Integration of Intelligence Processes into NATO's Strategic and Operational Planning System

Vasyl Shkoliarenko

Candidate of Technical Sciences, Senior Research Fellow, e-mail: vasyl1970@yahoo.com, ORCID ID: https://orcid.org/0000-0001-8274-2232

Yevheniy Bereznyak Military Academy, Kyiv, Ukraine

Received: August 16, 2026 | Revised: September 20, 2026 | Accepted: September 30, 2026

UDC 355.40:355.45:004.8

DOI: https://doi.org/10.33445/psssj.2026.7.3.2

Abstract

The evolving security environment, characterized by hybrid threats, multidomain operations, rapid technological change, and growing volumes of information, requires closer integration of intelligence into NATO's strategic and operational planning. Existing Alliance concepts, including Joint Intelligence, Surveillance and Reconnaissance (JISR), Multi-Domain Operations (MDO), the NATO Operational Planning Process (OPP), and the Comprehensive Approach, provide complementary foundations but do not independently provide an end-to-end intelligence governance architecture. The aim of this study is to examine the evolution, organizational architecture, and functional integration of NATO intelligence within strategic and operational planning and to develop a conceptual model for intelligence-driven planning. Using qualitative conceptual, comparative, structural-functional, and process analyses of NATO doctrinal and policy documents and relevant academic literature, the study identifies functional relationships among intelligence requirements, collection, processing, analysis, decision support, operational execution, assessment, feedback, and organizational learning. The proposed model treats intelligence as a continuous governance function linking strategic objectives to operational decisions and assessed effects. It complements JISR, MDO, OPP, and the Comprehensive Approach while incorporating artificial intelligence, decision-support systems, geographic information systems, big data analytics, and C4ISR/C5ISR as enabling capabilities that support human-centered decision-making. The conceptual contribution is an integrated framework for continuous intelligence-to-decision traceability and adaptive feedback across the planning lifecycle. Its practical value lies in supporting interoperability, planning refinement, multinational exercises, capability development, and subsequent empirical validation of intelligence integration mechanisms.

Key words: NATO; Intelligence Integration; Strategic Planning; Operational Planning; Joint Intelligence, Surveillance and Reconnaissance; Multi-Domain Operations; Intelligence Governance; Decision Support.

Introduction

The rapidly changing security environment has fundamentally transformed the principles of military planning and command within the North Atlantic Treaty Organization (NATO). Contemporary conflicts are characterized by multidomain operations, accelerated decision-making cycles, hybrid threats, cyberattacks, information confrontation, and the extensive use of artificial intelligence (AI), autonomous systems, and digital technologies. Under these conditions, the effectiveness of strategic and operational planning increasingly depends on the timely collection, processing, analysis, and dissemination of intelligence capable of providing commanders with comprehensive situational awareness and supporting evidence-based decision-making (Johnson, 2023; Gilli et al., 2025; Babayev et al., 2026).

Recent military conflicts, particularly Russia's full-scale invasion of Ukraine, have demonstrated that intelligence has become one of the decisive factors influencing operational success. The traditional perception of intelligence as merely a supporting activity has gradually evolved into an understanding of intelligence as a comprehensive and continuous process integrated into every stage of planning and execution. Intelligence products now influence strategic assessment, operational design, capability development, target selection, force employment, and post-operational evaluation. Consequently, intelligence is increasingly viewed not as an auxiliary function but as an integral component of NATO's operational planning architecture (Buluc et al., 2025; Kulyk, 2023).

The transformation of NATO toward Multi-Domain Operations (MDO) has further reinforced the importance of integrating intelligence across NATO's five operational domains—land, maritime, air, cyberspace, and space—while also accounting for the electromagnetic and information environments. Simultaneously, the rapid development of artificial intelligence, machine learning, geospatial information systems, decision-support systems, big data analytics, and automated planning tools has substantially changed the organization of intelligence processes. AI-enabled analytical platforms facilitate the fusion of heterogeneous information sources, predictive intelligence, operational risk assessment, and dynamic planning, allowing commanders to respond more rapidly to changes in the operational environment (Frame et al., 2024; Liu et al., 2024; Munir et al., 2024; Muller et al., 2023). At the same time, emerging intelligence paradigms—including Open-Source Intelligence (OSINT), Crowd Intelligence (CROWDINT), Citizen Intelligence (CITINT), and AI-assisted intelligence fusion—are reshaping the architecture of military intelligence and strengthening the integration of civilian, governmental, and military information resources (Kutej & Horak, 2025; Minniti & Pili, 2025).

The aim of this study is to examine the evolution, organizational architecture, and functional integration of NATO intelligence within strategic and operational planning and to develop a conceptual model that enhances intelligence-driven planning within the Alliance.

The scientific novelty of this study lies in conceptualizing intelligence integration as a continuous governance architecture that links intelligence requirements, collection, analysis, decision support, operational execution, assessment, and organizational learning within a single adaptive planning framework.

Literature Review

Research on intelligence integration into military planning has intensified considerably in recent years, reflecting the growing complexity of multidomain operations and the rapid digital transformation of modern armed forces. Existing studies can be grouped into six interrelated research areas: (1) NATO's transformation toward multidomain operations; (2) intelligence, surveillance, and reconnaissance (ISR) integration; (3) operational planning and decision-support systems; (4) digital technologies and artificial intelligence in intelligence processes; (5) geospatial, cyber, and open-source intelligence; and (6) capability development and interoperability. Although these areas have developed rapidly, they remain insufficiently integrated within a comprehensive conceptual framework linking intelligence processes to NATO's strategic and operational planning.

The first research direction concerns the evolution of NATO's operational concepts in response to contemporary security challenges. The transition from traditional joint operations toward Multi-Domain Operations has substantially changed the role of intelligence within military planning. Gilli, Gilli, and Grgić (2025) argue that future NATO operations require synchronized action across land, maritime, air, cyber, space, and information domains, making intelligence integration a prerequisite for operational superiority. Similarly, Kacmarik and Vasicek (2024) emphasize that multidomain operations require continuous intelligence support capable of integrating information

obtained from multiple operational environments into a unified situational awareness system. NATO doctrinal publications further reinforce this approach by identifying Joint Intelligence, Surveillance and Reconnaissance as one of the Alliance's key operational capabilities supporting strategic decision-making and capability development (NATO, 2026a; NATO, 2026c).

A second stream of research examines intelligence as a core component of operational planning. Contemporary scholars increasingly view intelligence not merely as information collection but as a continuous analytical process supporting operational design, planning, execution, and assessment. Kulyk (2023) demonstrates that the transformation of NATO's Joint ISR architecture has significantly enhanced interoperability among Allied intelligence organizations. Buluc, Arcos, and Ivan (2025) analyze the growing strategic role of intelligence in public communication during the Russian-Ukrainian war, illustrating that intelligence products increasingly influence not only military operations but also strategic communication and political decision-making. These findings indicate that intelligence has evolved into a multidimensional decision-support function extending beyond traditional military intelligence.

The third research direction focuses on operational planning methodologies and decision-support systems. Modern military planning increasingly relies on analytical models capable of processing large volumes of heterogeneous information under conditions of uncertainty. Liu et al. (2024) propose adaptive planning methods based on artificial neural networks that optimize operational planning through continuous feedback and scenario evaluation. Radovanovic, Zivkovic, and Crnogorac (2025) investigate decision-support models at the tactical level, demonstrating that analytical decision-support systems improve planning quality and operational responsiveness. Johnson (2023) further argues that while intelligent systems can significantly accelerate the Observe–Orient–Decide–Act (OODA) loop, effective command and control still requires human oversight and cognitive decision-making.

A rapidly expanding body of literature addresses the integration of artificial intelligence into intelligence and operational planning. Babayev, Akhundov, and Hashimov (2026) describe artificial intelligence as one of the principal drivers of multidomain operations, capable of transforming intelligence analysis, command and control, predictive modelling, and operational synchronization. Similarly, Munir, Mantoro, and Ayu (2024) demonstrate that AI integration into C4ISR architectures enhances information processing, target identification, and combat effectiveness. Frame et al. (2024) report that AI-enabled decision-support systems improve cognitive performance during intelligence collection and route planning, while Vold (2024) emphasizes the concept of Human-AI cognitive teaming, arguing that artificial intelligence should augment rather than replace human decision-makers in national security environments.

Another important research direction concerns the evolution of intelligence collection methods and the emergence of new intelligence paradigms. Kutej and Horak (2025) identify CROWDINT, CITINT, and digital battlespace intelligence as emerging approaches that substantially expand traditional intelligence capabilities during the Russia-Ukraine war. Minniti and Pili (2025) analyze NATO's growing reliance on Open-Source Intelligence, emphasizing its increasing importance for strategic warning, situational awareness, and intelligence fusion. Jones (2022) highlights the necessity of integrating cyber defense into intelligence and operational planning, arguing that cyberspace has become an inseparable component of modern intelligence architecture. At the same time, NATO's continuing investments in electromagnetic warfare, space-based capabilities, and AWACS platforms demonstrate the Alliance's efforts to integrate intelligence collection across all operational domains (NATO, 2023b; NATO, 2026b; NATO, 2026d).

A further research area examines the technological infrastructures supporting intelligence integration. Andrushko et al. (2023) investigate generalized models of information acquisition and processing systems designed to improve the efficiency of military information management. Kobzan

et al. (2025) analyze the development of military geographic information systems, demonstrating their growing role in operational planning, target acquisition, and command support. These studies confirm that modern intelligence increasingly depends on interoperable digital platforms capable of integrating information from multiple sources into a unified operational picture.

Despite the substantial growth of research devoted to multidomain operations, artificial intelligence, intelligence modernization, and operational planning, several important research gaps remain. First, existing studies primarily investigate individual elements of intelligence support, including Joint ISR, OSINT, cyber intelligence, artificial intelligence, and decision-support systems, rather than examining their interaction within NATO's comprehensive planning architecture. Second, insufficient attention has been devoted to the mechanisms through which intelligence processes are integrated simultaneously into strategic planning, operational planning, capability development, and command decision-making. Third, the reviewed literature does not reveal a widely accepted integrated conceptual framework explaining how intelligence, digital technologies, interoperability, and multidomain operations collectively shape NATO's planning system.

Accordingly, this study addresses these gaps by analyzing intelligence integration as a unified process embedded throughout NATO's strategic and operational planning cycle. The article synthesizes contemporary scholarly approaches, NATO doctrinal developments, and recent technological advances to propose a comprehensive understanding of intelligence-driven planning under conditions of multidomain operations and digital transformation.

Materials and methods

This study employs a qualitative research design based on conceptual and comparative analyses of NATO strategic planning concepts and intelligence doctrine. The research is grounded in an examination of official NATO doctrinal publications, policy documents, capability development frameworks, and academic literature addressing intelligence integration, strategic planning, Joint Intelligence, Surveillance and Reconnaissance, Multi-Domain Operations, the NATO Operational Planning Process, and the Comprehensive Approach.

The empirical basis of the research consists of publicly available NATO doctrines, concepts, policy papers, Allied Command Transformation publications, and peer-reviewed scientific studies devoted to intelligence support, operational planning, and multidomain operations. Sources were selected according to three criteria: direct relevance to NATO strategic or operational planning; explicit consideration of intelligence, ISR, decision support, interoperability, or multidomain integration; and sufficient institutional or scholarly authority to support conceptual analysis. The comparative analysis was conducted across common analytical dimensions: primary purpose, intelligence function, planning coverage, feedback mechanisms, decision support, technology integration, interoperability requirements, and organizational learning. These dimensions were then synthesized through structural-functional and process analyses to derive the recurring relationships and principles incorporated into the proposed conceptual model.

The research methodology combines several complementary scientific methods. The systems analysis method was applied to examine intelligence as an interconnected system supporting strategic and operational planning across multiple organizational levels. Comparative analysis was used to identify similarities, differences, complementarities, and functional limitations among JISR, MDO, OPP, and the Comprehensive Approach. Structural-functional analysis enabled the identification of the roles performed by intelligence processes within planning and decision-making activities. The process approach was employed to analyze the intelligence lifecycle and its interaction with planning, execution, assessment, and feedback mechanisms. In addition, the conceptual modelling method was used to develop an integrated framework describing the continuous interaction between intelligence processes and operational planning.

The study is grounded in the examination of official NATO doctrinal publications, organizational documents, capability development frameworks, institutional reforms, and academic literature addressing intelligence integration, governance, and strategic and operational planning. The methodological framework is intended to provide a systematic interpretation of existing NATO concepts rather than to evaluate operational effectiveness empirically. Accordingly, the proposed model should be considered a conceptual framework designed to support further doctrinal development and future empirical validation through multinational exercises, operational planning activities, and case-based research.

Results

1. Evolution of Intelligence Integration within NATO Strategic and Operational Planning

The analysis demonstrates that the role of intelligence within NATO's strategic and operational planning has undergone a profound transformation over the past three decades. Whereas intelligence was traditionally regarded as a supporting function responsible primarily for collecting and disseminating information on adversary capabilities, contemporary NATO planning increasingly positions intelligence as an integral component of the entire planning cycle. This evolution reflects changes in the operational environment, the emergence of multidomain threats, rapid technological advances, and the growing need for synchronized decision-making across strategic, operational, and tactical levels.

The first stage of this transformation was characterized by the transition from platform-oriented intelligence collection to integrated intelligence support. During this period, intelligence activities remained largely organized according to separate collection disciplines, including Human Intelligence (HUMINT), Signals Intelligence (SIGINT), Geospatial Intelligence (GEOINT), Measurement and Signature Intelligence (MASINT), and Imagery Intelligence (IMINT). Their principal function was to provide commanders with the information necessary for mission planning and battlefield assessment. Although these intelligence disciplines significantly enhanced operational awareness, they often operated through fragmented information channels with limited interoperability between national and multinational structures.

A substantial shift occurred as NATO increasingly adopted joint operational concepts and capability-based planning. Intelligence progressively evolved from an independent functional area into a continuously integrated process supporting all phases of strategic and operational planning. The establishment of JISR significantly strengthened multinational intelligence cooperation by facilitating the fusion of information collected from multiple intelligence disciplines into a common operational picture. Rather than focusing solely on intelligence collection, JISR emphasizes the synchronization of collection management, processing, exploitation, analysis, dissemination, and operational feedback throughout the planning cycle (Kulyk, 2023; NATO, 2026c).

The transition toward MDO further expanded the role of intelligence within NATO's planning architecture. Intelligence is no longer confined to supporting land operations but functions across NATO's five operational domains—land, maritime, air, cyberspace, and space—while also accounting for the electromagnetic and information environments. Effective planning increasingly depends on the ability to integrate heterogeneous intelligence sources into a unified decision-support environment capable of providing commanders with continuous situational awareness and predictive assessments. This multidomain approach requires close coordination among intelligence organizations, operational headquarters, cyber defence structures, space-based capabilities, and strategic communication actors (Gilli et al., 2025; Kacmarik & Vasicek, 2024).

The analysis also indicates that intelligence integration has become increasingly dependent on digital transformation. Modern planning processes rely on interconnected information infrastructures capable of processing large volumes of heterogeneous data within compressed

decision timelines. Military Geographic Information Systems (GIS), C4ISR/C5ISR architectures, and AI-enabled analytical platforms are evolving into the technological backbone of intelligence integration, enabling the collection, processing, visualization, and dissemination of intelligence products within a shared operational environment (Kobzan et al., 2025; Munir et al., 2024). Similarly, generalized information-processing models contribute to improving interoperability between intelligence assets and command-and-control systems by supporting automated information flows and reducing delays in operational decision-making (Andrushko et al., 2023).

A major trend identified in this research is the growing integration of artificial intelligence into intelligence support and operational planning. AI technologies increasingly assist analysts in processing large datasets, identifying patterns, generating predictive assessments, supporting scenario development, and accelerating intelligence fusion. However, the literature demonstrates a broad consensus that AI currently performs most effectively as an enabling technology that supports human decision-makers rather than replacing strategic judgement. The most promising applications concern war gaming, operational simulations, planner training, automated information summarization, scenario modelling, and the preparation of after-action reports, where AI enhances analytical efficiency while preserving human responsibility for operational decisions (Caballero & Jenkins, 2025; Johnson, 2023; Vold, 2024).

Within the proposed framework, these technologies should therefore be understood not as independent capabilities but as enabling mechanisms that connect intelligence processing with planning, decision support, and operational adaptation.

Another significant aspect of intelligence integration concerns the rapid development of decision-support systems designed to improve operational planning. Contemporary analytical platforms increasingly support the evaluation of alternative courses of action (COAs), ISR asset allocation, route optimization for intelligence collection, operational risk assessment, and dynamic planning under uncertainty. By automating computationally intensive analytical tasks, these systems accelerate planning processes, improve the consistency of operational assessments, and reduce the cognitive workload imposed on commanders and planning staffs (Frame et al., 2024; Liu et al., 2024; Radovanovic et al., 2025).

Table 1 illustrates that contemporary NATO concepts assign different but complementary functions to intelligence. JISR concentrates on intelligence collection and dissemination, MDO emphasizes cross-domain synchronization, OPP integrates intelligence into operational planning, while the Comprehensive Approach extends information sharing beyond the military domain. These concepts collectively provide the doctrinal basis upon which the proposed intelligence integration model is developed.

Table 1. Evolution of Intelligence Integration in Contemporary NATO Planning Concepts

NATO concept	Primary purpose	Intelligence function	Contribution to planning
Joint Intelligence, Surveillance and Reconnaissance (JISR)	Integration of ISR capabilities	Planning, collection, processing, exploitation, analysis, and dissemination	Integrates ISR activities and provides timely intelligence for planning, execution, and assessment
Multi-Domain Operations (MDO)	Synchronization of activities across all operational domains	Cross-domain intelligence integration	Supports operational synchronization and multidomain decision-making
NATO Operational Planning Process (OPP)	Development of operational plans	Intelligence preparation and assessment	Integrates intelligence into planning and Course of Action development
Comprehensive Approach	Coordination of military and civilian actors	Knowledge development and information sharing among stakeholders	Expands planning through civil-military cooperation and shared situational awareness

Source: Compiled by the author.

Despite these advances, the evolution of intelligence integration continues to face several operational challenges. One of the most significant is information overload resulting from the exponential growth of available data from military sensors, cyber systems, satellites, unmanned platforms, and open sources. Contemporary planning therefore increasingly depends on automated filtering, data fusion, and AI-assisted analytical methods capable of transforming large volumes of heterogeneous information into actionable intelligence (Toth, 2025; Munir et al., 2024). Another persistent challenge concerns interoperability among Allied intelligence systems, particularly regarding offensive cyber operations, cyber intelligence, and multinational information-sharing architectures, where differences in technical standards, security policies, and national regulations continue to constrain operational integration (Jones, 2022).

The analysis further demonstrates that the intelligence ecosystem supporting NATO planning is expanding beyond traditional military intelligence. Open-Source Intelligence, Crowd Intelligence, and Citizen Intelligence increasingly complement conventional intelligence disciplines by providing timely information from publicly available and civilian sources. Although these intelligence approaches substantially broaden the information base available for operational planning, their effective integration requires doctrinal adaptation, standardized validation procedures, and institutional mechanisms capable of incorporating non-traditional intelligence sources into NATO's planning architecture (Minniti & Pili, 2025; Kutej & Horak, 2025).

Finally, intelligence products are increasingly employed beyond operational planning to support strategic communication and political decision-making. Recent experience demonstrates that intelligence assessments are now used not only for classified operational planning but also to inform governments, strengthen public resilience, counter disinformation, and prepare the information environment before military operations. Consequently, intelligence integration has expanded from a purely military function into a broader strategic capability supporting both operational effectiveness and political decision-making within the Alliance.

Overall, the analysis demonstrates that NATO has progressively transformed intelligence from a supporting analytical activity into a multidimensional, technology-enabled, and continuously integrated process embedded throughout strategic and operational planning. This transformation is driven by multidomain operations, digitalization, artificial intelligence, and expanding multinational interoperability, establishing intelligence as one of the principal enablers of contemporary NATO decision-making.

2. Intelligence Processes within NATO Planning Architecture

2.1. Organizational Architecture of NATO Intelligence

The effective integration of intelligence into NATO strategic and operational planning depends not only on established planning procedures but also on the Alliance's institutional architecture responsible for intelligence management, coordination, and dissemination. Unlike many national intelligence systems operating under centralized command, NATO intelligence is based on a multinational governance model that combines political oversight, military command, national intelligence contributions, and specialized analytical organizations. This institutional arrangement reflects the Alliance's collective decision-making principles while ensuring that intelligence supports both political authorities and military commanders.

Historically, NATO's intelligence architecture developed through two largely independent pillars. At the political level, intelligence support for the North Atlantic Council (NAC) was provided by the Intelligence Unit within the International Staff, relying primarily on information voluntarily shared by national civilian intelligence services. In parallel, the Military Committee (MC) received military intelligence assessments from the Intelligence Division of the International Military Staff (IMS-INT), which focused on operational and strategic military analysis. Although both structures addressed common security challenges, coordination between them remained limited for many

years. Until 2016, interaction was primarily conducted through the Intelligence Steering Board, whose advisory role was insufficient to ensure continuous operational integration or unified intelligence management (Hanna et al., 2017; Foster, 2013).

The changing security environment following the illegal annexation of Crimea in 2014, the growing complexity of hybrid threats, and the increasing demand for timely strategic warning highlighted the limitations of this fragmented architecture. The coexistence of separate civilian and military intelligence channels often resulted in duplicated analytical efforts, inconsistent assessments, and delayed information exchange between political and military decision-making bodies. In response, NATO initiated a comprehensive reform of its intelligence governance by establishing the position of Assistant Secretary General for Intelligence and Security (ASG-I&S) and creating the Joint Intelligence and Security Division (JISD) in 2016 (Ballast, 2018). This reform represented a major institutional shift, placing civilian and military intelligence under unified strategic leadership while strengthening coordination among national intelligence services, NATO Headquarters, and military commands.

The JISD has since become the central coordinating body within NATO's intelligence architecture. Its responsibilities extend beyond intelligence production to include strategic assessment, intelligence coordination, security policy, counterintelligence, and the analysis of hybrid threats. By integrating expertise from previously separate intelligence communities, the JISD provides comprehensive intelligence support to both the NAC and the Military Committee, thereby strengthening the coherence of political and military decision-making. The establishment of a dedicated Hybrid Analysis Branch further expanded NATO's ability to identify and assess hybrid activities, disinformation campaigns, cyber threats, and other nonconventional security challenges requiring integrated intelligence support (Šenk & Hynek, 2026).

At the operational level, intelligence integration is implemented through a network of specialized commands and intelligence organizations. Allied Command Operations (ACO), headquartered at the Supreme Headquarters Allied Powers Europe (SHAPE), is responsible for planning and conducting Alliance operations while coordinating intelligence support for operational commanders (Hallams, 2011; Weaver, 2021). Operational intelligence is reinforced by the NATO Intelligence Fusion Centre (NIFC), which consolidates intelligence from Allied and national sources, supports multinational information sharing, and provides fused intelligence products for operational planning (Maksimenko, 2022). Complementing these capabilities, the Joint Intelligence, Surveillance and Reconnaissance (JISR) framework integrates information collected from land, maritime, air, space, and other ISR assets into a common intelligence environment that supports situational awareness and operational planning (Kulyk, 2023).

NATO's intelligence architecture has also evolved through the establishment of specialized organizations addressing emerging security domains. Centres of Excellence (CoEs), although operating outside the formal NATO Command Structure, contribute expert knowledge, doctrinal development, education, experimentation, and capability enhancement in specific functional areas. The NATO Strategic Communications Centre of Excellence (StratCom CoE) supports the Alliance in countering disinformation, strengthening strategic communication, and analysing information warfare, while the emerging NATO Artificial Intelligence Centre of Excellence (AI CoE) is expected to facilitate the integration of AI-enabled capabilities into intelligence analysis, decision support, and operational planning (Fijałka, 2025; Šenk & Hynek, 2026). In parallel, the planned NATO Integrated Cyber Defense Centre (NICC) reflects the increasing importance of cyber intelligence and cyber defense as integral components of multidomain operations.

The analysis demonstrates that NATO's intelligence system should be understood as a distributed institutional network rather than a single intelligence organization. Strategic governance provided by the ASG-I&S and the JISD, operational coordination through SHAPE, NIFC, and JISR,

together with the expertise generated by specialized centers, collectively create a multilayered architecture capable of supporting strategic assessment, operational planning, intelligence fusion, and continuous adaptation to emerging threats. Consequently, intelligence integration within NATO is achieved not only through standardized planning procedures but also through a coordinated organizational framework that links political authorities, military headquarters, operational commands, national intelligence services, and specialized knowledge centers into a unified intelligence ecosystem. Table 2 summarizes the principal organizational components of NATO's intelligence architecture and their contribution to strategic and operational planning.

Table 2. Current and Historically Significant NATO Intelligence Structures Supporting Strategic and Operational Planning

Structure	Organizational level	Main responsibilities	Contribution to planning
Assistant Secretary General for Intelligence and Security (ASG-I&S)	NATO HQ	Strategic leadership of intelligence and security	Integration of civil and military intelligence
Joint Intelligence and Security Division (JISD)	NATO HQ	Intelligence coordination, strategic analysis, hybrid threats	Strategic assessment and political decision support
Intelligence Unit (historical, pre-2016)	NATO HQ	Civil intelligence support before establishment of the JISD	Intelligence support to the North Atlantic Council
Intelligence Division (IMS-INT) (historical, pre-2016)	International Military Staff	Military intelligence assessment before establishment of the JISD	Support to the Military Committee
NATO Intelligence Fusion Centre (NIFC)	Military Committee	Intelligence fusion	Operational planning support
Joint Intelligence, Surveillance and Reconnaissance (JISR)	ACO / SHAPE	ISR integration	Common operational picture
Allied Command Operations (ACO / SHAPE)	Strategic Command	Operational command	Intelligence-driven operational execution
Joint Warfare Centre (JWC)	ACT	Training, experimentation	Operational planning exercises
StratCom Centre of Excellence	NATO-accredited CoE	Strategic communication	Counter-disinformation
NATO AI Centre of Excellence	NATO-accredited CoE	AI integration	Future intelligence capabilities

Source: Compiled by the author.

The organizational architecture presented in Table 2 demonstrates that intelligence integration within NATO is no longer confined to a single intelligence organization. Instead, it represents a distributed institutional network in which strategic governance, intelligence fusion, operational command, specialized centers, and technological capabilities collectively support the planning process. Consequently, intelligence integration should be interpreted not only as an analytical process but also as an organizational capability that enables continuous interaction among political authorities, military headquarters, operational commands, and specialized intelligence organizations.

2.2. Intelligence Processes across the NATO Planning Cycle

The evolution of NATO's planning concepts has fundamentally transformed the architecture of intelligence support. The findings presented in the previous section demonstrate that intelligence

has evolved from an independent analytical function into a continuously integrated process embedded throughout strategic and operational planning. Consequently, intelligence activities are no longer confined to the collection and dissemination of information but constitute a dynamic system supporting every stage of the NATO Operational Planning Process (OPP).

The analysis indicates that intelligence integration begins long before operational planning is initiated. At the strategic level, intelligence organizations continuously monitor the international security environment, identify emerging threats, evaluate adversary capabilities, and assess potential risks affecting the Alliance. These strategic assessments provide the knowledge base for political consultations, capability development, defense planning, contingency planning, and operational preparedness. Thus, intelligence forms the initial information environment from which strategic objectives and planning assumptions are derived.

As planning progresses to the operational level, intelligence becomes increasingly integrated into the Operational Planning Process. Intelligence supports mission analysis by identifying adversary intentions, centers of gravity, critical capabilities, requirements, vulnerabilities, and operational constraints. Simultaneously, intelligence contributes to Intelligence Preparation of the Operational Environment (IPOE), which integrates military, political, economic, social, information, infrastructure, cyber, and environmental factors into a comprehensive understanding of the operational environment. This multidimensional assessment enables planners to evaluate not only the adversary's military posture but also the broader operational context affecting campaign design.

The analysis further demonstrates that intelligence plays a central role in the development and comparison of alternative Courses of Action (COAs). Intelligence products support operational planners in estimating probable adversary reactions, assessing operational risks, identifying critical decision points, and evaluating potential opportunities across multiple operational domains. Rather than providing static intelligence reports, contemporary intelligence continuously updates operational assumptions as new information becomes available, allowing planning teams to adapt their decisions throughout the planning cycle.

An important feature of NATO's planning architecture is the integration of Joint Intelligence, Surveillance and Reconnaissance (JISR) into operational decision-making. JISR connects intelligence collection assets, processing systems, analytical organizations, and operational headquarters through interoperable information-sharing mechanisms. Intelligence derived from satellites, airborne platforms, unmanned aerial systems, cyber capabilities, maritime sensors, electronic surveillance, and human sources is fused into a common operational picture that supports commanders at the strategic, operational, and tactical levels. This integrated approach significantly reduces information fragmentation while improving the speed and consistency of operational decision-making.

The analysis also demonstrates that the growing volume and diversity of intelligence data have substantially changed the technological architecture supporting planning processes. Modern NATO planning increasingly relies on interoperable digital infrastructures capable of integrating heterogeneous intelligence sources into unified analytical environments. Military Geographic Information Systems (GIS), C4ISR and C5ISR architectures, cloud-based analytical platforms, and AI-enabled information management systems facilitate the visualization, fusion, and dissemination of intelligence products, thereby enhancing situational awareness and improving operational coordination among multinational headquarters (Kobzan et al., 2025; Munir et al., 2024; Tănase, 2022).

Artificial intelligence has become an increasingly important enabling capability within this intelligence architecture. AI applications assist intelligence analysts in processing large volumes of structured and unstructured information, identifying hidden relationships, detecting anomalies, generating predictive assessments, and supporting operational simulations. However, the analysis confirms the prevailing consensus in contemporary research that AI currently delivers its greatest

value as a decision-support technology rather than as an autonomous decision-maker. Human judgement remains indispensable for strategic assessment, ethical evaluation, political interpretation, and command responsibility, while AI enhances the speed, consistency, and analytical depth of intelligence products (Caballero & Jenkins, 2025; Johnson, 2023; Vold, 2024).

Another significant component of NATO's planning architecture is the increasing use of advanced Decision Support Systems (DSS). These systems support operational planners throughout the planning cycle by evaluating alternative Courses of Action, optimizing ISR asset allocation, assisting intelligence collection planning, modelling operational scenarios, and estimating potential mission outcomes. Contemporary DSS increasingly integrate machine learning, optimization algorithms, and predictive analytics, allowing commanders to compare multiple operational options under conditions of uncertainty while substantially reducing cognitive workload and planning time (Frame et al., 2024; Liu et al., 2024; Radovanovic et al., 2025).

The analysis further indicates that intelligence integration has expanded beyond traditional classified information sources. OSINT, CROWDINT, CITINT, cyber intelligence, and social media analytics increasingly complement conventional intelligence disciplines, providing planners with additional situational awareness during rapidly evolving crises. These intelligence sources significantly broaden the information base available for operational planning, although their effective integration requires standardized validation procedures, common interoperability standards, and corresponding doctrinal adaptations within NATO planning processes (Minniti & Pili, 2025; Kutej & Horak, 2025).

Despite the substantial progress achieved in intelligence integration, several challenges continue to affect NATO's planning architecture. Information overload remains one of the most significant obstacles, requiring automated filtering, intelligent data fusion, and AI-assisted analytical tools capable of transforming massive information flows into actionable intelligence. Furthermore, differences in national information systems, cyber capabilities, data classification policies, and multinational interoperability continue to complicate intelligence sharing within coalition environments, particularly in cyber intelligence and offensive cyber operations (Jones, 2022; Toth, 2025).

Based on the analysis, intelligence integration within NATO planning can therefore be conceptualized as a continuous, multidirectional process connecting strategic assessment, intelligence collection, information fusion, operational analysis, decision support, operational execution, and feedback mechanisms. Unlike traditional linear intelligence models, the contemporary NATO planning architecture functions as an adaptive intelligence ecosystem in which information continuously circulates among intelligence organizations, operational headquarters, digital infrastructures, and decision-makers. Such an approach enables the Alliance to accelerate operational planning, improve situational awareness, enhance multidomain synchronization, and strengthen the adaptability of command structures under rapidly changing security conditions.

The findings presented above indicate that contemporary NATO planning can no longer be interpreted as a linear sequence of planning activities supported by intelligence at selected stages. Instead, intelligence functions as a continuously operating process that links strategic assessment, operational planning, execution, and organizational learning through permanent information exchange and multidomain situational awareness. Existing studies extensively examine individual components of this process—including JISR, AI-supported analytics, decision-support systems, cyber intelligence, and OSINT—but provide limited explanation of how these components interact within a unified planning architecture. Based on the synthesis of NATO doctrinal principles and contemporary scientific research, this study proposes a conceptual framework illustrating the integration of intelligence processes into NATO's strategic and operational planning architecture (Figure 1).

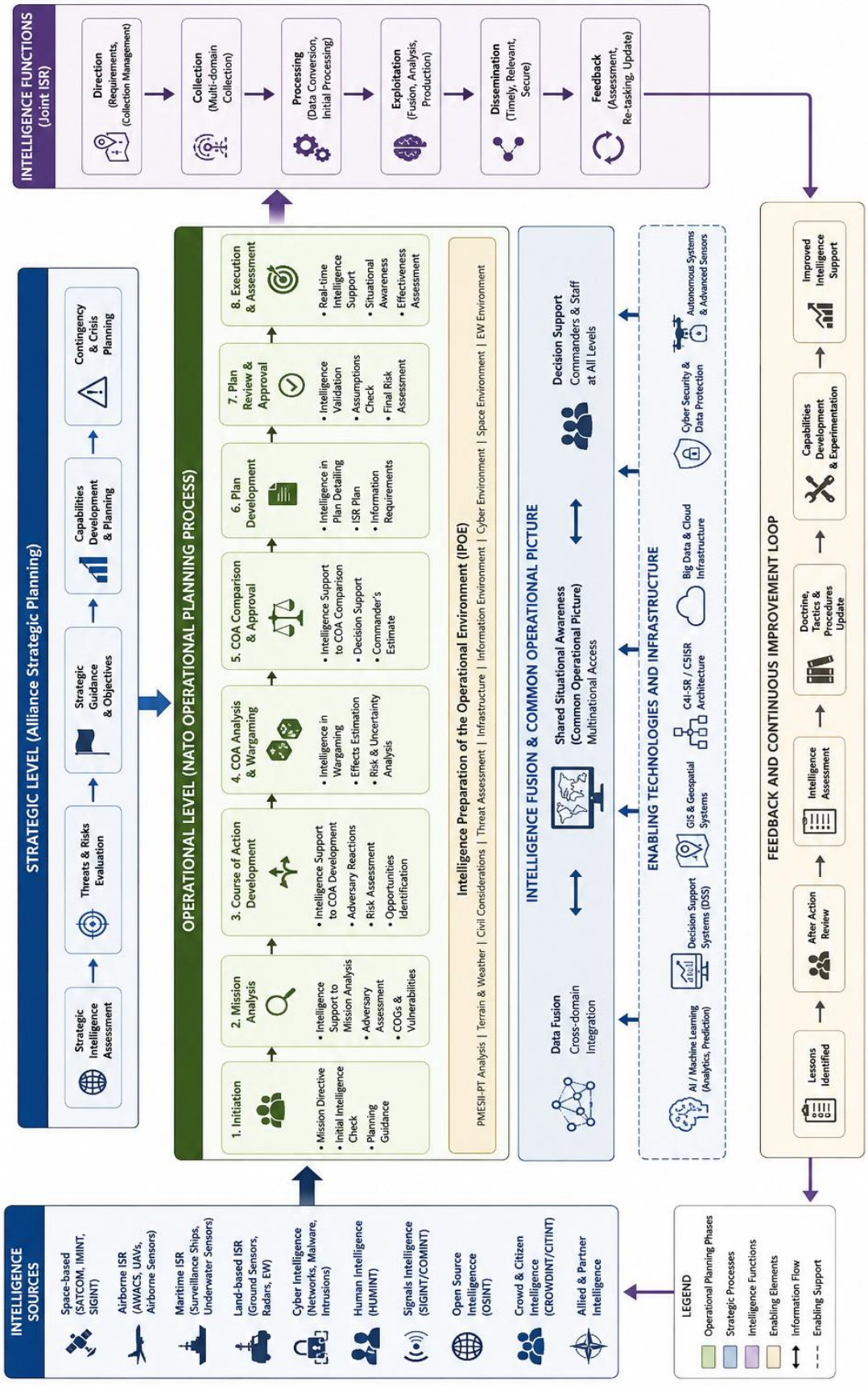


Figure 1. Integration of Intelligence Processes within NATO's Strategic and Operational Planning Architecture
Source: Compiled by the author.

As illustrated in Figure 1, intelligence integration should be understood as a multidirectional and continuous process rather than as a separate phase of operational planning. Intelligence activities begin with strategic assessment and the identification of planning requirements, continue through intelligence collection, processing, analysis, fusion, dissemination, and decision support, and remain active during operational execution and post-operation assessment. Throughout this cycle, intelligence products are continuously updated through feedback mechanisms, allowing commanders to adapt operational plans in response to changes in the operational environment.

Figure 1 therefore provides a descriptive synthesis of intelligence integration within NATO planning, combining the principal processes, information flows, and enabling technologies identified in the analysis.

The proposed framework also demonstrates the cross-functional role of enabling technologies—including artificial intelligence, decision-support systems, GIS, C4ISR/C5ISR architectures, cloud-based infrastructures, and big data analytics—which connect intelligence sources, operational headquarters, and decision-makers into a common operational picture. Consequently, operational effectiveness depends not only on the quality of intelligence products but also on the degree of interoperability, technological integration, and continuous information exchange across the strategic, operational, and tactical levels of command.

3. Transformation of the Intelligence Ecosystem in NATO Multi-Domain Operations

The analysis indicates that one of the most significant changes in NATO's intelligence architecture concerns not only the modernization of analytical processes but also the transformation of the intelligence ecosystem itself. Traditional intelligence structures were primarily organized around individual collection disciplines operating in parallel with limited interaction. Contemporary multidomain operations, however, require intelligence capabilities to function as an interconnected ecosystem in which multiple intelligence disciplines simultaneously contribute to a common operational understanding.

Unlike conventional intelligence architectures based on separate organizational structures, the multidomain approach emphasizes the convergence of information originating from physical, cyber, electromagnetic, space, and information environments. Intelligence therefore evolves from the aggregation of separate reports toward the continuous fusion of heterogeneous data streams. This transformation enables planners to identify relationships between operational domains that would remain invisible if individual intelligence products were analyzed independently.

An important characteristic of this evolving ecosystem is the increasing diversification of intelligence sources. While traditional intelligence disciplines—including HUMINT, SIGINT, GEOINT, IMINT, and MASINT—remain fundamental components of military intelligence, they are increasingly complemented by cyber intelligence, OSINT, CROWDINT, CITINT, social media analytics, commercial satellite imagery, and information obtained from private technology providers. Consequently, operational planning is no longer based exclusively on classified military information but increasingly incorporates verified civilian and commercial data capable of providing near-real-time situational awareness (Minniti & Pili, 2025; Kutej & Horak, 2025).

This diversification fundamentally changes the balance between collection and analysis. Historically, intelligence organizations concentrated considerable effort on acquiring information from limited sources. In contrast, the contemporary operational environment generates an abundance of information, making analytical integration, source validation, prioritization, and reliability assessment the principal challenges. Intelligence superiority therefore depends less on collecting additional data than on the ability to identify operationally relevant information and transform it into actionable knowledge within increasingly compressed planning timelines.

Another notable transformation concerns the temporal dimension of intelligence support. Traditional intelligence products were frequently produced as periodic assessments supporting

predefined planning milestones. Within multidomain operations, intelligence has become a continuously updated process capable of immediately incorporating new operational information into ongoing planning activities. Dynamic intelligence updates enable commanders to revise assumptions, reassess operational risks, and modify operational objectives without interrupting the planning cycle, thereby increasing organizational adaptability under rapidly changing battlefield conditions.

The analysis further demonstrates that intelligence integration increasingly extends beyond military organizations. Contemporary NATO operations rely on intelligence cooperation among military headquarters, intelligence agencies, governmental institutions, international organizations, research centers, commercial satellite operators, cybersecurity companies, and industrial partners. This expanding network significantly increases information availability while simultaneously creating new requirements for interoperability, standardized data governance, information security, and multinational coordination.

An additional feature of the emerging intelligence ecosystem is the growing integration of strategic communication with intelligence activities. Intelligence products are increasingly employed to support strategic messaging, expose adversary disinformation, strengthen societal resilience, and shape the international information environment before and during military operations. The experience of the Russian-Ukrainian war illustrates that the selective declassification of intelligence assessments may influence political decision-making, reinforce Allied cohesion, and reduce strategic uncertainty without requiring direct military action (Buluc et al., 2025).

The analysis also reveals an important conceptual shift from platform-centric intelligence toward network-centric intelligence. Operational effectiveness is determined less by the performance of individual sensors than by the ability of distributed intelligence networks to exchange information rapidly, synchronize analytical activities, and generate a shared operational picture across multinational command structures. In this context, interoperability becomes a strategic capability rather than merely a technical requirement, linking intelligence organizations into a resilient information ecosystem capable of supporting multidomain operations.

Accordingly, the transformation of NATO's intelligence architecture should be understood as an evolution from an intelligence cycle toward an adaptive intelligence ecosystem. This ecosystem integrates diverse information sources, analytical organizations, digital infrastructures, operational headquarters, and strategic decision-makers into a continuously interacting network. Such an approach substantially increases the flexibility of strategic and operational planning while creating the institutional foundation for the subsequent integration of artificial intelligence, predictive analytics, and autonomous decision-support capabilities.

4. Evolution of Decision-Making Models in NATO Intelligence-Driven Planning

The analysis indicates that the integration of intelligence processes has fundamentally transformed decision-making within NATO's strategic and operational planning system. Rather than simply increasing the volume of available information, contemporary intelligence capabilities are reshaping how commanders formulate operational problems, evaluate uncertainty, prioritize resources, and adapt plans during multidomain operations. As a result, decision-making is gradually evolving from a sequential planning procedure toward a continuously adaptive process supported by integrated analytical environments.

One of the principal characteristics of this transformation is the transition from reactive to anticipatory planning. Traditional operational planning was primarily based on the assessment of existing threats and the preparation of predefined response options. Contemporary intelligence-driven planning increasingly relies on predictive assessments that identify emerging patterns, estimate probable adversary behavior, and evaluate future operational conditions before they fully materialize. Consequently, planning shifts from responding to events toward anticipating operational developments and preparing adaptive response options in advance.

Another important transformation concerns the growing use of probabilistic rather than deterministic decision models. Modern operational environments are characterized by incomplete information, rapidly changing conditions, hybrid threats, and multidomain interactions that cannot be fully represented through linear planning assumptions. Intelligence products therefore increasingly incorporate alternative scenarios, confidence assessments, and risk estimates rather than single predictive conclusions. This enables commanders to compare several plausible operational futures while maintaining sufficient flexibility to adjust decisions as new intelligence becomes available.

The analysis further demonstrates that operational planning increasingly incorporates simulation-based decision support. Scenario modelling, digital war gaming, operational experimentation, and predictive simulations allow planning staffs to evaluate the consequences of alternative Courses of Action before operational execution. Unlike traditional planning methods based primarily on expert judgement, simulation environments provide opportunities to assess operational risks, identify potential bottlenecks, estimate resource requirements, and examine interactions among multiple operational domains under varying conditions.

An equally significant development is the increasing institutionalization of collaborative decision-making. Contemporary NATO operations involve multinational headquarters, specialized intelligence organizations, cyber defense structures, civilian agencies, and partner institutions participating simultaneously in planning activities. Intelligence products therefore serve not only as analytical inputs but also as a common information framework that enables geographically distributed planning teams to coordinate assessments, harmonize planning assumptions, and develop a shared operational understanding despite organizational diversity.

The analysis also reveals a growing emphasis on cognitive support for commanders and planning staffs. Rather than replacing human expertise, contemporary analytical environments are designed to improve cognitive performance by reducing information fragmentation, prioritizing operationally relevant intelligence, highlighting critical relationships, and visualizing complex operational dependencies. Decision quality increasingly depends on the ability to transform extensive multidomain information into structured knowledge that supports timely human judgement under conditions of uncertainty.

Another emerging feature concerns the integration of organizational learning directly into operational decision-making. Lessons identified during current operations are increasingly incorporated into planning activities through continuously updated knowledge repositories, digital analytical platforms, and adaptive planning procedures. This significantly shortens the cycle between operational experience and doctrinal adaptation, allowing planning organizations to refine operational concepts without waiting for formal doctrinal revisions.

The analysis further indicates that decision superiority is becoming an independent operational objective within NATO planning. While traditional military planning primarily emphasized force superiority, modern multidomain operations increasingly recognize that operational advantage may result from superior information processing, faster assessment of emerging situations, earlier identification of decision opportunities, and more rapid synchronization of multinational capabilities. Intelligence integration therefore contributes not only to improved situational awareness but also to greater speed, adaptability, and resilience in command-and-control processes.

Finally, the transformation of decision-making models highlights an important organizational implication. As analytical capabilities become increasingly distributed across multinational networks, operational effectiveness depends less on centralized information control and more on the ability of planning organizations to maintain a common operational picture while enabling decentralized execution. Intelligence-driven planning thus supports the principle of mission

command by providing subordinate headquarters with continuously updated situational awareness while preserving the strategic coherence of Alliance operations.

Overall, the analysis demonstrates that intelligence integration is transforming NATO decision-making from a hierarchical information-processing model into an adaptive, knowledge-based system. Within this system, predictive intelligence, collaborative planning, simulation environments, cognitive decision support, and continuous organizational learning collectively enhance the Alliance's ability to respond to multidomain threats while preserving the central role of human command in operational and strategic decision-making.

5. A Conceptual Model for Integrating Intelligence Processes into NATO Strategic and Operational Planning

The synthesis of the preceding analysis demonstrates that the effectiveness of intelligence integration cannot be explained solely by improvements in collection capabilities, analytical methods, or digital technologies. Rather, it depends on the ability of NATO's planning system to organize intelligence as a continuously evolving capability that supports strategic adaptation throughout the entire operational lifecycle. Based on the analysis, this study proposes a conceptual model that systematizes the principal functional relationships between intelligence processes and strategic and operational planning within the Alliance.

Unlike traditional approaches, which generally position intelligence as one of several supporting functions within operational planning, the proposed model conceptualizes intelligence as an integrating mechanism connecting strategic assessment, operational design, capability employment, and organizational learning. Intelligence therefore performs not only an informational role but also a coordinating function by synchronizing activities across multiple operational domains and organizational levels.

The proposed conceptual framework is based on six interrelated principles. The following principles are normative design propositions derived from the comparative and structural-functional analysis rather than descriptions of formally adopted NATO procedures.

The first principle is continuous intelligence integration. Intelligence activities should accompany every stage of strategic and operational planning rather than being concentrated during mission preparation. Continuous intelligence support enables commanders to update operational assumptions, reassess risks, and adjust planning decisions in response to changes in the operational environment.

The second principle is multidomain intelligence synchronization. Contemporary operational environments require intelligence to integrate information obtained across NATO's five operational domains—land, maritime, air, cyberspace, and space—together with relevant information from the electromagnetic and information environments. Operational effectiveness therefore depends on the ability to combine these heterogeneous intelligence streams into a coherent operational picture that supports unified planning across the Alliance.

The third principle is interoperability by design. Intelligence integration increasingly relies on standardized procedures, common data architectures, compatible analytical environments, and secure multinational information-sharing mechanisms. Interoperability should therefore be regarded as a foundational design principle rather than as a technical requirement addressed only after operational systems have been developed.

The fourth principle is adaptive decision support. Intelligence should not merely provide information describing the operational environment but should actively support decision-making through predictive assessments, alternative scenario development, risk evaluation, and continuous operational monitoring. Such an approach transforms intelligence into an active component of planning capable of improving operational adaptability under conditions of uncertainty.

The fifth principle is human-centered technological integration. Although artificial intelligence, advanced analytics, and automated decision-support systems substantially enhance the speed and quality of intelligence processing, strategic responsibility and operational judgement remain inherently human functions. Consequently, technological innovation should strengthen human cognitive performance, facilitate collaborative planning, and improve the transparency of analytical processes rather than replace command authority.

The sixth principle is continuous organizational learning. Intelligence integration should extend beyond operational execution by systematically incorporating operational experience, validated lessons identified, and emerging threat assessments into future planning activities, capability development, doctrine refinement, education, and training. Such feedback mechanisms strengthen institutional resilience while enabling the Alliance to adapt more rapidly to evolving security challenges.

The interaction of these principles forms the conceptual architecture presented in Figure 2. The proposed model illustrates intelligence integration as a cyclical and adaptive process in which strategic guidance, multidomain intelligence collection, analytical fusion, operational planning, decision support, operational execution, assessment, and organizational learning continuously reinforce one another. Rather than functioning as independent stages, these elements operate as an integrated knowledge system in which intelligence serves as the principal mechanism connecting political objectives with operational implementation.

Unlike Figure 1, which synthesizes the existing architecture of intelligence integration within NATO planning, Figure 2 presents the normative conceptual model proposed in this study and structures the relationships among its six design principles.

The proposed framework also demonstrates that the future development of NATO planning will increasingly depend on the ability to combine technological innovation with institutional adaptability. Intelligence integration should therefore be understood not only as the modernization of information systems but also as the transformation of organizational processes, collaborative planning practices, and multinational governance mechanisms. Such an approach strengthens strategic coherence across the Alliance while preserving the flexibility required to respond effectively to multidomain threats.

Overall, the proposed conceptual model provides an integrated analytical framework that links the principal findings of this study into a coherent representation of intelligence-driven planning. It may serve as a theoretical basis for further research on NATO operational planning, capability development, intelligence governance, and the application of emerging technologies within multinational security environments. In addition, the model offers practical value by supporting the refinement of planning methodologies, the enhancement of interoperability, and the development of adaptive intelligence capabilities for future Alliance operations.

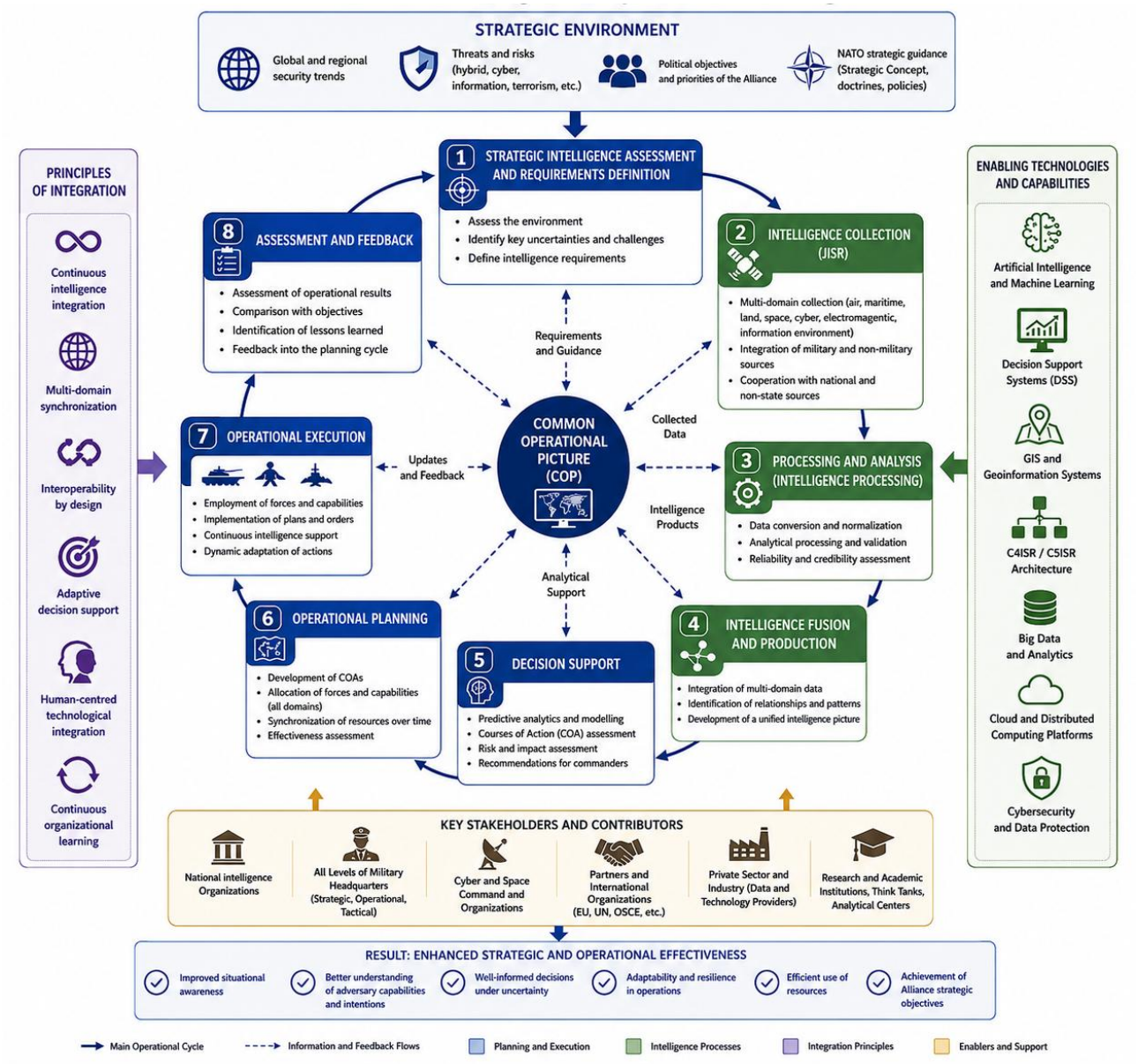


Figure 2. Conceptual Model for Integrating Intelligence Processes into NATO's Strategic and Operational Planning

Source: Compiled by the author.

Discussion

The comparison was conducted across the analytical dimensions defined in the methodological framework, including primary purpose, intelligence function, planning coverage, feedback mechanisms, decision support, technology integration, interoperability requirements, and organizational learning.

The comparison presented in Table 3 demonstrates that the proposed model does not duplicate existing NATO approaches but addresses the functional gaps between them. JISR provides the organizational and technical basis for collecting, processing, and disseminating intelligence; Multi-Domain Operations establish the requirement to coordinate activities and effects across operational domains; the NATO Operational Planning Process structures the development of operational decisions and plans; and the Comprehensive Approach expands cooperation beyond

purely military actors. However, none of these approaches independently provides an end-to-end mechanism linking strategic objectives, intelligence requirements, collection, analysis, decision support, operational execution, assessment, and organizational learning. The proposed model integrates these functions into a single recurrent architecture.

Table 3. Comparison of the Proposed Intelligence Integration Model with Existing NATO Approaches

Criterion	NATO JISR	Multi-Domain Operations (MDO)	NATO Operational Planning Process (OPP)	Comprehensive Approach	Proposed model
Primary objective	Coordinate ISR capabilities	Synchronize effects across all domains	Structure operational planning	Integrate military and civilian actors	Integrate intelligence throughout the planning lifecycle
Main focus	Integration of ISR planning, collection, processing, exploitation, analysis, and dissemination	Operational synchronization	Planning methodology	Cross-sector cooperation	Intelligence-driven governance of planning
Role of intelligence	Integrated ISR capability and intelligence support	Operational enabler	Staff support function	Shared information resource	Central integrating mechanism
Planning coverage	ISR integration across planning and execution	Execution and synchronization	Planning stages	Crisis management	Entire intelligence–planning–assessment cycle
Feedback mechanism	Mission-driven reassessment and collection adjustment	Operational adaptation	Operational assessment	Institutional coordination	Continuous intelligence feedback loop
Decision support	Direct support to planning and command decisions	Supports operational effects	Supports COA development	Supports coordination	Predictive and adaptive decision support
Technology integration	ISR platforms	Multidomain technologies	Planning tools	Information-sharing tools	AI, DSS, GIS, big data, and C4ISR/C5ISR integrated into one framework
Organizational learning	Limited	Lessons from operations	Lessons learned process	Civil-military experience	Embedded continuous learning cycle
Main limitation	Primarily focused on integrating ISR capabilities rather than governing the full planning lifecycle	Focus on operational synchronization	Sequential planning logic	Coordination without intelligence governance	Requires interoperability, data governance, and common standards

Source: Compiled by the author.

In comparison with JISR, the proposed model does not replace or diminish JISR's integrated role in ISR planning, collection, processing, exploitation, analysis, and dissemination. Rather, it extends the analytical focus from ISR integration to explicit end-to-end traceability between intelligence requirements and specific planning decisions, executed actions, assessed effects, and organizational learning. Within the proposed architecture, intelligence effectiveness should therefore be evaluated not primarily by the quantity of collected information but by its relevance to command decisions, timeliness, reliability, and capacity to reduce operational uncertainty. This makes it possible to identify whether a failure occurred during requirements formulation, collection, processing, analysis, dissemination, decision use, or subsequent assessment.

The relationship with Multi-Domain Operations is complementary. MDO explains how military and non-military activities can be synchronized across NATO's five operational domains—land, maritime, air, cyberspace, and space—while being coordinated with activities in the electromagnetic and information environments. The proposed model specifies how intelligence should support that synchronization by identifying cross-domain dependencies, critical vulnerabilities, warning indicators, and unintended consequences. Its feedback mechanism is particularly important because the completion of assigned activities does not necessarily demonstrate the achievement of the intended operational effect. Intelligence assessment is therefore required to determine whether adversary behavior and operational conditions have changed as expected.

Compared with the NATO Operational Planning Process, the proposed model gives intelligence a more active role in testing the continuing validity of plans. Planning assumptions are treated as subjects of continuous intelligence verification rather than as fixed premises accepted at the beginning of the process. Consequently, each major assumption should be connected to observable indicators, an assigned collection mechanism, and a threshold requiring command review. Courses of Action may also be assessed according to their intelligence feasibility: a Course of Action that depends on unavailable, delayed, or unreliable information creates a higher level of execution risk even when it is operationally feasible.

The proposed model also develops the intelligence dimension of the Comprehensive Approach. It identifies specific entry points for information provided by national authorities, international organizations, private companies, research institutions, and other non-military contributors. The value of their participation is determined not only by institutional cooperation but also by the relevance, accessibility, timeliness, credibility, and compatibility of the information supplied. At the same time, these actors cannot automatically be incorporated into a military command structure. Their involvement requires differentiated arrangements for access, consent, source protection, data ownership, classification, and information disclosure.

The principal advantage of the proposed model is end-to-end traceability between political objectives, intelligence activities, operational decisions, executed actions, and assessed effects. It also integrates assessment into the intelligence cycle, creates a defined place for technological support, and connects operational evidence with lessons learned and capability development. Artificial intelligence, decision-support systems, GIS, big data analytics, and C4ISR/C5ISR architectures are consequently treated as enabling instruments rather than autonomous decision-making components. This preserves human responsibility while allowing technological capabilities to accelerate processing, reveal relationships, and prioritize information.

Research Limitations

The model nevertheless has several limitations. First, it remains conceptual and does not define staff responsibilities, technical protocols, classification procedures, data formats, or decision authorities. Second, its effective implementation depends on interoperability among national systems and on the willingness of Allies to exchange intelligence. National restrictions, unequal

capabilities, incompatible networks, and different security policies may interrupt the information flows represented in the model. Third, the Common Operational Picture may create false certainty if assumptions, conflicting assessments, outdated reports, and varying confidence levels are displayed as equally reliable information. The COP should therefore distinguish verified data, analytical judgements, unresolved disagreements, and information gaps.

The proposed model also involves several inherent trade-offs. Greater interoperability may improve multinational intelligence integration but may conflict with national sovereignty, security restrictions, and classification requirements. Similarly, faster AI-supported analysis may accelerate decision-making while increasing the risk of unreliable or insufficiently validated assessments. Continuous information sharing can improve situational awareness but may also expose sensitive sources and methods. Finally, efforts to maintain a common operational picture must account for divergent national assessments, different confidence levels, and competing interpretations of the same operational environment.

A further limitation concerns the balance between adaptability and planning stability. Continuous intelligence updates may support rapid adjustment, but they may also produce unnecessary replanning and unstable priorities. The practical application of the model therefore requires predefined thresholds indicating when new intelligence should lead to routine updating, command reassessment, or formal revision of a Course of Action. Human judgement, legal review, and command accountability must remain mandatory, especially when AI-supported systems are used to generate forecasts or recommendations.

For NATO doctrine and practice, the model could serve as a cross-functional framework connecting JISR, MDO, the OPP, operational assessment, lessons learned, and civil-military interaction. Its practical implementation could include an intelligence–decision traceability matrix linking every priority intelligence requirement to a decision point, responsible staff element, source, deadline, and confidence threshold. NATO exercises could also evaluate the complete intelligence-to-decision chain by measuring the time needed to detect an invalid assumption, notify commanders, modify a decision, and disseminate the change across multinational components.

Empirical validation of the proposed model could be based on a set of measurable indicators. These may include the timeliness of intelligence support, the proportion of validated planning assumptions, decision-update latency, interoperability success rates, and the recurrence of identified intelligence gaps. Additional indicators could assess the reliability of intelligence products, the speed of information dissemination across multinational components, and the extent to which intelligence assessments result in documented adjustments to operational plans. Such measures would provide a basis for evaluating whether the proposed framework improves the effectiveness, adaptability, and traceability of intelligence-supported planning.

Accordingly, the proposed model should not be interpreted as an additional parallel NATO process. Its potential lies in aligning existing approaches around a common intelligence-governance architecture. Further development should focus on testing the model during multinational exercises, defining measurable indicators of intelligence relevance and timeliness, establishing differentiated information-sharing rules, and integrating recurring intelligence gaps into doctrine, training, and capability development. Such validation would determine whether the model can move from a conceptual representation to a practical instrument for improving NATO strategic and operational planning.

Conclusions

The findings of this study indicate that existing NATO concepts—including Joint Intelligence, Surveillance and Reconnaissance, Multi-Domain Operations, the NATO Operational Planning Process, and the Comprehensive Approach—perform complementary functions but do not

independently provide a unified framework linking intelligence activities with planning, decision-making, execution, assessment, and organizational learning.

The principal conceptual contribution of this research is the proposed model of intelligence integration across the entire planning lifecycle. The model establishes continuous relationships among intelligence requirements, information collection, analysis, decision support, operational execution, assessment, and feedback. It also incorporates artificial intelligence, decision-support systems, geographic information systems, big data analytics, and C4ISR/C5ISR architectures as enabling capabilities that strengthen, rather than replace, human decision-making.

The comparative analysis supports the conclusion that the proposed model complements existing NATO planning concepts by providing an overarching intelligence-governance framework rather than introducing an additional planning process. At the same time, the proposed mechanisms for intelligence-decision traceability, adaptive thresholds, and continuous organizational learning should be regarded as normative elements of the model rather than as empirically validated NATO procedures.

The model therefore requires further empirical validation. Future research should focus on testing it in multinational exercises and operational planning, developing measurable indicators of intelligence effectiveness and decision support, refining mechanisms for multinational information sharing, and assessing the implications of AI-enabled analytical systems for intelligence governance within NATO.

Funding

This research received no external funding.

Competing interests

The author declares no conflict of interest.

Use of Artificial Intelligence

Artificial intelligence was used for language editing, translation, and technical verification of the manuscript.

References

Andrushko, M., Arkushenko, P., Kuznetsov, V., & Andrushko, A. (2023). Substantiation of a generalized model of the functioning of a promising information and measuring system for collecting and processing information. *Collection of Scientific Works of the State Research Institute for Testing and Certification of Armaments and Military Equipment, 3*(17), 7–14. https://doi.org/10.37701/dndivsovt.17.2023.01

Babayev, S., Akhundov, R., & Hashimov, E. (2026). Conceptual-theoretical foundations and the transformative role of artificial intelligence in multidomain operations. *Grail of Science, 64*, 606–615. https://doi.org/10.36074/grail-of-science.20.03.2026.069

Batalov, M., Korostelov, V., Yarysh, I., & Zozulya, L. (2025). Perspectives on the process of defining goals during the planning and execution of joint fire support in a combined arms brigade according to NATO standards. *Testing and Certification, 3*(9), 51–57. https://doi.org/10.37701/ts.09.2025.06

Buluc, R., Arcos, R., & Ivan, C. (2025). When spies go public! Lessons learnt from the instrumentalization of intelligence for strategic communication in the run-up to the Russian-Ukrainian war. *Intelligence and National Security, 40*(1), 42–57. https://doi.org/10.1080/02684527.2024.2405255

Díaz Matey, G. (2026). New horizons in intelligence cooperation: Spain and the evolution of EU and NATO intelligence. *International Journal of Intelligence and CounterIntelligence, 39*(2), 554–577. https://doi.org/10.1080/08850607.2024.2426723

Fijałka, M. (2025). NATO Artificial Intelligence Centre of Excellence. *Internal Security, 17*(1), 227–245. https://doi.org/10.5604/01.3001.0055.4516

Frame, M. E., Kaiser, J., Kegley, J., Armstrong, J., & Schlessman, B. (2024). Impacts of decision support systems on cognition and performance for intelligence-gathering path planning. *Military Psychology, 36*(3), 323–339. https://doi.org/10.1080/08995605.2023.2178210

Gilli, A., Gilli, M., & Grgić, G. (2025). NATO, multi-domain operations and the future of the Atlantic Alliance. *Comparative Strategy, 44*(1), 73–91. https://doi.org/10.1080/01495933.2024.2445491

Hanna, M., Granzow, D., Bolte, B., & Alvarado, A. (2017). NATO intelligence and information sharing: Improving NATO strategy for stabilization and reconstruction operations. *Connections: The Quarterly Journal, 16*(4), 5–33.

Hallams, E. (2011). North Atlantic Treaty Organization (NATO). In G. Martel (Ed.), *The encyclopedia of war*. Wiley-Blackwell. https://doi.org/10.1002/9781444338232.wbeow454

Johnson, J. (2023). Automating the OODA loop in the age of intelligent machines: Reaffirming the role of humans in command-and-control decision-making in the digital age. *Defence Studies, 23*(1), 43–67. https://doi.org/10.1080/14702436.2022.2102486

Jones, J. (2022). Integrating and shaping military cyber defence in operational and intelligence planning. *International Conference on Cybersecurity and Cybercrime, 9*, 57–62. https://doi.org/10.19107/CYBERCON.2022.07

Kacmarik, O., & Vasicek, R. (2024). The multi-domain approach to military operations and its challenges to intelligence and intelligence, surveillance, reconnaissance. In *Proceedings of the Challenges to National Defence in Contemporary Geopolitical Situation*, Brno, Czech Republic, 11–13 September 2024. https://doi.org/10.3849/cndcgs.2024.357

Kobzan, S., Pomortseva, O., Pankiv, V., Kharchenko, O., & Panteleieva, N. (2025). Military geoinformation systems: Application paths and development prospects. *Testing and Certification, 1*(7), 67–75. https://doi.org/10.37701/ts.07.2025.08

Kulyk, T. (2023). Joint intelligence, surveillance and reconnaissance as a priority area of NATO transformation. *Bulletin of the Mariupol State University. Series: History. Political Science, 35–36*, 100–110. https://doi.org/10.34079/2226-2830-2023-13-35-36-100-110

Kutej, L., & Horak, L. (2025). Emerging intelligence paradigms in the Russia-Ukraine war: CROWDINT, CITINT, and the digital battlespace. *Obrana a Strategie, 25*(1), 193–211. https://doi.org/10.3849/1802-7199.25.2025.01.193-211

Liu, Y., Wang, Y., Li, H., et al. (2024). An adaptive operation planning and EBO-BPNN optimization method for decision support systems. *Scientific Reports, 14*, 21838. https://doi.org/10.1038/s41598-024-72808-y

Minniti, F., & Pili, G. (2025). NATO's evolving landscape in open source intelligence. *The RUSI Journal, 170*(6–7), 100–114. https://doi.org/10.1080/03071847.2025.2589828

Munir, M., Mantoro, T., & Ayu, M. A. (2024). Enhancing military C4I-SR through integrating AI for optimized combat effectiveness. In *10th International Conference on Computing, Engineering and Design (ICCED)* (pp. 1–6). https://doi.org/10.1109/ICCED64257.2024.10983638

Muller, W., Reinert, F., Pfirrmann, U., Muhlenberg, D., & Ellmauer, C. (2023). A multi-agent system for ISR asset planning. In *Congress in Computer Science, Computer Engineering, & Applied Computing (CSCE)* (pp. 136–144). https://doi.org/10.1109/CSCE60160.2023.00027

North Atlantic Treaty Organization. (2023a). *NATO Allies and Sweden strengthen intelligence cooperation during Unified Vision 2023*. https://www.nato.int/cps/en/natohq/news_216223.htm

North Atlantic Treaty Organization. (2023b). *Electromagnetic warfare*. https://www.nato.int/en/what-we-do/deterrence-and-defence/electromagnetic-warfare

North Atlantic Treaty Organization. (2026a). *NATO's role in capability development*. https://www.nato.int/en/what-we-do/deterrence-and-defence/natos-role-in-capability-development

North Atlantic Treaty Organization. (2026b). *AWACS: NATO's "eyes in the sky"*. https://www.nato.int/en/what-we-do/deterrence-and-defence/awacs-natos-eyes-in-the-sky

North Atlantic Treaty Organization. (2026c). *Joint Intelligence, Surveillance and Reconnaissance*. http://www.nato.int/cps/en/natohq/topics_111830.htm

North Atlantic Treaty Organization. (2026d). *NATO's approach to space*. https://www.nato.int/en/what-we-do/deterrence-and-defence/natos-approach-to-space

Radovanovic, M., Zivkovic, M., & Crnogorac, M. (2025). Application of decision-making support model in the operations planning process at the tactical level. *Vojenské Rozhledy: Czech Military Review, 34*(1), 85–103. https://doi.org/10.3849/2336-2995.34.2025.01.085-103

Šenk, M., & Hynek, N. (2026). NATO/EU synergies against information warfare: A "circulatory institutionalist" model of expert voluntarism. *European Security, 35*(2), 254–275. https://doi.org/10.1080/09662839.2025.2566519

Toth, A. (2025). Enhancing situational awareness and decision-making. *Hadmernok, 20*(2), 143–160. https://doi.org/10.32567/hm.2025.2.9

Usov, D. (2024). Analysis of national security threats by NATO intelligence agencies: Trends and experience. *Political Science and Security Studies Journal, 5*(4), 90–95. https://doi.org/10.33445/psssj.2024.5.4.8

Vold, K. (2024). Human-AI cognitive teaming: Using AI to support state-level decision making on the resort to force. *Australian Journal of International Affairs, 78*(2), 229–236. https://doi.org/10.1080/10357718.2024.2327383

Weaver, J. M. (2021). Allied Command Operations/Supreme Headquarters Allied Powers Europe (ACO/SHAPE). In *NATO in contemporary times*. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-68731-1_3

This is an open access journal and all published articles are licensed under a Creative Commons «Attribution» 4.0.