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The Diverse Approaches to Land Force Interoperability in Europe.

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European Army Interoperability Center

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INTRODUCTION

For three decades, various international challenges have shaped European behaviour in the fields of security and defence. The end of the Cold War and the rise of expeditionary warfare have led to several transformations affecting all European states and their defence frameworks. Contemporary challenges, and new threats, have reshaped national political and military agendas. It has encouraged the exploration of innovative approaches to military matters. Europeans have progressively re-nationalised their defence policies. However, in times of crisis, European states have been inclined to cooperate. This tendency towards improving operational effectiveness and optimising defence procurements identifies the major reasons why military cooperation must increase. Therefore, we must acknowledge the critical importance of interoperability between states in this process.

Consequently, this study analyses interoperability in the land forces domain. It focuses on intra-state cooperation, EU coordination, and NATO co-action. Accordingly, multiple partnerships and projects have been launched to pursue enhanced international cooperation. This Food for Thought investigates how the concept of interoperability is applied at intra-state, EU, and NATO levels. It will highlight coordination and underscore cooperation between actors. The analysis has been conducted through a combination of quantitative and qualitative research methods: databases, trends and charts, case studies, as well as a review of the published literature.

INTEROPERABILITY: FRAMEWORK, BENEFITS, AND CHALLENGES

The term *interoperability* exists in several contexts, such as computing, telecommunication, commerce, and industry; it can be defined as multiple systems' ability to exchange information and work together efficiently. It is not limited to these sectors; it is also relevant to the military domain. Here, it refers to the ability of organisations or individuals to cooperate to achieve common objectives.
NATO defines interoperability as the "*ability for Allies to act together coherently, effectively and efficiently to achieve tactical, operational and strategic objectives*"[1]. Moreover, NATO believes interoperability allows multinational-forces to collaborate to improve operational approaches[2]. This can relate to communications, infrastructure, equipment, and knowledge sharing[3]. Therefore, interoperability is a factor in the following areas: technology, strategy, operations, and tactics. The

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1. NATO, "Interoperability: Connecting NATO Forces". 2020. NATO. Available at: https://www.nato.int/cps/en/natolive/topics_84112.htm#:~:text=NATO's%20interoperability%20policy%20defines%20the,tactical%2C%20operational%20and%20strategic%20objectives
2. *Ibid.*
3. *Ibid.*

tactical domain is where all other dimensions combine and are put into practice[4]. Whilst the tactical level necessitates functional tactics, techniques, and shared procedures, strategic interoperability requires political decisions. Indeed, the tactical level's strengths and benefits come from the practical interchange of units and equipment[5].

It is possible to observe numerous examples of military interoperability worldwide; however, Europe emerges as one of the most promising areas for land forces cooperation. Recent collaborative projects identify three levels of interoperability:

- Intra-state.
- Within the European Union (EU).
- Within NATO.

In Europe, various forms of military cooperation have appeared; however, their modalities depend on intergovernmental agreements negotiated between participating states.

They may have diverse purposes and natures or varying levels of integration. For instance, French President Emmanuel Macron proposed the European Intervention Initiative (EI2); to rapidly enhance European crisis management capability. To achieve this, the EI2 aimed at creating improved interoperability between multinational forces via a shared *modus operandi*. Nine EU countries agreed to cooperate starting from June 2018[6]. At present, EI2 can count on the participation of 13 EU Member States and Norway.

From NATO's perspective, interoperability is a central concept, at the core of concerns since the Alliance's foundation. From an EU perspective, interoperability has recently emerged in its vocabulary and has rapidly become a priority for Member States. Together with European governments, EU Institutions have created dedicated tools, defined military and civilian structures, and built defence agencies.

However, within both NATO and the EU, interoperability between armed forces has played a vital role in improving the forces' readiness. On the EU front, Member States have shaped EU defence with structures and tools that enhance the EU's capabilities for effective crisis management and for intervening in security and defence affairs[7]. These procedures have created an institutional framework to strengthen cooperation and integration processes in the EU defence sphere.

Strong cooperation between European armies has become vital in dealing with European security threats ranging from border protection to terrorism. The former became the focus of regulations in 2019, aimed at ameliorating the interoperability of information concerning border security and access to the EU[8]. When interoperability between armed forces is efficient, it is an exceptional asset, and it has many advantages; however, interoperability must overcome several hurdles, often related to equipment, politics, and economics.

National forces have access to weapons that frequently differ from those available to other countries. This stems from the desire to protect national defence industries (and their economic benefits). However, at the tactical level, interoperability is efficient when equipment and units are interchangeable. Therefore, the standardisation of supplies and equipment becomes essential if interoperabil-

4. Hura, Myron, Gary McLeod, Eric V. Larson, James Schneider, Daniel Gonzales, Daniel M. Norton, Jody Jacobs, Kevin M. O'Connell, William Little, Richard Mesic, and Lewis Jamison, *Interoperability: A Continuing Challenge in Coalition Air Operations*. Santa Monica, CA: RAND Corporation, 2000. Available at: https://www.rand.org/pubs/monograph_reports/MR1235.html.
5. *Ibid.*
6. Zandee, D. and Kruijver, K., 2019. *The European Intervention Initiative Developing A Shared Strategic Culture for European Defence*. The Hague: The Clingendael Institute.
7. Menon A. 2012, *"Defence Policy"*, in E. Jones, A. Menon and S. Weatherill (eds), *"The Oxford Handbook of the European Union"*, Oxford: Oxford University Press, pp. 585-599.
8. Cornella, Alessia, Linda Zamengo, Alexandre Delepierre, and Georges Clementz. 2020. *"Fighting Terrorism: The Need for Multi-Level Intervention and EU Interoperability"*. FINABEL Food For Thought.

ity is to improve and increase the operational effectiveness of collaborating forces[9].

National forces must consider the defence budget and the resource gaps of their partners[10]. During a 2014 NATO summit, EU members of NATO were asked to contribute 2% of their GDP to defence by 2024. However, estimates show that only seven complied with this request[11]. More recently, the COVID-19 pandemic has caused massive losses to European GDP; and as has happened in the past, during times of economic contraction defence expenditures have undergone massive cuts[12].

Nevertheless, it is relevant to mention how budgets are used. According to the European Parliament (EP), European Union Member States combined are the second-largest defence spender in the world. However, EU countries squander billions of Euros buying and producing similar pieces of equipment. Efficient interoperability could save billions; it would reduce the economic burden on individual countries, increase research capabilities, and allow investments in other programs[13].

Naturally, political choices may become antagonistic towards efficient interoperability; indeed, most governments are unwilling to cede sovereignty over their armed forces. National decision-makers prefer to maintain their ability to defend themselves. They consider military authority a national prerogative; ergo, military interdependence is not necessarily considered viable as it may be politically undesirable[14].

Finally, interoperability partners may dispute control of operations. Moreover, they may develop different strategies to achieve the same objectives; after identifying and analysing the factors that may jeopardise a mission, the allies may choose divergent courses of action. If they are not aligned, interoperability might be lost[15].

However, interoperability has proven beneficial in numerous circumstances: it increases the legitimacy of missions, deters opponents from taking actions against the coalition; it bolsters the partners' confidence, as they are not left alone to deal with threats. Moreover, interoperability reduces the individual burden of operations, as partners share the costs. It enhances defence procurement by avoiding duplication of expenditure.[16]. Overall, interoperability is an excellent asset for armed forces. It helps to shape the strategic environment, increase multinational capabilities, and decrease equipment burdens.

9. Fiott, Daniel. 2018. «European Armaments Standardisation». Europarl.Europa.Eu. Available at: https://www.europarl.europa.eu/thinktank/en/document.html?reference=EXPO_STU(2018)603872#:~:text=Standardisation%20is%20a%20method%20of,enhance%20armaments%20standardisation%20in%20Europe

10. Derleth, James., 2015. Enhancing Interoperability: The Foundation for Effective NATO Operations. [online] NATO Review. Available at: <https://www.nato.int/docu/review/articles/2015/06/16/enhancing-interoperability-the-foundation-for-effective-nato-operations/index.html>

11. Greece, Estonia, Romania, Poland, Latvia, Lithuania, Bulgaria.

12. Berenson, Doug, Dominik Kimla, and Alix Leboulanger. 2020. "Defense Spending And COVID-19: Implications on Government Finance and National Security :|". Avascent. Available at : https://www.avascent.com/news-insights/perspectives/defense-spending-and-covid-19-implications-on-government-finance-and-national-security/#_ftn1

13. Europarl.europa.eu. 2019. EU Army Myth: What Is Europe Really Doing to Boost Defence? | News | European Parliament. [online] Available at: <https://www.europarl.europa.eu/news/en/headlines/security/20190612STO54310/eu-army-myth-what-is-europe-really-doing-to-boost-defence>

14. Pettinari, F. 2019. "Possibilities and Challenges to the Creation of a Cooperative European Defence System", FINABEL Food for Thought.

15. Pernin, Christopher G., Angela O'Mahony, Gene Germanovich, and Matthew Lane, Chasing Multinational Interoperability: Benefits, Objectives, and Strategies. Santa Monica, CA: RAND Corporation, 2020. Available at: https://www.rand.org/pubs/research_reports/RR3068.html.

16. Pernin, Christopher G., Angela O'Mahony, Gene Germanovich, and Matthew Lane, Chasing Multinational Interoperability: Benefits, Objectives, and Strategies. Santa Monica, CA: RAND Corporation, 2020. Availabel at: https://www.rand.org/pubs/research_reports/RR3068.html.

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# BILATERAL AND MULTILATERAL COOPERATION AT THE INTRA-STATE LEVEL

Recently, asymmetric and hybrid threats have led European states to reconsider their military postures and consider the importance of cooperation and collaboration of land forces at the strategic, tactical, and operational levels.

In general, each state's military capability is not solely based on defence interests, but also on cultural, political, and functional aspects. These are strongly related to the history, geography, and geophysical characteristics of each state. Interests, intentions, and security purposes lead countries to stipulate bilateral or multilateral agreements within their geographic region or beyond, both with governments and private businesses[17]. However, the propensity of European nations to coordinate their military systems, units, and forces with their partner's equivalents demands interoperability among the discrete military branches within a state. Once achieved, this can be exported to pursue defence objectives through joint cooperation with other forces. Communal interest always enhances interoperability among states.[18]

Inevitably, interoperability at the intra-state level entails certain political and economic costs.
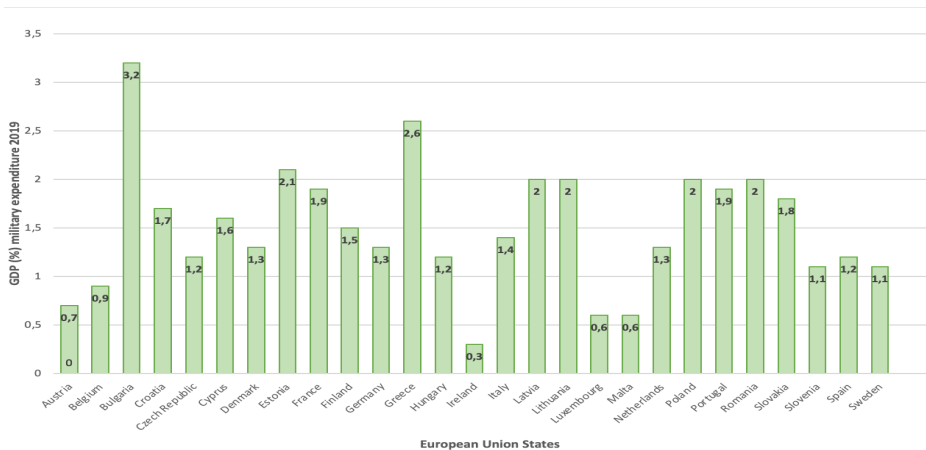
GDP (%) military expenditure (2019) - European Union Member States

This chart shows defence spending across the EU in 2019. We can see that only six states devoted 2% of their GDP -or more- to military expenditure. Bulgaria devotes the high-

17. Margail, Éric. 2020. «Pensées Mili-Terre - Article Complet D'un Ouvrage - Centre De Doctrine Et D'enseignement Du Commandement». Penseemiliterre.Fr. Available at : https://www.penseemiliterre.fr/interoperabilite-on-peut-encore-s-ameliorer-_114197_3000457.html
18. "Standardization Interoperability". Department of Army Washington DC. April 2020. Available at: https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN19606_AR34-1_FINAL.pdf

The Motorised capacity Programme (CaMo)

est share of GDP to defence, whilst Ireland devotes the lowest[19]. It is worth noting that 2% GDP defence spending is a NATO target; however, 21 of these states in this chart are both EU *and* NATO members, thus expected to reach this level of defence spending.

Whilst reaching defence spending targets may be difficult, several EU Member States have shown a propensity to stipulate bilateral and multilateral agreements to modernise their land forces. The *Motorised Capacity Programme* (CaMo), for example, is a multinational partnership between France and Belgium for the acquisition of French armoured vehicles by Belgium.

In addition to the delivery of 442 armoured vehicles to Belgium —expected to be operational between 2025 and 2030— this agreement represents a milestone for interoperability at the ground forces level between the two European states[20]. Meetings and roundtables have defined how the new vehicles should be equipped. The production of mil-

itary equipment and its implementation will follow guidelines outlined in the Scorpion Programme[21]. France will receive significant financial income from Belgium, and Belgium will increase its military capabilities. This latter will be mutually beneficial, as both states plan to operate closely in future.

Moreover, in terms of interoperability, the CaMo Programme represents a turning point; it constitutes not only an industrial partnership, but it ensures the mutual commitment of military capabilities between the two nations. Likewise, we can see Franco-German agreements, signed in April 2019 for the joint development of a Main Battle Tank (MBT): The Main Ground Combat System (MGCS), intended to replace the German Leopard 2 and the French Leclerc by 2030. These reflect interests that go beyond national borders, and this partnership is a first step to defining future cooperation and coordination at the land force level. These bilateral agreements may produce new interests in the long-term,

19. "Military Expenditure (% Of GDP) | Data". 2020. *Data.Worldbank.Org*. Available at: https://data.worldbank.org/indicator/MS.MIL.XPND.GD.ZS.
20. Ruzhelnyk, Olga. 2020. "Franco-Belgian Camo Project: Entry into Force of The Intergovernmental Agreement and Notification of The Contract for The Acquisition of Armoured Vehicles - EDR Magazine". *EDR Magazine*. https://www.edrmagazine.eu/franco-belgian-camo-project-entry-into-force-of-the-intergovernmental-agreement-and-notification-of-the-contract-for-the-acquisition-of-armored-vehicles.
21. The Scorpion Programme is an ambitious French project that involves land forces modernization. Audrey Quintin reports: "*It consists of a $6.8 billion multi-company modernisation effort aimed at replacing all French frontline fighting vehicles, with improved platforms linked with a new and unified communications and battlefield management system (BMS)*". (Finabel, 2020).

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among other EU members, as Spain and Poland have expressed their interest in the project[22]. The production and purchase of vehicles between states reflects a broader vision of cooperation, partnership, and possible joint defence, of which the Franco-German initiative constitutes clear evidence.

Industrial Cooperation

From an industrial perspective, land force interoperability can be facilitated by purchasing innovative jointly deployable robots or vehicles. For example, the "*Mission Master Armed Reconnaissance*", developed by Rheinmetall Defence – a German firm based in Dusseldorf – has been integrated into the Dutch army as part of the *CDE Programme* (*Concept Development and Experimentation*). The British Army has sought the system for evaluation. It is expected to constitute part of the *United Kingdom's Robotic Platoon Vehicle Programme*[23]. This robot aims to collect tactical information to provide front-line fire support, and an immediate common operating picture to protect soldiers[24]. Focussing on interoperability through contractual agreements, Hungary has become the first NATO country to order Rheinmetall's Lynx KF41 infantry fighting vehicles. It has ordered 241 vehicles and nine Buffalo armoured recovery vehicles. The contract includes additional products and services such as simulators, training, instruction, and an initial supply of spare parts and maintenance support.

Finally, interoperability between states can be also translated as cooperation between industries. For example, at the beginning of 2020, Rheinmetall and Czechoslovak Group a.s. signed a Memorandum of Understanding (MoU) to transfer defence technologies useful in producing tactical military vehicles between Germany and the Czech Republic. This partnership will include hundreds of companies in both states who will form part of their supply chain[25].

Therefore, internal, and international cooperation are two essential steps to consider before any other regional or global partnership. Common military equipment, joint training and military exercises can facilitate better tactical coordination between states. Andrew Mack states that military superiority does not guarantee victory, especially at the land forces level. Tactics, coordination, strategies, and collaboration are the key factors to consider in order to achieve efficient results. The concept of interoperability includes these aspects and facilitates the achievement of safe and successful military aims. The exchange of military capabilities, components, and systems to improve the production of military equipment; to ensure better coordination among nations, are crucial points on the military and political agendas of several European States[26].

Future expectations

Further cooperation, partnerships and training between states are expected to happen in Europe. On the 20th of November 2020, the US Army V Corps was officially inaugurated

22. Rizzi, Alberto. 2020. "Towards A European Tank: France And Germany Sign Agreements on MGCS Project". *Finabel*. https://finabel.org/towards-a-european-tank-france-and-germany-sign-agreements-on-mgcs-project/

23. Sprenger, Sebastian, and Sebastian Sprenger. 2020. "Rheinmetall Unveils New Ground Robot for Armed Reconnaissance". *Defense News*. https://www.defensenews.com/global/europe/2020/11/29/rheinmetall-unveils-new-ground-robot-for-armed-reconnaissance/

24. "Rheinmetall Defence - Latest News Rheinmetall Unveils its New Mission Master – Armed Reconnaissance System". 2020. *Rheinmetall-Defence.Com*. Available at: https://www.rheinmetall-defence.com/en/rheinmetall_defence/public_relations/news/latest_news/index_25536.php

25. "Rheinmetall Defence - Latest News Rheinmetall And Czechoslovak Group A.S. Sign MoU For Production and Technological Support in The Field of Military Vehicles". 2020. *Rheinmetall-Defence.Com*. https://www.rheinmetall-defence.com/en/rheinmetall_defence/public_relations/news/latest_news/index_25664.php

26. Hura, Myron, Gary McLeod, Eric V. Larson, James Schneider, Daniel Gonzales, Daniel M. Norton, Jody Jacobs, Kevin M. O'Connell, William Little, Richard Mesic, and Lewis Jamison, Interoperability: A Continuing Challenge in Coalition Air Operations. Santa Monica, CA: RAND Corporation, 2000. https://www.rand.org/pubs/monograph_reports/MR1235.html

in Poznań, Poland[27]. The bilateral agreement between Poland and the United States is in line with the Memorandum of Understanding (MoU) signed between Donald Trump and Andrzej Duda in 2019, which included: "*the establishment of a forward division command in Poznan, stationing of a rotationally-present armoured brigade in Żagań-Świętoszów, deployment of Reaper UAVs squadron to Łask, the establishment of a Polish-US combat training centre (CTC) in Drawsko Pomorskie, the establishment of an airlift cargo hub for USAF in Wrocław-Starachowice, the establishment of the presence of an Army Aviation Brigade on a rotational basis, and a logistics battalion as well as special ops facility in Powidz, and other special ops facility in Lubliniec.*"[28].

The tactical interoperability - military exercises and training - highlighted in this agreement is part of a broader vision affecting European states[29]. At the tactical level, an Emergency Deployment Readiness Exercise (EDRE) took place in July 2019 in Poland. This US initiative also involved the German Bergen-Hohne firing range, and it was aimed at testing the deployment and evaluation of the Army Pre-positioned Stock system[30].

Furthermore, the intention to conduct joint operations during conflict or to tackle security threats has also been enhanced by Norway, Sweden, and Finland, in September 2020 through the signing of the *Trilateral Statement of Intent*, to enhance both tactical and operational cooperation between the states. The interoperability envisioned by these three countries will later affect Denmark and Iceland, who will be informed as cooperation proceeds[31].

Future Franco-British land force cooperation is expected to occur following the Franco-British Council conference in November 2020[32]. Finally, the *Strategic Vision Statement* of November 2019 saw Germany and the United States commit to build strong interoperability at the land forces level, by 2027. The agreement aims to better manage human capability and weapons systems at both regional and global levels.

INTEROPERABILITY IN THE EU

In addition to European States' bilateral/trilateral approach to army interoperability, the EU has upgraded its framework. Brussels has made efforts to conceive an ideal structure to foster defence cooperation between Member States. However, this remains a partly voluntary mechanism, and it may result in a highly fragmented system.

It is essential to assess how military interoperability is framed within the EU context.

27. Bornio, Jakub. 2020. "US Army'S V Corps Forward Command Inaugurated in Poland - Jamestown". *The Jamestown Foundation*. https://jamestown.org/program/us-armys-v-corps-forward-command-inaugurated-in-poland/
28. Graf, Jędrzej, and Jakub Palowski. 2020. "Defence24 Reveals Details of The Enhanced Defence Cooperation Agreement [EXCLUSIVE]". *Defence24.Com*. https://www.defence24.com/defence-policy/defence24-reveals-details-of-the-enhanced-defence-cooperation-agreement-exclusive
29. Ibid. 12
30. Palowski, Jakub. 2020. "Abrams MBTs to be Deployed to Poland, Trophy APS to be Tested at German Firing Range". *Defence24.Com*. https://www.defence24.com/armed-forces/land-forces/abrams-mbts-with-trophy-aps-to-be-deployed-to-poland-us-army-verifying-its-readiness
31. Kaikkonen, Antti, Frank Bakke-Jensen, and Peter Hultqvist. 2020. ""Finland, Norway And Sweden Enhance Their Trilateral Military Operations Cooperation"". *Regeringskansliet*. Available at: https://www.government.se/opinion-pieces/2020/09/finland-norway-and-sweden-enhance-their-trilateral-military-operations-cooperation/
32. "Defence Conference / Conférence Défense – Franco-British Council". 2020. *Francobritish.Org*. Available at: http://francobritish.org/en/defence-conference-conference-defense/

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Despite a lack of clear and comprehensive definitions, EU institutions address the subject relatively coherently. On a purely military level, interoperability is put forward as "the ability of Member State HQs and forces to train, exercise and operate effectively together in the execution of assigned missions and tasks"[33]. This includes compliance with the principle of inclusiveness and the promotion of "standardisation of material, resources, services and procedures"[34]. It is essential to emphasise that "standardisation is a method of improving interoperability within and between European armed forces and a process that can enhance the operational effectiveness of Europe's militaries"[35]. Additionally, while the European Parliament defines interoperability as "the ability of different military organisations to conduct joint operations", this shall be accompanied by the commitment to "increase investment, share information, pool resources and create synergies at EU level to better protect Europeans" and "avoid duplications and increase efficiency"[36].

EU framework for interoperability

The above-mentioned intentions have been underscored by several EU defence initiatives in the last two decades. In 2000, the EU Military Committee (EUMC), composed of Member States' defence chiefs, was established to provide military advice for the conduct of the Common Security and Defence Policy (CSDP). However, the first significant step towards a more integrated defence policy was creating the European Defence Agency (EDA) in 2004. This allowed for enhanced collaboration on military capability development. The agency identifies priorities and opportunities for cooperation; this is achieved through the Capability Development Plan (CDP), which will be discussed later. In addition to the EDA and its CDP, the EU Battlegroups (EUBG), are a highly interoperable EU-wide intervention corps designed for crisis management, which reached full tactical and operational capability in 2007; however, they have yet to be deployed.

Furthermore, Article 42 of the Treaty of Lisbon which entered into force in 2009, provided that the CSDP "shall provide the Union with an operational capacity drawing on [Member States] civilian and military assets"[37]. Additionally, it "shall include the progressive framing of a common Union defence policy"[38]. In this sense, in 2010, the EU Council set in motion the Pooling & Sharing (P&S) concept for military capabilities to forge their collective use under the direction of EDA. Other initiatives in the field of standardisation include the European Defence Standard Reference System (EDSTAR), conceived to support the implementation of armaments standards; the European Defence Standardisation Information System (EDSIS) to list existing standards, and the Material Standardisation Group (MSG) to propose adjustments or new standards.

However, a turning point for the EU framework for interoperability occurred in 2016 with the EU Global Strategy (EUGS) release, where the EU declared itself to be a

33. EEAS, 2019. *"EU Concept or Military Command and Control - Rev 8"*. Brussels, EU Council.
34. Ibid.
35. Fiott, Daniel, 2018b. *"European armaments standardisation"*. Policy Department, Directorate-General for External Policies, European Parliament.
36. *"EU defence: how Parliament wants to boost cooperation"*. 2017. European Parliament News. Available at: |https://www.europarl.europa.eu/news/en/headlines/security/20170602S-TO76617/eu-defence-how-parliament-wants-to-boost-cooperation
37. Article 42, paragraph 1. Treaty on the Functioning of the European Union (TFEU).
38. Ibid, paragraph 2. TFEU.

global security and defence actor. Brussels has expanded its scope for cooperation beyond the crisis management area to include the protection of its territory and citizens. To achieve these objectives, "capabilities should be developed with maximum interoperability and commonality"[39]. Since the publication of the EUGS, the Implementation Plan on Security and Defence was presented to the High Representative. The EU designed several defence tools to enable more effective and comprehensive coordination.

The first move in this direction, triggered by the Implementation Plan, was establishing the Coordinated Annual Review on Defence (CARD) to systematically monitor national defence expenditures and identify opportunities for cooperation based on the priorities identified by the CDP. [40] This process

will eventually improve Member States' capabilities in the long term; their national defence planning will progressively align while preserving their defence sovereignty. EDA, acting as CARD Secretariat, presented the first CARD report in 2020, in which 55 opportunities for joint capabilities development were identified; among them, the next generation MBT and the Soldier System projects constitute breakthroughs. Although permitting a degree of national flexibility, CARD represents a useful EU mechanism to provide top-down guidance to stimulate Member States interoperability. Nevertheless, the most relevant progress for the EU framework for interoperability has been the activation, in 2017, of the Permanent Structured Cooperation (PESCO), based on Article 46 of the Treaty on the European Union (TUE). This initiative com-

A coherent approach from priorities to impact
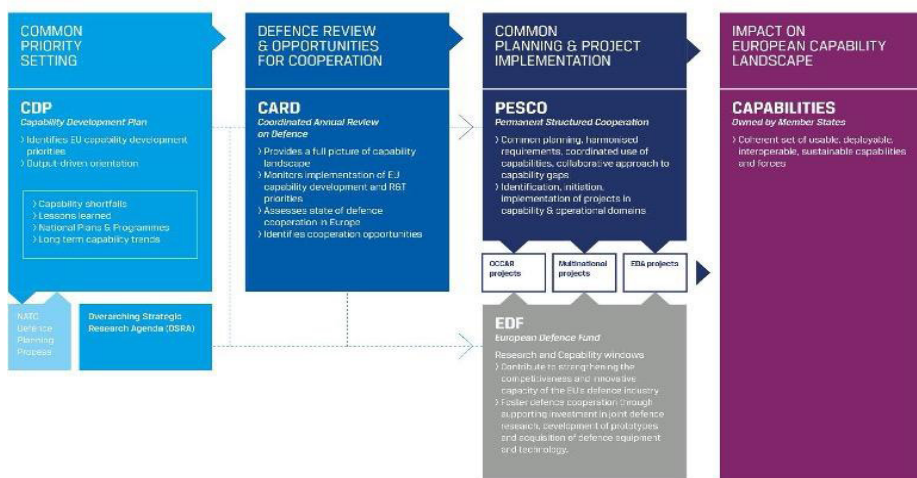
[A coherent approach from priorities to impact. SOURCE: EDA]

A coherent approach from priorities to impact

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39. EEAS, 2016. "*Shared Vision, Common Action: A Stronger Europe. A Global Strategy for the European Union's Foreign and Security Policy*".
40. To which EDA Member States join in on a voluntary basis

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menced with a high level of involvement as 25 EU Member States are involved (Denmark, Malta and the UK do not participate). PESCO projects (now 47) are implemented on a voluntary basis; the commitments possess a legally binding nature, provided by Protocol no. 10 annexed to the Treaty of Lisbon. This states that PESCO Member States shall "take concrete measures to enhance the availability, interoperability, flexibility and deployability of their forces, in particular by identifying common objectives regarding the commitment of forces, including possibly reviewing their national decision-making procedures"[41]. Therefore, PESCO is perhaps the most powerful tool for defence cooperation between Member States and represents a noticeable stride given enhancing EU interoperability.

To complement this, two regulations have been established. One is the European Defence Industrial Development Programme (EDIDP)[42]. This was conceived to assist in industry innovation and capability development. The other, the European Defence Fund (EDF), was conceived to provide financial incentives from the EU budget to implement joint procurement of defence equipment [43]. It also seeks to avoid unnecessary duplication and strengthen targeted research projects. To better manage standardisation of defence materials the European Defence Standardisation Committee (EDSC) was established. This alongside the Military Planning and Conduct Capability (MPCC) will improve the operational effectiveness of EU forces.

Considering the entire EU defence cooperation framework, high fragmentation appears evident. However, it is feasible to achieve cohesion within the spectrum of tools created. We can consider the binding commitments of Protocol no.10: coherence is ensured if every gear accomplishes its task. The CDP sets collaboration priorities. The CARD takes stock of the national capabilities landscape and PESCO structures and implements projects benefiting from the EDF's financial support.

EU interoperability in practice

The long-term objective of achieving tactical, and therefore operational, interoperability between the EU Member States is the attainment of EU strategic autonomy, as detailed in the EUGS. In the short term, the Union envisages a plan to be able to spend much more effectively on defence. Indeed, while EU Member States have collectively the second-largest level of defence spending, "Governments still largely plan for and invest in their defence on a national basis"[44]. In so doing, they refrain from exposing national industries to market forces. This results in duplicated capabilities and fragmented investments in R&T/R&D.

The lack of cooperation at EU level produces enormous economic losses; however, the alignment of national defence planning through EU-wide defence planning, with various initiatives, is set to address these issues. Nonetheless, the European planning cycle is not linear, nor it is managed by a single institution.

Through the EUGS Implementation Plan, the EU Council has broadened defence objectives to encompass the protection of the

41. Article 2, c). Protocol no.10 to the Treaties.
42. European Parliament, European Council, 2018. *"Regulation establishing the European Defence Industrial Development Programme aiming at supporting the competitiveness and innovation capacity of the Union's defence industry"* REG 2018/1092.
43. European Commission, 2018. *"Proposal for a Regulation of the European Parliament and of the Council establishing the European Defence Fund"* COM (2018) 476 final.
44. Fiott, Daniel, 2018a. *"EU defence capabilities development: Plan, priorities, projects"*. European Institute for Security Studies (EUISS), Briefs.

Union and its citizens through enabled military planning. This is achieved through the Capability Development Mechanism (CDM), operated by the EUMC with the support of the EU Military Staff (EUMS).

The CDM determines the military level of ambition (based on political ambition), relying upon five planned assumptions for CSDP missions. Consequently, it produces guidance for EU military requirements through the Requirement Catalogue (RC). This includes tasks such as border protection and response to hybrid threats. Once requirements are established, the forces and capabilities available from Member States are considered through submission of the Force Catalogue (FC). "It expressly specifies that these 'contributions' are established on a 'voluntary', 'non-binding' basis, and only for the purposes of defence capability planning"[45]. Most importantly, the CDM issues a Progress Catalogue (PC), which proposes realistic processes to satisfy the capability needs by applying the SAEP (Scrutiny Assessment Evaluation Prioritisation) approach, a process essential to the CDP.

Whilst the EDA runs the CDP, the EUMC contributes to two of its four strands within the SAEP mechanism. Notably, Strand A sets "capabilities gaps stemming from the CDM and prioritises them"[46], whilst Strand D "takes stock of the capability-relevant lessons learned from EU military operations and missions"[47], both covering a short-term perspective. Additionally, Strand B, is dedicated to R&T, as well as Strand C in creating a Collaborative Database (CODABA) to share Member States defence planning information. These are projected in the longer-term. Whilst the former is clearly connected to the EDF, the latter operates in conjunction with CARD and is reinforced even further by the PESCO binding commitment no.6[48].

The output of the latest CDP has been the enactment of 11 priorities to upgrade and modernise land platforms as well as "the adaptation of military capabilities required for territorial defence and security"[49]. It is worth noting that Member States have been concerned to raise the effectiveness of these priorities. They have addressed these concerns through eleven Strategic Context Cases (SCCs) conceived to help switch from theoretical to concrete actions and working programmes. These are aimed at enhancing interoperability within the EU.

45. Mauro, Maitre Frederic, 2018. *"EU Defence: The White Book implementation process"*. Policy Department, Directorate-General for External Policies, European Parliament.
46. Ibid.
47. Fiott, Daniel, 2018a. *"EU defence capabilities development: Plan, priorities, projects"*. European Institute for Security Studies (EUISS), Briefs.
48. "Playing a substantial role in capability development within the EU, including within the framework of CARD, in order to ensure the availability of the necessary capabilities for achieving the level of ambition in Europe" Binding Commitments | PESCO https://pesco.europa.eu/binding-commitments
49. EDA, 2018. *"Capability Development Plan"*. Factsheet https://www.eda.europa.eu/docs/default-source/eda-factsheets/2018-06-28-factsheet_cdpb020b03fa4d264cfa776ff000087ef0f

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EU Defence Planning for joint capability development and the resulting implementation retains its voluntary nature; the Union and Member States have moved to bolster interoperability through several initiatives. Among these, joint military exercises such as Integrated Resolve 2020, are designed to strengthen coordinated tactical conduct of operations through an integrated approach. Additionally, another crucial push towards equipment interchangeability is the development of cutting-edge military technology through PESCO. Projects such as Timely Warning and Interception with Space-based Theatre Surveillance (TWISTER), a SAM system aimed at intercepting hypersonic missiles, thereby take on huge EU territorial defence responsibilities.

Another boost to EU defence policy, and in turn, the interoperability of Member State forces, lies in the development by EU defence ministers of a Strategic Compass. This is poised to ensure coherence and common objectives in security and defence, while "pushing member-states towards a common understanding of the threats to Europe and how to counter them together"[50].

INTEROPERABILITY IN NATO

Since its establishment in 1949, interoperability has been of fundamental necessity to NATO. In any possible military scenario involving multiple countries, it is desirable to have high levels of interoperability to guarantee readiness and operational effectiveness. Thus, functional interoperability has always been an end state for NATO countries. Moreover, interoperability does not only mean enhancing readiness and effectiveness; it is also pivotal to the strategic deterrent power of the alliance. The strategic scenario in the first decades of NATO's history was remarkably different from the present. The main concerns originated from the potential for aggression by Warsaw Pact countries. Interoperability was limited to preparing divisions and regiments to fight together against the Soviet bloc. Decision-makers saw cooperation as a means of buying time during a conflict to allow for reinforcements from the other countries of the Alliance.

The fall of the Soviet Union completely changed the strategic situation; in the following years, several former Warsaw Pact countries approached and joined NATO and the EU; today, NATO has 30 Member States, each with its own historical and cultural background, different from the next. There are also significant differences in the doctrine and training of individual state's armed forces. For instance, former Warsaw Pact states used Soviet doctrine, which cleaved differences between them and their new partners. The multitude of challenges with regards to interoperability within NATO is not insignificant. For instance, there are "at least 13 different systems for battle tracking within NATO. Many

50. Scazzieri, Luigi, 2020. *"Can the EU's Strategic Compass steer European Defence?"*. Bulletin Article | Centre for European Reform https://www.cer.eu/publications/archive/bulletin-article/2020/can-eus-strategic-compass-steer-european-defence#:~:text=In%20June%202020%20EU%20defence.in%20security%20and%20defence%20policy.&text=Instead%2C%20it%20is%20supposed%20to.capabilities%20the%20Union%20should%20develop.

based on different technical standards, are not interoperable"[51].

To resolve the issues of interoperability, NATO has undertaken several initiatives. These include the Connected Forces Initiative (CFI), conceived to ensure NATO forces from various states can train, operate, and communicate together efficiently and effectively[52]. The process of improving interoperability could be considered similar to the creation of a common language among a population with diverse cultural and linguistic backgrounds. NATO identifies three different components of interoperability: technical, human, and procedural. The technical component is focused on means, hardware, and vehicle integration. Human interoperability mainly concerns procedures and doctrines. The procedural aspect deals with issues related to the standardisation and provision of a common understanding of specific concepts and terminologies, and at the same time focusses on training issues.

The likely scenario in which NATO would be called into action changed utterly after the Cold War. New conditions such as asymmetric conflict and civil insurgencies emerged in the 1990s and early 2000s. These were symptoms of global geopolitics' reconceptualisation as the world transitioned away from the Cold War world system. From a military perspective, significant changes occurred at this time, for example several NATO countries abolished conscription.[53] Additionally, countries downsized their defence systems in terms of human resources and aerial, naval, and land forces. During this transformation,

only a few countries -notably the US, France, and the UK- maintained broad military capabilities.

Following the fall of the Soviet Union, NATO land force interoperability has been facilitated by various national capabilities. A key objective has been to utilise more technological forces. These forces would be smaller in number, but highly efficient, due to better technology and higher levels of training.

Since this period, interdependence amongst western states has grown in economic, social, and military spheres. Many NATO members have developed systems and capabilities designed to be complementary among them. NATO has pushed to redefine its principle meaning and nature and adapt its goals to the new geopolitical environment. In recent years, there was a focus on low-intensity warfare, piracy, terrorism, and counterinsurgency, necessitating a shift in focus[54]. Collective defence remains the core business of NATO. However, this is complicated by new challenges facing the Alliance.

NATO has heavily invested financially and focussed intellectually on the concept of interoperability. The organisation has charged multiple agencies to improve interoperability over the years.

In 2001, the Committee for Standardisation (CS) was established with the goal of coordinating efforts on defence planning. Subsequently, in 2015, the Alliance began a two-pronged reinforcement, implementing the standardisation office and enhancing cooperation with the Military Committee and the NDPP (NATO Defence Planning Process)[55].

51. James Derleth, Enhancing interoperability: the foundation for effective NATO operations, 16 June 2015, https://www.nato.int/docu/review/articles/2015/06/16/enhancing-interoperability-the-foundation-for-effective-nato-operations/index.html#:~:text=Key%20tactical%20interoperability%20challenges%20include,doctrinal%20differences%2C%20and%20resource%20gaps.&text=There%20are%20vast%20technological%20disparities%20between%20NATO%20forces.&text=Many%20of%20them%2C%20because%20of,technical%20standards%2C%20are%20not%20interoperable.
52. Deni, John R, Shifting locus of governance? The case of NATO's connected forces initiative, 2016 European security (London, England), 02 April 2016, Vol.25(2), pp.181-196. Available at: https://doi.org/10.1080/09662839.2016.1157067
53. Anon, 2019, NATO Handbook, "NATO Force Structure Land Interoperability & Standardization Handbook. NATO Unclassified.
54. G. Till, 2018, "Sea power: A guide for the twenty-first century" Routledge (2ª edition).
55. NATO, Standardization, 2017, access 7/12/2020, https://www.nato.int/cps/en/natohq/topics_69269.htm

Furthermore, the North Atlantic Council has the NATO Support and Procurement Organisation (NSPO) to facilitate cooperation in the fields of "acquisition, capability, support and logistics provision[56].

NATO has launched several projects to realise common doctrines, procedures, and shared technologies. These projects are voluntary and not binding. They provide common means and tools placed at the disposal of all NATO Member States. The three main standardisation measures are STANAGs, STANRECs, and APs:

- STANAG – Standardisation Agreements are documents focused on creating common terms and conditions for equipment and means within the Alliance. STANAGs constitute the basics for technical interoperability on a broad variety of communication and information systems vital for NATO operations. STANAGs are flexible tools; they can be updated and renewed as lessons are learned from issues and difficulties faced at the operational level.

- STANREC – Standardisation Recommendations are documents for adapting and adjusting standards. They also focus on the state of implementations in each Member State.

- AP – The Allied Publication; official documents that are complementary to STANAGs and STANRECs[57].

STANAGs define what should be done regarding implementation, and STANRECs recommend measures necessary to reach the desired level or goal.

However, none of these inherently ensure an immediate fulfilment of the desired level of standardisation and interoperability. The implementation itself may vary depending on the Alliance members. The process can be slowed by single states' issues, delays and "physiological terms" which may not be under the direct control of NATO or the national armed forces. Standardisation requires time to fully mature, and some states may reach acceptable levels faster than others; this also depends on the structure and characteristics of each state's armed forces.

The Smart Defence Initiative (SDI) is another NATO interoperability organisation. This was established after cuts to national defence budgets following the economic crisis of 2008. This programme focuses on encouraging Allies "to cooperate in developing, acquiring, and maintaining military capabilities to meet current security problems in accordance with the new NATO strategic concept"[58]. The programme aims to align members national priorities with NATO's. It aims to push and promote joint ventures in the defence industry within the Alliance, allowing access to technology and capabilities that individual states would struggle to obtain alone. It also encourages higher specialisation; in this way, smaller countries can focus on their specific industrial excellence instead of a multitude of standard products.

The benefits of this program include economic, industrial, and technological development among the states. NATO smart defence means pooling and sharing capabilities, setting priorities, and coordinating efforts.

It is also important to mention the NATO Defence Planning Process (NDPP), which promotes standardisation and interoperabil-

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56. NSPA | NATO Support and Procurement Organisation (NSPO). Available at: https://www.nspa.nato.int/about/nspo, access 7/12/2020

57. Anon, Study on "European armament standardisation", EPRS, European Parliament, 2018.

58.Anon, NATO Review Magazine, Smart Defence. Available at: https://www.nato.int/docu/review/topics/en/Smart-Defence.htm#:~:text=Smart%20defence%20is%20a%20con-cept,the%20new%20NATO%20strategic%20concept [Accessed 09 December 2020]

ity. The NDPP's purpose is to improve interoperability, especially in developing capability delivery in the short and medium terms. It is based on 4-year cycles, up to 20 years and follows a 5-step regulation:

- Establish political guidance.
- Determine requirements.
- Apportion requirements and set targets.
- Facilitate implementation.
- Review results.

This process is designed to be extremely flexible to face the sudden changes to member states scenarios and needs. The review is performed every two years and facilitates continuous implementation. All decisions related to bodies, agencies, and programmes in the domain of interoperability are taken at the higher political level of the North Atlantic Council, underlining the crucial importance of interoperability and standardisation.

The challenge of creating an efficient framework within NATO is complicated by the evolution of contemporary warfare and by the emergence of new, increasingly potent threats. It is difficult for armed forces to anticipate and adapt to new cyber or hybrid warfare scenarios. Militaries face a double challenge: on the one hand, keeping up with improvements in interoperability; on the other hand, creating common doctrines and approaches to new scenarios. Suppose in the conventional warfare domain, it is possible to improve interoperability. In that case, these new scenarios represent an opportunity: There is a possibility to create *a priori,* common foundations for cyber and hybrid warfare. This would avoid the obligation to pursue and fill doctrinal and operational gaps among Member States retroactively.

Interoperability is necessary for the Alliance to use its full potential by avoiding gaps, shortages, and disruptions, especially in the operational field.

Compatibility	The lowest level of interoperability, with products, processes or services used together under specific conditions to fulfil requirements without causing unacceptable interactions.
Interchangeability	The capacity of a single product, process, or service to be used in place of another to fulfil the same requirements.
Commonality	The highest level of interoperability. It consists of sharing the utilisation of the same doctrines, procedures, and equipment.

CONCLUSION

Interoperability represents an asset to armed forces in terms of effectiveness and coordination. To this end, various forms of defence cooperation in view of achieving interoperability have been established across Europe.

Intra-state projects embody the first facet through bilateral agreements, like the CaMo programme or the Franco-German partner-

ship, as well as through contractual arrangements involving private businesses. The most prominent interoperability frameworks are those of the EU and NATO. These organisations can foster more inclusive cooperation towards harmonising national defence processes and the standardisation of military equipment.

However, coherence between the approaches is necessary to increase their potential. As the EUGS broadens EU defence scope to include territorial protection, Brussels must draw from NATO's long-standing expertise. Indeed, NDPP requirements are taken into consideration by both the CDP and the CARD; PESCO are set to be complementary to NATO for interoperability and standardisation. Therefore, despite the lack of a clear agreed-upon division of labour, the two organisations will complement each other. Two factors are important here: a tacit geographical split (as each entity intervenes where the other does not) and a discrepancy in scope (as NATO is, by mandate, aimed at collective defence, while the EU so far, devotes itself to security missions through the CSDP).

To shape a partnership that would be mutually beneficial, NATO and the EU have managed to reach an arrangement concerning their relations via the 2016 Joint Declaration[59]. This identified seven concrete areas for cooperation, reinforced by an annual progress review and 74 specific cooperation initiatives. In 2018, a more ambitious Joint Declaration was signed, specifying that "the capabilities developed through the EU and NATO's defence initiatives should remain coherent, complementary and interoperable. They should be available to both organisations"[60]. Further-more, the latest progress report emphasises efforts made to ensure coherence between the CDP and the NDPP, encompassing extensive consultations, meetings, and cross-briefings at staff level as well as joint exercises.

Conversely, deeper cooperation between NATO and the EU is currently prevented by potentially insurmountable issues. Among them, there is the absence of task distribution that, although partly implicit, has never been undertaken. It has become even more relevant as the EU increases its defence profile through several tools, which, in turn, have raised concerns across the Atlantic. The protection of the European continent could be at stake as the US may progressively shift its focus Eastward to engage in great power competition with China, rather than countering Russia's aggressiveness in Europe.

Most importantly, any agreement between the two organisations is hindered by Turkey's unwillingness to recognise Cyprus (a non-NATO EU Member State), so that any legally grounded relationship between NATO and the EU that goes beyond the obsolete Berlin Plus Agreement (signed before Cypriot accession to the EU) is impossible[61]. Accordingly, cooperation is limited to staff-to-staff exchanges, while activities like information sharing and joint training only occur at an informal level. Such a scenario precludes any form of deeper cooperation; it may undermine European interoperability and, consequently, affect the response to new challenges. However, much has already been done within NATO to enhance interoperability and standardisation. For instance, the three main measures: STANAGs, STANRECs, and APs are increasing and improving interoperability, giving clear guidelines to the Alliance. In

59. *"Joint declaration by the President of the European Council, the President of the European Commission, and the Secretary General of the North Atlantic Treaty Organization"*. 2016. Warsaw
60. *"Joint declaration on EU-NATO cooperation by the President of the European Council, the President of the European Commission, and the Secretary General of the North Atlantic Treaty Organization"*. 2018. Brussels
61. A comprehensive package of agreements made by NATO and the EU between 2002 and 2003.

addition, there are other ambitious programs and projects, particularly stemming from the EU framework, heading in the right direction. These actions represent good starting points; their deployment is aimed to ensure the continuation of a trend-oriented to the reaching of full interoperability.

Despite this, it is necessary to increase the efforts towards a common defence strategy of Europe. It is also important to have a stable foreign policy with more cohesion and coherence between the EU and NATO and increase interoperability implementation.

With new scenarios, it is essential to create an efficient framework dedicated to interoperability across Europe. In addition, to anticipate as much as possible, the process of military integration among European states, it is vital to guarantee an efficient defence sector, ready to face any possible future developments.

In conclusion, interoperability is pivotal for European defence to realise its full potential by avoiding shortages and disruptions. New technologies represent opportunities to be seized. Together with broader shared plans of acquisition and training will avoid the need to fill gaps in future. Moreover, fully functional interoperability could guarantee results superior to the sum of its parts, with the consequences for spending efficiency, greater deterrence power, and effective common defence.

Finally, it is desirable to increase means (vehicles, aircraft, vessels) and personnel under the direct control of international military commands. In these multinational contingents, training and international cooperation at every level could be improved. It is important to have personnel, trained and accustomed, to working together with other national forces. Establishing more military forces, both multinational and permanent, will increase the awareness of differences, doctrines, training modalities and procedures. Furthermore, from a long-term perspective, working, training, and operating together with an allied force will lead to normalisation of such practice. This will increase the number of military staff capable of understanding and operating at ease with different allied armed forces. Interoperability between other national forces will become ordinary and not extraordinary.

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Created in 1953, the Finabel committee is the oldest military organisation for cooperation between European Armies: it was conceived as a forum for reflections, exchange studies, and proposals on common interest topics for the future of its members. Finabel, the only organisation at this level, strives at:

- Promoting interoperability and cooperation of armies, while seeking to bring together concepts, doctrines and procedures;
- Contributing to a common European understanding of land defence issues. Finabel focuses on doctrines, trainings, and the joint environment.

Finabel aims to be a multinational-, independent-, and apolitical actor for the European Armies of the EU Member States. The Finabel informal forum is based on consensus and equality of member states. Finabel favours fruitful contact among member states' officers and Chiefs of Staff in a spirit of open and mutual understanding via annual meetings.

Finabel contributes to reinforce interoperability among its member states in the framework of the North Atlantic Treaty Organisation (NATO), the EU, and *ad hoc* coalition; Finabel neither competes nor duplicates NATO or EU military structures but contributes to these organisations in its unique way. Initially focused on cooperation in armament's programmes, Finabel quickly shifted to the harmonisation of land doctrines. Consequently, before hoping to reach a shared capability approach and common equipment, a shared vision of force-engagement on the terrain should be obtained.

In the current setting, Finabel allows its member states to form Expert Task Groups for situations that require short-term solutions. In addition, Finabel is also a think tank that elaborates on current events concerning the operations of the land forces and provides comments by creating "Food for Thought papers" to address the topics. Finabel studies and Food for Thoughts are recommendations freely applied by its member, whose aim is to facilitate interoperability and improve the daily tasks of preparation, training, exercises, and engagement.

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