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The Importance of Accreditation of Training Programmes for the Interoperability of Member States within NATO

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Abstract

This paper examines the role of training programme accreditation in enhancing interoperability within NATO. A case study of the Slovak JTAC programme supported by SWOT analysis and document review was applied. In this paper we have found that accreditation improves procedural standardisation, technological compatibility and operational performance, while revealing resource and organisational challenges. The study expands understanding of interoperability through a multi-layered framework as a research implication. Recommendations support optimisation of training, resource use and capability development which is a clear practical implication. Originality and value have been achieved by providing a unique empirical view of accreditation as a key tool for strengthening NATO's interoperability.

KEY WORDS: *accreditation, interoperability, NATO, training programmes.*

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1. Introduction

In recent years, we have witnessed a significant deterioration of both the global and regional security environment, characterized by increasing unpredictability and escalating tensions in strategically key regions [1]. The security situation is changing dynamically due to the rise of new, sophisticated security threats that directly threaten the stability and integrity of the community of democratic states united in the North Atlantic Alliance. In response to these realities, NATO countries must continuously increase their readiness and resilience to effectively face the entire spectrum of modern challenges [2], [3]. One of the most effective ways to achieve this goal is to streamline training programmes and ensure their rigorous alignment within the framework of interoperability between Member States [4]. It is precisely a high level of interoperability that ensures national training capacities are utilized to the maximum possible extent for the needs of collective defence, allowing the armed forces to operate as a unified and coherent whole.

To achieve such synergy, NATO member states shall develop the national defence system and defence capabilities and ensure the necessary resources and their efficient and transparent use. Also, of course, in response to the dynamics of the contemporary operating environment, a review of concepts and approaches, and the associated technological modernisation, is required to ensure that the individual armed forces, individually and collectively, are able to respond adequately to symmetric, asymmetric and hybrid threats. This also requires an alignment of the overall concept of development and deployment, as the high level of interoperability required in many cases poses an additional challenge. Interoperability among NATO countries is key to enhance collective defence, and NATO defines the term interoperability as: *"The ability to act together coherently, effectively and efficiently to achieve Allied objectives."* [5]

The North Atlantic Alliance is a military-political grouping in which the ability to jointly plan and conduct

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operations is an absolute prerequisite for success [6]. As the armed forces of the NATO Member states are heterogeneous, interoperability allows different units, systems and processes to work in synergy and complement each other in the conduct of complex modern operations.

Interoperability is achieved on three interconnected layers, namely the technological aspect, the process and the human element. We observe that most of the technologies used within NATO Member states are compatible, which has been achieved through the joint efforts of NATO Member states in the development of new weapon systems and their procurement. We consider the standardization of processes by individual NATO countries to be a problem area, which in turn directly impacts the interoperability of the human element. U.K. Royal Navy Vice Adm. Guy Robinson, chief of staff to NATO's Supreme Allied Commander Transformation said, at the National Defense Industrial Association's JADC2: All Domain Warfare Symposium July 18.: *"NATO has been clear enough in setting and communicating standards and objectives to alliance members. So, why aren't we as interoperable as we'd want to be? ... Well, having a standard is one thing, meeting a standard is something altogether different... ."* [7]. One critical aspect of interoperable cooperation is to ensure unified and high-quality training that meets alliance-defined norms and standards. Accreditation of training programmes creates a framework of trust that the relevant training institutions and units have the appropriate quality, competence, capability and processes that are compatible with NATO requirements.

The objective of the study is therefore, on the basis of a case study and SWOT analysis, to propose a possible way of achieving interoperability applicable within NATO Member States. In this article, we analyze the importance of accreditation of training programs for interoperability in NATO, with special emphasis on the case study of the Slovak national training program JTAC (Joint Terminal Attack Controller). Through the analysis of NATO documents, interviews and directives, we report the benefits, challenges and recommendations for the accreditation process, which allows Slovak JTAC units to be compatible with allied forces. Main objective of the article is to explore the relevance of accreditation and identify the systemic benefits and limitations of accreditation of training programmes for interoperability of Member states within NATO, through a case study of national JTAC program accreditation.

Research questions:

1. How is the accreditation defined?
2. What is the procedure for granting accreditation of training programs?
3. How does an accredited program improve procedural compliance and quality of performance?
4. What are the benefits of accredited programmes?
5. What barriers and limitations accompany the accreditation process?
6. What strategy should be chosen to maintain and improve interoperability within NATO?

2. Research methods

To address the research problem, the Joint Terminal Attack Controller (JTAC) national program accreditation case study was used as the main method [8, 9, 10, 11]. The auxiliary methods of research, namely SWOT, synthesis, deduction and analysis, were also applied.

Data selection and analysis. The analysis is based on two primary types of sources:

- official and institutional documents, such as NATO doctrines, and publicly available parts of directives;
- secondary analytical literature, including authors own publications.

Documents were selected based on their relevance, credibility and for their ability to capture the importance of accreditation of training programmes for the interoperability within NATO.

Limitations. However, there is a need for further research, such as:

- a reassessment of current organisational structures, training concepts and equipment,
- the introduction of advanced technologies for interoperability with NATO Member states to ensure that all NATO Member states are able to contribute fully to NATO's joint operations.

It is recommended that the concept of enhanced interoperability be applied in military practice as a result of this study.

3. Research Results

Given the nature of current and anticipated future joint operations, understanding and developing interoperability is a necessary step to achieve operational efficiencies. To ensure interoperability at the level of standardisation, the mere implementation of NATO standardisation documents is not enough. An analysis of the current state of affairs has shown that the very structure of NATO's standard documents allows individual Allies to make their own national changes or address specific events or situations in different ways, which can lead to a lack of interoperability and misunderstandings.

3.1. The Case study: JTAC National Training Program

Case study selection and purpose. The case study method was chosen to illustrate how achieving accreditation of training programmes improves interoperability within NATO. The JTAC National Training Program was chosen because it is a NATO CCS and U.S. JFS ESC accredited training programme [9-13].

This case provides a comparative lens for observing differences, advantages and disadvantages, as well as operational and deployable flexibility. The use of case study supports the aim of the article by abstractly highlighting the importance of accredited training programs for interoperability within NATO.

Parameters and categories of comparison. Across the case, the study will focus on three interconnected layers of interoperability:

a) the process,
b) the technological aspect,
c) the human element.

Currently, 23 of NATO's 30 partner countries have a national JTAC NATO training program accredited by a standardization team. Of these, 16 NATO partner countries have an accredited national training program by the JFS ESC standardization team. This means that they have been granted the so-called dual accreditation, i.e. confirmation that the JTAC national training program is in line with both NATO publications and the US MoU. The remaining countries are in the process of preparing for accreditation, implementation or ratification.

a) The process. The whole standardization process can be divided into three steps:

Step 1 ratification and accession,
Step 2 implementation,
Step 3 accreditation.

Step 1: ratification and accession

Each NATO partner country is obliged to participate in the ratification process of NATO publications. During this process, each NATO partner country may comment on NATO's announced STUDY DRAF publication through its representatives in the NSO Working Group. After the conclusion of the comment procedure, individual NATO countries are obliged to officially express their agreement or disagreement with the final form of the submitted publication. If agreed, individual countries officially ratify the publication in question. For JTAC eligibility, STANG 3797 and STANAG 7144 must be ratified.

If a country decides to accede to the JCAS AP MOA 2024-01, the JTAC must officially apply to the JFS ESC. If each member of the JFS ESC agrees to the accession of the requesting country, the JFS ESC will subsequently initiate the process of accession and signature of JCAS AP MOA 2024-01, JTAC, by the requesting country. The AF SR ratified STANAG 3797 and STANAG 7144 and acceded to JCAS AP MOA 2024-01, JTAC, thus meeting the requirements for the successful completion of the first step [8- 10].

Step 2: implementation

Upon successful ratification and accession to NATO publications, each country must implement the signed publications in the form of a regulation, directive or service instrument within one year of ratification and accession. The AF SR implemented the ratified STANAG and JTAC MOA by issuing the SPJ-C-3-16/JTAC National JTAC Training Programme [11]. For most skills and competencies, this step ends the entire standardization process. There is no form of verification that a given implementation document actually meets all the requirements set out in the ratified document. In the case of JTAC eligibility, the third step has been taken [12].

Step 3: accreditation

A nation that plans to build, develop, and maintain JTAC capability within its armed forces while also planning to deploy JTACs in MKM operations is required to build a JTAC training program and subject it to accreditation. Depending on whether a nation has implemented only the NATO publication or has also acceded to the JCAS AP MOA 2004-01, JTAC, it will officially apply for accreditation of either CCS, JFS ESC, or both.

In the case of an application for dual accreditation, CCS and JFS ESC, after mutual coordination, shall form a combined standardisation team.

After the official request and delivery of the necessary documents to prepare the CST accreditation, the accreditation process will begin in the facilities designated by the requesting country.

First of all, the CST will evaluate whether the NATO implementation document STANG 3797 and the US JTAC MoA are in line with the implemented documents. Any ambiguities must be explained and clarified by the CST.

Secondly, the CST controls the content and method of theoretical teaching in the form of participation in one to two lessons. At the same time, it checks whether the classroom equipment and teaching aids help to meet the set goal of the lesson.

Thirdly, if the evaluated country has a virtual simulator, the CST evaluates whether the training using virtual technologies is in accordance with the implemented documents, not only in terms of content but also in terms of technology

[13, 14, 15].

Fourthly, the CST evaluates the actual equipment of individual JTACs with a focus on the requirements set for achieving compatibility within NATO and partner countries and with a focus on the requirements for meeting individual types of air-ground operations. This step ensures that the compatibility of the technological component of interoperability is checked.

In the fifth row, the CST evaluates practical training during air-ground operations. The training must be carried out under a tactical theme with real aviation, optimally with the use of real air ammunition.

We can state that it is in this step that the control takes place, as well as the technical terms of technology, processes and the human element. The basis for interoperability between NATO member countries is made up of uniform processes and procedures. This requirement is equally relevant in the education of artillery officers, where differences in curricula, practical training and teaching methods may directly reduce preparedness for joint fire support in multinational and multi-domain operations [16]. By checking and evaluating the established practices of each country, the theoretical and legal basis for achieving interoperability is provided. The standardization team evaluates not only the content of the implementation national document, but also whether it is legally accepted within the legal and doctrinal system of the state. It also evaluates the scope of its competence and approval authority. The set system of ratification, implementation and subsequent accreditation in the case of JTAC national training programs is considered to be functional and clearly provides standardized procedures to individual NATO member countries and partner countries. We believe that in the field of standardization of procedures and processes, interoperability in the field of JTAC training has been achieved.

b) The technological aspect

An essential part of the accreditation is also the evaluation of the compatibility of technologies used by the evaluated country during training, as well as the deployment of JTAC in operations. The standardization team will physically check what facilities a given country has, how many it owns, and how and where it has them located within its organizational structure. At the same time, it evaluates the recovery and development plan for the future.

Based on this information, they evaluate which CAS capabilities a given country is currently able to fulfill, and in what time horizon it is able to start fulfilling new capabilities. At the same time, the standardization team provides the evaluated country with proposals and recommendations for further development in the field of technologies so that they are compatible with the standard technologies and with the development plan within NATO.

c) The human element

The human element is the most important and at the same time the most vulnerable element. It is therefore very important that it is not neglected when assessing overall interoperability in a given area. In the field of the JTAC national training programme, the standardization team will proceed to the evaluation of the human element only after positively evaluating the procedures, processes and available technologies.

The aim of the human element assessment is to determine the practical level of application of established processes, procedures and available technologies during real practical JTAC training in direct air support (CAS). The standardization team not only checks the level of performance of the CAS JTAC, but also the pilots actually flying during the CAS, or subject matter experts if JTAC Simulator is applied. Of course, JTAC-I or JTAC-E is also evaluated at the same time [17, 18].

We can argue that such a way ensures the verification of the standard procedures established at the application level using compatible technologies. Based on the analysis of the case study, we argue that accreditation contributes to increasing interoperability within NATO by evaluating each interoperability area and determining whether each interoperability area meets the minimum requirements. At the same time, by granting accreditation, it makes known to each NATO member state the information that an accredited NATO member is interoperable with other accredited NATO members in the assessed capability.

3.2. JTAC National Training Program SWOT Analysis (SR)

The SWOT analysis of the JTAC National Training Program focused on establishing a strategy and proposals for the further development of the accredited training program. The analytical team consisted of five members. Each of the members is considered an expert in the field of training and development of military capabilities.

In the first step, using the brainstorming method, the team members determined the most important elements for each area and then assigned them weights. To determine the final value of individual external and internal factors and their order, a simple tool in Microsoft Excel from Computer Press from 2009 was used, which was modified in 2022 and supplemented with the automation of calculations and the display of the resulting graph.

The final value of each factor consists of the product of the factor's grade and its weight. The score of the factor of strengths and weaknesses, opportunities and threats was determined by the team by scoring from 1 to 5 based on a subjective evaluation, where 5 points meant the highest attractiveness or severity of the factor and vice versa 1 point meant the lowest.

The weight of internal factors was determined using the method of pair comparison of individual factors, with each team member individually evaluating each factor using this method. The resulting value of the factor weight was determined by the arithmetic mean of the factor weights determined by the team members.

For opportunities and threats, the non-standardized weight of individual factors was determined by the team by scoring from 1 to 5 based on the determination of the probability of the occurrence of the factor, where 5 points meant the probability of the occurrence of the factor bordering on certainty (81 to 100%) and vice versa 1 point the probability of the occurrence of the factor almost impossible (1 to 20%). To obtain the standardized factor weight (the sum of the factor weights is equal to 1), a calculation was used according to the relation:

$$v_j = \frac{w_j}{\sum_{i=1}^{m} w_i}, \tag{1}$$

where **v** is the normed weight, **w** is the non-normed weight, **j** indexes the specific factor, **m** is the number of factors, and **i** indexes the factors when summed. Based on the determination of the final value, the order of strengths and weaknesses, opportunities and threats was determined. As a result of this step, the list of elements in each area was sorted by weight [19].

STRENGTHS

Table 1.

Identification of strengths [19]

	List of strengths	Why?
A	Strong normative and doctrinal anchoring	The program is fully aligned with NATO standards. It ensures interoperability within NATO operations. It has clearly defined terminology, processes and roles.
B	Comprehensive training system (end-to-end)	It covers the entire cycle from selection -> pre-qualification training -> IQC -> recurrent training -> evaluation -> re-qualification. Precisely defined requirements for qualification, control and evaluation.
C	Strong emphasis on standardization and quality control	Established STANEVAL system. Periodic reviews (every 18 months). Precise evaluation criteria (Q, Q-, U).
D	Clear organizational structure of management	Defined key roles JTAC Programme Manager, Chief of STANEVAL, JTAC-I / JTAC-E. Precisely defined competencies and responsibilities.
E	Detailed Training Standards	Accurate control counts (TACs) for both qualification and retention. Division by CAS types (Type 1, 2, 3, day/night, laser, urban, etc.). A combination of live, dry and simulated scenarios.
F	Emphasis on safety and quality of training	Strict rules (e.g. decommissioning in the event of a security breach). Pre-deployment qualification check.
G	Established system of records and documentation	JTAC Training & Evaluation Folder. Digital System (JEDI). CAS LOG a (J)MET tracker.

Table 2.

Determining the resulting weight of strengths [19]

	Weight for the 1st member	Weight for the 2nd member	Weight for the 3ed member	Weight for the 4th member	Weight for the 5th member	Sum of weights	Final weight for the team
A	10,20%	12,24%	16,33%	12,24%	6,12%	0,571429	11,43%
B	18,37%	16,33%	14,29%	20,41%	20,41%	0,897959	17,96%
C	10,20%	20,41%	16,33%	12,24%	16,33%	0,755102	15,10%
D	16,33%	14,29%	24,49%	24,49%	14,29%	0,938776	18,78%
E	18,37%	22,45%	12,24%	14,29%	20,41%	0,877551	17,55%
F	16,33%	4,08%	6,12%	6,12%	12,24%	0,44898	8,98%
G	10,20%	10,20%	10,20%	10,20%	10,20%	0,510204	10,20%

Table 3.

Rating of the attractiveness of strengths [19]

Strengths	Attractiveness of the strength (rating)	The weight of the strength	Strength level
A	4	11,43%	0,46
B	5	17,96%	0,9
C	5	15,10%	0,76
D	4	18,78%	0,75
E	3	17,55%	0,53
F	2	8,98%	0,18
G	3	10,20%	0,31
	Total	100%	3,89

LEGEND:

# of points	Attractiveness of the strength
5	Fundamentally important
4	Very significant
3	Significant
2	Insignificant
1	Negligible

Table 4.

Sort strengths by value (strengths) [19]

	List of strengths	Strength level
B	Comprehensive training system (end-to-end)	**0,9**
C	Strong emphasis on standardization and quality control	**0,76**
D	Clear organizational structure of management	**0,75**
E	Detailed Training Standards	**0,53**
A	Strong normative and doctrinal anchoring	**0,46**
G	Established system of records and documentation	**0,31**
F	Emphasis on safety and quality of training	**0,18**

WEAKNESSES

Table 5.

Identification of weaknesses [19]

	List of weaknesses	Why?
A	High complexity and administrative complexity	A large amount of documentation, inspections and records. Administrative burden for both JTACs and governance structures
B	Strong dependence on external sources	NATO Accredited Courses (IQC). Aeronautical technology and CAS platforms. Simulation systems
C	Personnel demands	Experience requirements: JTAC -> JTAC-I -> JTAC-E (time-consuming growth). Limited number of qualified instructors and evaluators
D	Risk of loss of qualifications	Strict limits: by 6 months between inspections and (J)MET expiration and evaluations. May lead to frequent re-qualification
E	Language barrier	STANAG 6001 obligation (3,3,3,2). Potential restriction for candidates
F	Limited domestic capacities	Some capabilities (e.g. FAC(A)) only simulated so far. Dependence on foreign partners

Table 6.

Determining the resulting weight of weaknesses [19]

	Weight for the 1st member	Weight for the 2nd member	Weight for the 3rd member	Weight for the 4th member	Weight for the 5th member	Sum of weights	Resulting weight for the team
A	5,56%	8,33%	11,11%	19,44%	19,44%	0,638889	12,78%
B	16,67%	22,22%	8,33%	19,44%	11,11%	0,777778	15,56%
C	27,78%	22,22%	19,44%	8,33%	2,78%	0,805556	16,11%
D	8,33%	16,67%	25,00%	25,00%	22,22%	0,972222	19,44%
E	27,78%	25,00%	25,00%	25,00%	22,22%	1,25	25,00%
F	13,89%	5,56%	11,11%	2,78%	22,22%	0,555556	11,11%

Table 7.

Rating the attractiveness of weaknesses [19]

Weaknesses	Severity of the weakness (rating)	The weight of the weakness	Weakness level
A	2	12,78%	0,26
B	4	15,56%	0,62
C	5	16,11%	0,81
D	3	19,44%	0,58
E	5	25,00%	1,25
F	2	11,11%	0,22
	Total	100%	3,74

LEGEND:

# of points	Severity of the weakness
5	Unacceptable - mission at risk
4	Very significant
3	Significant
2	Insignificant
1	Negligible

Table 8.

Sort weaknesses by value (weaknesses) [19]

	List of weaknesses	Weakness level
E	Language barrier	**1,25**
C	Personnel demands	**0,81**
B	Strong dependence on external sources	**0,62**
D	Risk of loss of qualifications	**0,58**
A	High complexity and administrative complexity	**0,26**
F	Limited domestic capacities	**0,22**

OPPORTUNITIES

Table 9.

Identification of opportunities [19]

	List of opportunities	Why?
A	Development of simulation technologies	SIM-VE and SIM-LE systems. Reduced dependence on real-world flights. Increasing the availability of training
B	Deepening cooperation in NATO	Joint trainings and courses. Exchange of experience and standards. Access to advanced technology
C	Digitalization and automation	Development of the JEDI system. Automation of qualification tracking. Better training analytics
D	Expansion of capabilities (DaCAS, UAV, ISR)	Integration of modern technologies: digital CAS, UAV and video downlink
E	Professionalization of training	Use of SMEs (Subject Matter Experts). Involvement of contractors.

		Specialized courses
F	Increasing operational readiness	Better preparedness for HCM (Home Operations) and ICM (Foreign Operations)

Table 10.

Team assessment of opportunities [19]

Opportunity	Attractiveness of impact (Opportunity Assessment)	Probability of occurrence of an opportunity	The weight of opportunity	Level of contribution
A	5	3	15,00%	0,75
B	4	4	20,00%	0,8
C	5	3	15,00%	0,75
D	4	4	20,00%	0,8
E	2	3	15,00%	0,3
F	1	3	15,00%	0,15
		Total	100%	3,55

LEGEND:

# of points	Attract. of the impact of the oppor.
5	Fundamentally important
4	Very significant
3	Significant
2	Insignificant
1	Negligible

# of points	Probability of occurrence of an opportunity
5	Bordering on certainty (81 to 100 %)
4	Highly likely (61 to 80%)
3	Normally possible (41 to 60%)
2	Exceptionally possible (21 to 40%)
1	Almost impossible (1 to 20%)

Table 11.

Sort opportunities by value (contribution level) [19]

	List of opportunities	Level of contribution
D	Expansion of capabilities (DaCAS, UAV, ISR)	**0,8**
B	Deepening cooperation in NATO	**0,8**
C	Digitalization and automation	**0,75**
A	Development of simulation technologies	**0,75**
E	Professionalization of training	**0,3**
F	Increasing operational readiness	**0,15**

THREATS

Table 12.

Identification of threats [19]

	List of threats	Why?
A	Lack of resources	Aerospace. Ammunition. Simulation systems: programme itself identifies the need to address resource gaps
B	Staff deficit	Lack of JTAC-I and JTAC-E. Departures of experienced staff
C	Dependence on NATO infrastructure	Initial qualification courses abroad. Accreditation. Political and organizational factors
D	Operational pace and deployment	Upon returning from operation, a JTAC may lose qualification. Conflict between training and deployment.
E	Technological obsolescence	Rapid development of CAS technologies. Risk of lagging behind (e.g. DaCAS, ISR).
F	Safety risks	Errors in TAC can have fatal consequences. High demands on accuracy and coordination.

Table 13.

Team assessment of threats [19]

Threat	Severity of the impact (threat assessment)	Probability of occurrence	The weight of the threat	Risk level
A	4	3	12,50%	0,5
B	5	5	20,83%	1,04
C	4	4	16,67%	0,67
D	3	5	20,83%	0,62
E	5	5	20,83%	1,04
F	3	2	8,33%	0,25
		Total	100%	4,12

LEGEND:

# of points	Severity of the impact of the threat
5	Unacceptable - mission at risk
4	Very significant
3	Significant
2	Insignificant
1	Negligible

# of points	Probability of occurrence of a threat
5	Bordering on certainty (81 to 100 %)
4	Highly likely (61 to 80%)
3	Normally possible (41 to 60%)
2	Exceptionally possible (21 to 40%)
1	Almost impossible (1 to 20%)

Table 14.

Sort threats by value (risk level)

	List of threats	Risk level
B	Staff deficit	**1,04**
E	Technological obsolescence	**1,04**
C	Dependence on NATO infrastructure	**0,67**
D	Operational pace and deployment	**0,62**
A	Lack of resources	**0,5**
F	Safety risks	**0,25**

In the next step, the differences between strengths and weaknesses and between opportunities and threats were calculated. Based on these calculations, a graph 1 was compiled that clearly determined the recommended strategy for the development of the training program. The recommended strategy logically resulted in proposals and measures for the further development of the accredited training program.

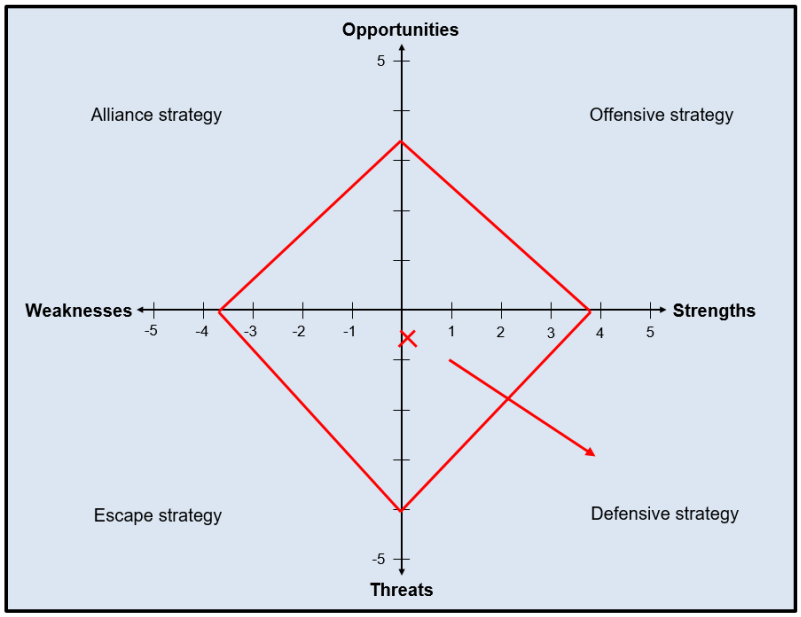
Summary of SWOT analysis. The JTAC training program in the Slovak Republic is very robust, standardized and compatible with NATO, but at the same time is demanding on resources, personnel and administration. The key strategic issue is balance between high standards (quality) and availability of resources (reality). The key opportunity is to connect digitization and simulation which will increase efficiency without compromising quality. Optimization-based approaches can support this effort by improving the efficiency and coverage of complex training and testing processes under operational constraints, while reducing the overall cost of verification. [20]

Based on the results of the SWOT analysis, a **defensive (Strengths/Threats) strategy**, using strengths to eliminate threats, is highly recommended or the further development of JTAC training.

Based on the established strategy, we propose to:

1. manage the scarcity of resources (lack of aviation and ammunition) by optimally combining LIVE vs SIM vs DRY controls at the national level. To build a JTAC simulation center focused not only on controlling of air assets during CAS, but mainly on the planning and integration of air efforts and subsequent training of the flow of information through the command and control network during control of combat in augmented reality [21].
2. retain qualified personnel (prevent JTAC departure) by establishing a JTAC retention program, allocating stabilization financial allowances, and ensuring career growth in the specialty.

3. adapt to technological changes by avoiding obsolescence by regularly updating the educational curriculum (every 1-2 years) and creating an innovation cell in the subordination of the JTAC PM. Set up the equipment procurement cycle so that there is no obsolescence and incompatibility with NATO.



Strengths	3,89
Weaknesses	-3,74
Opportunities	3,55
Threats	-4,12

Difference Between Strengths and Weaknesses	**0,15**
Difference between Opportunities and Threats	**-0,57**
The resulting strategy: Defensive Strategy-ST-Strenghts Threats (0,15; -0,57)	

Graph 1 Determining the resulting strategy

The SWOT analysis of the case study confirms the importance of accreditation of training programs by:

- accreditation significantly reduces deviations in procedures, the risk of security incidents and the need for additional courses before joint operations,
- accreditation contributes to a unified understanding of tasks, compatibility in major NATO exercises and joint operations, quality of communication and deployment flexibility.

In this context, effective military communication between fire-direction and fire-coordination elements is a basic prerequisite for future artillery fire-support systems and for maintaining interoperability during joint and expeditionary operations [22].

The results of the SWOT analysis of the JTAC national training program point to benefits for NATO countries due to better integration into the NRF and VJTF, the possibility to organize high-quality multinational exercises by any NATO Member state, time and cost savings in the retraining of soldiers, higher credibility of the national forces of individual NATO Member states.

While accreditation brings significant benefits, our research has also identified a number of challenges:

- administrative and organisational burden: the accreditation and re-accreditation process requires considerable effort, coordination and documentation on the part of national institutions,
- personnel requirements: the need for qualified instructors, evaluators (this can place high demands on the personnel capacities of smaller armed forces),
- financial costs: the implementation of live exercises are financially demanding,
- balance between the national and alliance dimensions: when determining training content and priorities, there can be tension between national objectives and NATO requirements,
- maintaining standards: after accreditation, quality standards need to be constantly maintained, which requires long-term commitments and investments.

Constructive simulation can help mitigate this burden by testing artillery-unit survivability, self-defence and resource-allocation requirements in firing positions without relying exclusively on costly live training activities [23]. This challenge is also closely linked to the wider defence-industrial environment, where the ability to develop, procure and sustain advanced technologies depends not only on military requirements, but also on the financial stability and innovation capacity of arms companies operating under current political and security pressures [24, 25].

Based on the research, we recommend:

- to conduct accreditation for all training programmes within NATO,

- to build NATO training centres for instructors and evaluators,
- to support the procurement of training equipment and premises;
- to share training opportunities among NATO Member States,
- to continue with joint research and subsequent deployment of new technologies and weapon systems;
- to share new lessons learn from current armed conflicts and their subsequent implementation into doctrines, regulations and SOPs.

This is particularly important for artillery units operating in degraded environments, where electronic warfare or system failures may deny access to automated systems and require resilient, doctrinally embedded contingency and emergency procedures. This is equally important in degraded artillery conditions, where manual correction methods can preserve fire accuracy and operational continuity when automated fire-control systems are unavailable or malfunctioning [26, 27]. Also the adoption of AI-enabled tools that can improve command and fire-control processes, accelerate response times and increase the accuracy of fire support, provided that their deployment meets operational and security requirements [28]. It is also relevant for artillery operations, where research on terrain mobility after munition impact improves command decision-making, supports operational planning and helps assess whether post-strike terrain remains passable for friendly forces or restrictive for an adversary. This also applies to artillery support functions, where autonomous and degradation-resistant meteorological data preparation can improve fire accuracy and sustain operational capability even under hostile conditions or limited access to external data sources [29, 30].

4. Conclusions

The results of our analysis show that the accreditation of training programs, especially for specialized and highly sensitive competencies such as JTACs, is crucial for interoperability in NATO. It ensures that certified professionals have uniform competencies and knowledge, which reduces the risk of operational errors and increases credibility within the alliance. A case study of the Slovak JTAC program points out that even smaller NATO Member states can successfully build and accredit a high-quality training program. The Slovak Armed Forces have undergone a accreditation process, which is a significant achievement not only in terms of quality, but also in terms of strategic position in NATO.

However, the challenges associated with costs and personnel resources are not negligible. It is therefore important that national decision-makers and training providers weigh the long-term benefits of accreditation against initial investments. Collaborative exercises, sharing instructors, and using alliance-approved training can be effective ways to minimize costs. We also recommend that NATO and NATO Member states strengthen support mechanisms for smaller countries in the accreditation of training programmes, for example through mentoring, funding and staff exchanges.

Accreditation of training programmes is a key tool to promote interoperability within NATO. It provides a quality assurance framework, unifies procedures and creates credibility for certifications among allies. A case study of the Slovak national JTAC program shows that even smaller member states can successfully complete this process and thus contribute to the entire alliance. Although the accreditation process is challenging – administratively, staff-wise and financially – the long-term benefits of increased operational reliability, strategic relevance and efficiency outweigh the initial costs. Future efforts should be directed towards strengthening support for nations in accrediting programmes, as well as improving re-accreditation processes to ensure sustainability and even greater interoperability within NATO.

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