AI-enabled predictive maintenance and real-time component telemetry be integrated into a resilient digital backbone/C4 infrastructure to reduce the physical and electromagnetic signature of CSS elements?

e. Point-of-need manufacturing. To what extent can tactical additive manufacturing and dispersed logistics networks shorten supply lines and enable just-in-time fabrication of critical parts to maintain divisional manoeuvre?

f. Electromagnetic deception. What combination of active decoys and passive signature-reduction systems is required to successfully deceive adversary ISR, draw kinetic strikes away from actual personnel, and force adversaries to expose their active sensors to counterstrikes?

g. How can distributed, networked crossing systems be utilized to secure and protect the assault, secure, and sustain phases of Wide Wet Gap Crossing (WWGC) operations under ubiquitous adversary sensing and high-intensity precision fires?

h. Order of Battle (ORBAT) architecture. Should the proposed technology-enabled CS and CSS capabilities be integrated organically to augment the standing BDE/DIV ORBAT as a high-low capability mix, or should they remain modular, cross-domain assets task-organized from higher echelons?

i. Interoperability and isolation. How can modern CS and CSS systems be designed to operate within an integrated NATO multi-domain C2 framework, while retaining the resilience to operate in isolation (with degraded or zero communications) for up to 3 days?

j. DOTMLPFI and affordability pathways. What are the high-level acquisition and lifecycle cost trade-offs associated with these alternative support structures, and what realistic five-year transition pathways exist for Allies to deliver these capability targets?

Analytical Focus and Required Outputs

8. The final written report will provide the following, inter alia:

a. Brigade/Division Design Document. A document outlining the proposed brigade/division CS/CSS structures and their integration into the ORBAT, technology integration plan, operational concepts, and risk assessment.

b. Visual Representations. Organizational charts, equipment layouts, and conceptual diagrams illustrating the brigade/division structures, relative to the benchmark structure and key technological integrations.

c. Defence Planning Recommendations. Evidence-based DOTMLPFI assessment of the proposed design options. Tangible findings that suggest the alternative options can deliver the related NATO Capability Targets (CC/CS), are operationally suitable and industrially achievable.

d. Quantitative and qualitative assessments which should include:

i. The degree to which the proposed designs incorporate modern and emerging technologies and innovative operational concepts.

ii. The degree to which the proposed designs incorporate different combinations of exquisite and lower-cost platforms and effectors while harnessing power of our legacy capabilities where deemed suitable and novel solutions where deemed beneficial (Hi-Low Mix).

iii. A description of the notable improvements in lethality, survivability, mobility, and situational awareness in a multi-domain operations environment.

iv. Affordability cost metrics for each of the alternative options that optimize affordability, specifically reducing CS/CSS footprint as well as acquisition and life cycle costs.

v. The effectiveness of the design in reducing risk to CS/CSS personnel and increasing freedom of manoeuvre of the supported formation.

vi. The realism and practicality of the proposed designs, considering technological maturity, integration challenges, industry capacity and potential cost implications.

FLEX Sprint 3 Topic 3

Collaborative Combat Aircraft (CCA): Concepts of Employment, Priority Use-Cases, and Open NATO Autonomy Reference Architecture for Smaller NATO Nations

Why and What

The purpose of this research is to determine the concepts of employment and operational use-cases for which Collaborative Combat Aircraft are most likely to provide the greatest operational advantage, advance lethality and survivability and reduce risk for the Alliance over the next five years. It will address options for both Fourth and Fifth Generation combat aircraft fleets. Underpinning these use cases is the requirement to aggressively optimize affordability, specifically reducing personnel numbers as well as acquisition and life cycle costs. Data associated with current CCA efforts should be leveraged.

The research will identify realistic pathways through which Allies could field, support, enable or employ interoperable CCA-related capabilities in combination with aircraft and mission systems expected to be developed by different Allies. The focus shall be on delivering or contributing to Alliance-relevant effects rather than on procuring a nationally unique CCA system. The research shall employ realistic scenario-based mission analysis, modelling and simulation, and structured architectural comparison. Options identified shall be realistic, interoperable and implementable by Allied forces within approximately five years. The study shall inform national decision-making and NATO capability development but shall not define detailed acquisition programmes or bespoke air vehicle designs.

Capability Options for Allies

The research shall propose and assess CCA options and architectures against contractor supplied scenario-based mission analysis supported by modelling and simulation to compare options, trade-offs and cost-sustainability implications. It shall include but not be limited to:

Fourth and fifth generation aircraft concepts of employment and use-cases in which CCA may generate the highest relative value, such as mass, persistence, survivability, sensing extension, communications relay, electronic support or attack, decoy employment, strike support, escort, target development, battle damage assessment and cross-domain kill-chain extension.

Crewed-uncrewed (high-low) optimal mix per concept of employment, including to defend; offer extended ISR; offer external magazine; extend range of crewed assets; and how the available degree of autonomy affects the optimum high-low ratio and the cost-effectiveness of CCA concepts.

National contribution models such as mission autonomy software modules, mission data services, payloads, support infrastructure, synthetic training, test and evaluation, basing, logistics, maintenance, operators, or multinational pooled capability elements.

Interoperability requirements across different CCA aircraft, mission systems, command-and-control arrangements, datalinks, mission data environments, weapons interfaces, and software update pipelines.

Priority layers, interfaces, services, governance functions and overarching requirements for an open NATO Autonomy Reference Architecture that could enable portability of autonomy functionality across more than one aircraft type.

Data access, sharing, security, sovereignty and stewardship arrangements necessary to enable development, test, validation, fielding and sustainment of interoperable CCA-related capability;

Industrial, manpower, sustainment and software support models that reduce barriers to entry for smaller Allies while preserving operational relevance and upgrade flexibility.

Systems to be Augmented or Replaced

The research shall assess how CCA concepts of employment and interoperable architecture approaches can complement, augment or partially replace current approaches, assumptions and practices including:

Platform-centric, vertically integrated solutions that tightly couple autonomy software to one aircraft family;

National approaches that make coalition integration, software portability and data-sharing more difficult;

Crewed-only concepts of employment for missions where CCA could lower risk, add affordable mass or increase persistence;

Personnel-intensive command, control and mission support approaches that limit scaling or multinational participation.

Research Questions

To assess benefits and identify priorities, the following questions should guide the research:

Operational Value. For which concepts of employment and operational use-cases is CCA most likely to deliver the best combination of mission effectiveness, survivability, persistence and decision-speed advantage compared with current and planned alternatives?

Cost-Effective Implementation. Which of the use-cases could be fielded and employed most cost-effectively when the full cost of implementation, manpower, training, support, software sustainment, mission data management and upgrade burden is considered?

National Collaboration. For each use-case, which are the most credible and affordable ways for smaller NATO Allies to contribute to, collaborate, or acquire CCA capabilities?

Interoperability Priorities. Which interfaces, standards, services, data constructs and operating procedures are most critical to allow smaller Nations to develop or procure CCA capability elements that can operate across multiple national aircraft and mission systems?

Open NATO Autonomy Reference Architecture Prioritization. What should be the priority building blocks for an open NATO Autonomy Reference Architecture, and in what order should they be developed, specified, tested and governed, to deliver the greatest near-term interoperability value?

Software Portability and Update Agility. To what extent can separation of autonomy functionality from specific aircraft improve software competition, shorten update cycles, reduce vendor lock, and lower entry barriers for Allies?

Data Access. What categories of data are required to design, train, test, validate, certify, deploy and sustain interoperable CCA-related capability, and what data-sharing, releasability or synthetic-data approaches are most practical?

Governance and Assurance. What governance, safety, cyber, accreditation, assurance and sovereignty mechanisms are needed for Nations to trust, integrate and operate portable autonomy-related functionality across different national airframes?

Five Years Roadmap. What are the necessary and most realistic actions over the next five years for NATO and Allies to move from analysis to experimentation, standards development, reference implementation, demonstration and initial operational capability?

Analytical Focus and Required Outputs

The final report shall deliver a structured set of implementable findings and options based on the following outputs:

Ranked Use-Case Assessment. A comparison of concepts of employment and use-cases showing which CCA options offer the highest benefit relative to total cost and implementation burden against representative NATO scenarios.

Cost-Effectiveness Matrix. A comparison of use-cases and contribution models, including cost of entry, recurring cost, manpower burden, infrastructure implications and timeline to fielding.

Interoperability Dependency Map. An assessment of the interfaces, standards, mission-data dependencies, command-and-control functions and operational procedures needed for cross-Nation and cross-domain interoperability.

Open Architecture Priority Stack. A recommended prioritization of the building blocks for an open NATO autonomy reference architecture, including candidate layers, interfaces, data models, middleware or service needs, software portability principles, and governance actions.

National Contribution Menu. A set of credible options through which small, medium or large Allies could contribute to CCA use-cases, separated into national-level achievable options, multi-national pooled options, framework-nation partnership options, and NATO-level enabling actions.

Data Access and Stewardship Assessment. A map of essential data categories and of practical approaches for data access, security, releasability, synthetic data, test data, mission data support and long-term stewardship.

Risk Assessment. A structured review of operational, technical, software, cyber, legal, policy, industrial and sovereignty risks, with proposed mitigation options.

Five-Year Roadmap. A phased roadmap for the development of standards; experimentation; prototype reference implementation; demonstrations; governance development; and initial fielding pathways.

Deliverables Schedule

The contractor shall provide the following deliverables. Delivery dates are expressed relative to the period of performance from 15 September 2026 to 10 February 2026 and may be adjusted by the COTR at contract award if required for programme alignment.

Deliverable	Due Date	Classification	Minimum Content
D1. Inception Note and Data Plan	30 September 2026	Yes	Refined scope, assumptions, scenarios, modelling approach, data requirements, risk register, and engagement plan.
D2. Scenario and Use-Case Review Brief	14 October 2026	Yes	Candidate concepts of employment and use-cases, screening logic, preliminary assumptions and architecture framing.
D3. Interim Progress Report 1	30 October 2026	Yes	Initial modelling and simulation results, use-case shortlist and evidence traceability update.
D4. Interim Progress Report 2	30 November 2026	Yes	Draft cost-effectiveness comparison, interoperability dependency map and architecture priority options.
D4. Interim Progress Report 3	16 December 2026	Yes	Refined analysis of results and final report outline.
D5. Draft Final Report and Briefing	20 January 2027	Yes	Complete draft report, executive summary, draft recommendations, annexes and senior leader briefing.
D6. Final Report, Final Briefing and Supporting Data Package	10 February 2027	Yes	Revised final report, final briefing deck, assumptions log, evidence annex, and releasable extract if requested.

All written deliverables shall be submitted in English in editable Microsoft Office format and in PDF. Where practical, the contractor should provide both a version at the lowest releasable classification and a full version up to NATO SECRET. Briefing slides shall be provided for formal reviews when requested by the COTR.