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CALL FOR PAPERS

The editorial board of *Hungarian Defence Review* invites authors to submit papers in 2019, based on new research results that deal with some aspect of the following topics:

1. Hybrid warfare – changes in the doctrine of leadership: decision-making and Mission Command in the 21st century
2. Automated systems: changes in the operational requirements of autonomous systems in light of recent technological developments
3. Warfare in non-conventional theatres: challenges and opportunities of the information battlespace, the role and significance of information warfare in contemporary conflicts
4. Built-in areas: the characteristics of urban combat and its digital military challenges in built-in areas
5. Cognitive development: Super-soldiers? Challenges and opportunities in the mental development of the digital soldier – human-machine teaming on the battlefield
6. Leadership aspects of technological changes and their impact on decision-making
7. The introduction of Mission Command into the Hungarian Defence Forces on the organizational level.

We request our authors to submit a max. 2000-character preliminary abstract of the planned paper, addressed to the responsible editor (gaspar.katalin@hmzrinyi.hu). The editorial board of the journal will evaluate the received abstracts and notify the submitter of the decision. At the same time, acceptance of a submitted abstract does not automatically entail the publication of the paper, as the decision on its publication will be based on the final text after a professional review.

The Editorial Board of Hungarian Defence Review

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FOREWORD

This year we can see that the defence transformation in Hungary has kicked into full gear. The first Airbus helicopters and Leopard tanks are arriving to our units symbolising the modernization efforts. At the same time, the HDF is committed to focus on defence innovation. These two strategic efforts (modernization and innovation) must go hand in hand in order to build the defence force of the future.

As General Ferenc Korom's vision laid out, in order to establish a capable, agile, and ready HDF, which can effectively respond to new threats and challenges, we must focus not only on the acquisition of the best available platforms and technologies, but also on changing the culture of the forces through innovation and organizational learning processes as well.

In order to modernize our armed forces, decision makers must have a balanced approach towards procurement and innovation. Both of them have their own challenges. Military procurement must be rational and flexible. Innovation, as a strategic tool itself, serves three purposes. First of all, monitoring the technology trends and adjusting innovation priorities accordingly is a must. Future foresight is absolutely necessary to avoid strategic surprises, and to create an arsenal for strategic deterrence or surprise.

Secondly, strategic agility must be pursued in developing new technologies. Anomalies and wicked problems are showing up on an everyday basis, and large enterprises should not dismiss them. The defence sector should use innovation methodologies to speed up development and testing in order to enable future operators to handle a wide variety of security challenges.

Finally, as technology development becomes exponential, we, humans must be able to re-imagine our organizational learning processes as well. Knowledge management therefore is the third pillar of innovation and a defence knowledge strategy must support the overall grand strategy in order to attract and retain talent in the digital age. People bring experience, skills, and expertise to the defence sector, and such collective knowledge has great value.

Alas, the ultimate purpose of modernization and innovation is to enable our warfighters with the best possible equipment, and this requires a well-intentioned and considered knowledge management process, continuous and relentless technology development and a focus on the enhancement of the human element.

We are paying close attention to these trends in the Defence Review this year as well, and invite everyone who are willing to share their ideas on contemporary security challenges, force modernization, technology trends, defence innovation, and other thought-provoking ideas about the nature of warfare in the 21st century.

This specific issue reflects the above-mentioned ideas, as we can see thought-provoking articles from our international pool of authors on personal development, blockchain technologies, society building and multi domain operations as well. The following issue will be focusing on innovation, sharing the ideas of top military applied design thinkers from around the world.

Col Imre Porkoláb PhD
Deputy National Armament Director for Research Development and Innovation
Chief of the Editorial Board, Hungarian Defence Review

HDR 2020, Nr. 1, 4–14.

Viktor Huszár

APPLICATION POSSIBILITIES OF DECENTRALIZATION AND BLOCKCHAIN TECHNOLOGY USING COMPUTER VISION AND ARTIFICIAL INTELLIGENCE IN DEFENSE MANAGEMENT, MILITARY AND POLICE ORGANIZATIONS

DOI: 10.35926/HDR.2020.1.1

ABSTRACT: *Military science has faced new challenges **at** the end of the 20th century with the emergence of the Internet. Challenges and threats to traditional security got a new in-terpretation with a new concept of cybersecurity, which led to an organic transforma-tion of military engineering and IT. As the Internet has fundamentally changed the way the world works, new technologies have emerged on the network that can revolutionize the multitude of industries. Such innovation is Distributed Ledger Technology (DLT) and Blockchain Technology supplemented with Artificial Intelligence and machine vision. The potential uses of the block chain represent a multitude of military technical scientific challenges. The technology makes it possible to co-operate freely with cryptographic pro-cedures on distributed networks without state control, but it can also serve military and defense management purposes.*

KEYWORDS: *decentralization, blockchain technology, machine learning, Artificial Intelligence*

INTRODUCTION

Information technology is constantly evolving and transforming. Early scientific pioneers, like Christensen highlighted the importance of "disruptive" innovations that can affect the overall operation of companies, governments.[1] The turbulent and dynamic computer science industry has witnessed the birth of the floppy disk, then the transition to CD, DVD and Blu-eray discs, but most remarkably, the evolution of the internet can be classified as a disruptive innovation. The most recent organic defragmentation of the ubiquitous information network is a revolutionary innovation based on the blockchain technology.[2] Most people identify this technology with bitcoin[3], but it is much more than the evolution of a new digital currency.

1 Bower, L. and Christensen, M. "Disruptive Technologies. Catching the Wave". *Harvard Business Review* 74/1. 1995. 43-53. https://hbr.org/1995/01/disruptive-technologies-catching-the-wave, Accessed on 20 April 2020.

2 Haber, S. and Stornetta, W. S. "How to time-stamp a digital document". *Journal of Cryptology* 3/2. 1991. 99–111. DOI:10.1007/bf00196791

3 Satoshi, N. "Bitcoin: A peer-to-peer electronic cash system". bitcoin.org. 2008. https://bitcoin.org/bitcoin.pdf

Blockchain is clearly a disruptive technology that changes the way the world works in economic, legal and information security terms.[4] It will have a significant impact on IT systems, but less attention has been paid to the opportunities and threats of the blockchain networks in military administration.

Defense areas for blockchain-based applications and solutions raise a wide range of scientific questions. In terms of military use, governmental development puts emphasis on hybrid warfare and globally substantially more funding is available for research and development of the field. Blockchain technology allows voluntary, distributed networks created for military purposes to co-operate through a cryptographic process without central and state control. Blockchain technology consequently results in a digital paradigm shift, characterized by decentralization, blockchain technology, machine learning, and Artificial Intelligence.

CHALLENGING MILITARY APPLICABILITY

The potential applications of the blockchain raise numerous military technical challenges. Blockchain is a computer-scientific term for a distributed data storage technology, a distributed ledger database that stores a list of entries in ever-increasing blocks. Each block also contains a link to the preceding block on each node that stores a structured chain.[5] An essential feature of systems using blockchain is the storage of blockchain nodes in all structured entries using a consensus algorithm. Despite the fact that bitcoin was an early adapter of the technology, today there are numerous systems under development that follow the same principle but differ fundamentally from bitcoin in their purposes and key technical elements. These systems together are often referred to as blockchain technology, not too precisely. The technology allows voluntary, distributed networks to be cryptographically deployed in a robust manner, without governmental and central state control. In addition to banking systems, virtual money and the development of Smart Contract,[6] real estate sales, exchange of assets and movable property are also emerging. However, military applications are even more interesting, as data security must be a priority in defense administration and in the daily communication of authorities.

For blockchain-based military use, there are several scientific challenges depending on the protocol in use. The need for a centralized data storage and uncontrolled security management system should be explored for the efficient use of resources. The problem extends to the artificial isolation of such a system and the military risks of "awaking" machine-learning or programmed Artificial Intelligence. Science should investigate how data security, data integration, isolation of the Artificial Intelligence decision-making environment, and the framework for authorization levels can be achieved in such an automated, distributed network-based military environment.

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4 "Blockchains: The great chain of being sure about things". *The Economist,* 31 October 2015. https://www.economist.com/briefing/2015/10/31/the-great-chain-of-being-sure-about-things, Accessed on 20 April 2020.

5 Huszár, V. "A decentralizáció és a blockchain-technológia felhasználási lehetőségei gépi látás és mesterséges intelligencia használatával a katonai szervezetekben". *Hadmérnök* 14/4. 2019. 179-189. DOI: 10.32567/hm.2019.4.11

6 Szabo, N. "Formalizing and securing, Relationships on public networks". *First Monday 2/9. 1997.* DOI:10.5210/fm.v2i9.548

Currently, due to centralized data storage and central control, fragile data communication between military and police departments is a major problem, especially in less developed countries. The most important aspect in terms of the degree of vulnerability is the activity of the user or the organization and – closely related to this – the value of their data. Particularly popular targets of attackers are financial institutions and organizations dealing with state or classified documents.[7]

Blockchain technology also raises the issue of user profiling. The problem is that the long-term use of the blockchain may allow monitoring of user behavior and the use of profiling. Government regulations require data protection measures based on the complete knowledge of a specific system, the personal data it processes, and the related data processing operations.[8]

Police forces aim at reducing illegal activities through appropriate regulations as there has been a transition from traditional means of payment to blockchain-operated cryptocurrencies. Central authorities, including the central bank of a country, may find it easier to filter the purpose of the cash flow, so money laundering, illegal substances or weapons will not be completed with cryptocurrency payments. The main argument supporting blockchain and cryptocurrencies, like bitcoin, are based on the transparency of the transactions which are all public. On the other hand, the analysis of public blocks lacks any KYC process (which is increasingly propagated by regulators to allow the identification and exclusion of prohibited operators.[9]

Hybrid Warfare

In Hungary, the Zrínyi 2026 Defense and Armed Forces Development Program has recognized that new types of challenges require special attention in order to build, maintain, and develop the Hungarian cyber defense capabilities[10]. In June 2019, the Cyber Training Center of the Hungarian Armed Forces was established, which serves as one of the most important pillars of our hybrid force development strategy. The cyber defense force's approach relies on the appropriate infrastructure and equipment but the establishment of a Hungarian cyber academy created the ability needed for hybrid warfare: digitally trained soldiers. The Cyber Training Center can serve a dual purpose, because in addition to supporting cyber defense capability development and harmonization, it can also directly become an institutionalized military technology research and development center which fundamentally determines the defense capability of a country[11]. Previous studies suggest that Hungary should specialize in IT areas such as electronics and software development. Given the fact, that blockchain-based military applications globally have not been explored, a key research target area should be

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7 Folláth, J., Huszti A. and Pethő A. "Informatikai biztonság és kriptográfia". Debrecen: Kempelen Farkas Digitális Tankönyvtár, 2011. https://regi.tankonyvtar.hu/hu/tartalom/tamop425/0046_informatikai_biztonsag_es_kriptografia/ch03s04.html

8 Péterfalvi, A. "A Nemzeti Adatvédelmi és Információszabadság Hatóság állásfoglalása a blokklánc ("blockchain") technológia adatvédelmi összefüggéseivel kapcsolatban". NAIH. 18 July 2017. https://www.naih.hu/files/Adatved_allasfoglalas_naih-2017-3495-2-V.pdf

9 Cuen, L. "Most Crypto Exchanges Still Don't Have Clear KYC Policies: Report". coindesk.com. 27 May 2019. https://www.coindesk.com/most-crypto-exchanges-still-dont-have-clear-kyc-policies-report

10 "Zrínyi 2026 Programme to begin". Ministry of Defence, Hungary. 22 Dec 2016. 14. https://www.kormany.hu/en/ministry-of-defence/news/zrinyi-2026-programme-to-begin

11 Kovács, L. *A kibertér védelme*. Budapest: Dialóg Campus, 2018.

the distributed ledger systems. Countries like Hungary can gain global competitive military advantage with superior IT knowledge, which results in government-civil-military interoperability, educational, economic, and social added value. The development of hybrid warfare is therefore beneficial for key national objectives.

Distributed General Ledger (DLT) technology is able to make optimal use of new innovations such as Artificial Intelligence and machine vision.[12] A distributed general ledger is a database of digital data distributed (decentralized), shared, and synchronized across multiple geographic locations, countries or institutions.

The potential use of deep neural network learning capabilities that can be run on such a general ledger poses a number of military scientific challenges, and consequently creates new platforms for cyber operations.

The everyday work of military and police forces has been supported by security camera feeds. Computer vision and automated image analysis could save military resource. An image analyzed means the actual image data structure changes: images become image descriptions, which can be classified into image groups. The purpose of computer vision is to create three-dimensional models based on images or videos.[13] This requires data processing, analysis, and image recognition, all of which require high computing power, so current image analysis methodologies are often slow and do not operate in real time. Blockchain based networks achieved outstanding computing power capabilities. Shockingly, in 2013 all mining computers had a combined computing capacity of 250 times the capacity of the 500 largest supercomputers,[14] and the mining community's aggregate consumption in 2017 was higher than the average annual electricity demand of 159 countries.[15] It is legitimate to use blockchain-based technologies to help machine vision, thus reducing expensive hardware and resource requirements. Without resource efficient IT backend, computer vision research expenses can get out of control. The price of the first Hungarian 5G automotive test track proves the massive cost related to the implementation of innovative machine vision based R&D results.[16]

Blockchain technology might be a revolutionary research field for military engineering but there is still space for better understanding the advantages and disadvantages of decentralization, by studying the international military applications that have already been implemented or are under current development.

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12 "Distributed Ledger Technology: Beyond block chain". London: UK Government Office for Science, 2016. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf

13 Csetverikov, D. "Digitális képelemzés alapvető algoritmusai". Budapest: ELTE, 2015. https://www.inf.elte.hu/dstore/document/297/Csetverikovjegyzet.pdf

14 Cohen, R. "Global Bitcoin Computing Power Now 256 Times Faster Than Top 500 Supercomputers, Combined!". *Forbes,* 28 November 2013. https://www.forbes.com/sites/reuvencohen/2013/11/28/global-bitcoin-computing-power-now-256-times-faster-than-top-500-supercomputers-combined/#381f46086e5e

15 Williams-Grut, O. "The electricity used to mine bitcoin this year is bigger than the annual usage of 159 countries". Markets Insider. 27 November 2017. https://markets.businessinsider.com/currencies/news/bitcoin-mining-electricity-usage-2017-11-1009558934

16 "Mintegy 40 milliárd forintból épül járműipari tesztpálya Zalaegerszegen". autoszektor.hu. 19 May 2016. http://www.autoszektor.hu/hu/content/mintegy-40-milliard-forintbol-epul-jarmuipari-tesztpalya-zalaegerszegen, Accessed on 15 January 2019.

BLOCKCHAIN TECHNOLOGY

More and more frequently scientific authors publish that blockchain technology will be the next technological revolution[17] that will impact our lives similarly as it happened with Internet. It will affect, for example, the more conservative financial sector but also recent popular research areas, such as Artificial Intelligence. The importance of blockchain – distributed fault tolerance, seamless transaction – has already been recognized by the industry, and research is under way on how to possibly migrate various existing systems to blockchain basis, in whole or in part.

It is worth considering blockchain-based technologies as implementing a distributed ledger.[18] In the context of blockchain technologies, the ledger is an entry repository where entries can be stored and cannot be modified once they are in the repository (this ledger may also have a narrow "ledger" semantics depending on the blockchain technologies and their application, but this is not nearly a regularity). Blockchain technologies implement distributed ledger by keeping it in sync with nodes in the distributed network, which can be geographically distant or owned by different companies, so each node has its own equivalent copy of the ledger. Any changes to the ledger – and the rest of the nodes in the network agree – will appear within minutes on other nodes, even seconds on some solutions, and will allow any trusted central monitoring body to access the information stored in the entries, without involving its internal processes and rules.[19]

The ledger is maintained by distributed network nodes – based on some sort of consensus algorithm – that heavily use cryptography to store and verify transactions. This allows the network to remain functional even with a large number of defective nodes, provided that the number of defective nodes is below the maximum number of defective nodes. IT knows and applies a great deal from the distributed consensus algorithm or, more generally, from the distributed consensus protocol. In a given application context, the selection of the consensus protocol is influenced by factors such as hypothesized failure modes, maximum system size, consensus response time, and synchronization requirements. Accordingly, it is not surprising that different blockchain technologies also use a number of different consensus protocols. However, what is common in blockchain technologies is that the problem of distributed consensus is addressed by some protocol.

Almost independently of blockchain technology, the blockchain has a common structure. In a sense, blockchain is a transaction log (journal) whose entries are stored in blocks in a strictly chronological order. As shown in Figure 1, these blocks are time-stamped and identified by some suitably selected cryptographic hash. Each block contains a reference to the block preceding it. In this way, the blocks are organized into a backward-chained list, which, at worst, can be processed from the first block to clearly determine the current state of the distributed database (of course, when there is consensus between nodes on the block-

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17 Tapscott, D. and Tapscott, A. Blockchain Revolution: How the Technology behind Bitcoin is Changing Money, Business, and the World. London: Penguin. 2016.

18 Kakavand, H., Kost de Sévres, N. and Chilton, B. "The Blockchain Revolution: An Analysis of Regulation and Technology Related to Distributed Ledger Technologies". *Social Science Research Network* 2017. DOI:10.2139/ssrn.2849251 ; https://www.semanticscholar.org/paper/The-Blockchain-Revolution%3A-An-Analysis-of-and-to-Kakavand-S%C3%A8vres/df2e88f4ce56c0456e0472d29b8f660fdd865e78

19 Pinna, A. and Ruttenberg, W. *Distributed ledger technologies in securities post-trading revolution or evolution?*. Frankfurt am Main: European Central Bank, 2016. DOI:10.2866/270533

chain). If the consensus protocol is "strong", then it is not possible to change or delete an earlier operation without the client that is aware of enough nodes in the system to notice it.

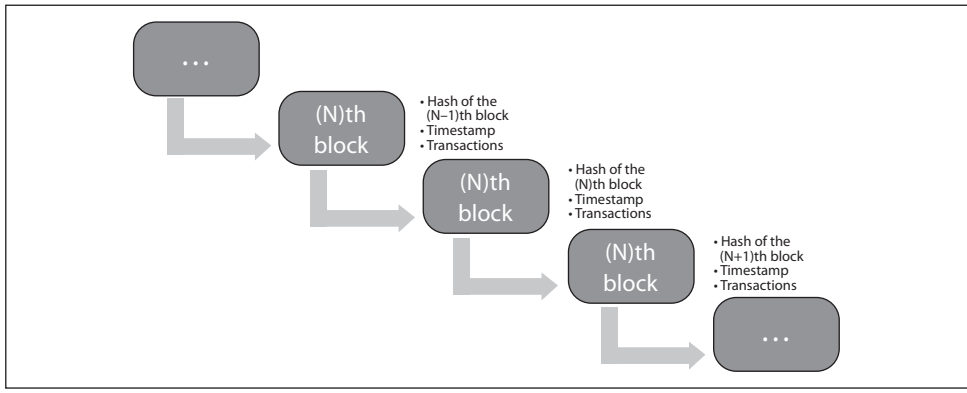

Figure 1 *Structure of blockchain*[20]

The decentralized nature of blockchain technology (Figure 2) means that it does not rely on a central entity, a checkpoint. The lack of authority makes the system fairer and more secure. The way in which data is recorded on the blockchain reflects the value of decentralization.[21] Instead of relying on a central authority to secure transactions with other users, blockchain uses innovative consensus protocols on the node network to authenticate transactions and record data in an unbiased manner. Thus, the blockchain is not stored by a central data controller, but practically all users store it on their own computers.

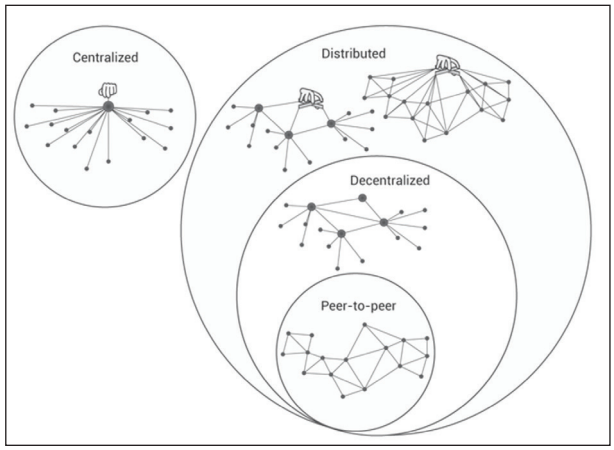

Figure 2 *Representation of different (centralized, distributed, decentralized) systems*[22]

[20] Huszár. "A decentralizáció és a blockchain-technológia felhasználási lehetőségei…"

[21] Buterin, V. "Ethereum White Paper: A next-generation smart contract and decentralized application platform". blockchainlab.com. April 2014. 6. https://blockchainlab.com/pdf/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf

[22] Dwyer, G. P. "The Economics of Bitcoin and Other Private Digital Currencies". MPRA Paper 57360. 8 May 2014. 2. https://mpra.ub.uni-muenchen.de/57360/3/MPRA_paper_57360.pdf

Blockchain technology is also extremely useful in national defense applications. Several applications are being investigated by the governments, which use blockchain and has an operational and support role.

COMPUTER PROTECTION: DATA INTEGRITY

Cybersecurity is the closest low-cost but high-paying application of blockchain technology. Blockchain technology is independent of secrets and trusts, just like the previous systems based on it. Blockchain retains its credibility in two ways. First, it ensures that digital events are widespread and transmitted to other nodes in the network. Then, by consensus, these events are entered into databases that can never be modified by a third party.

In addition, blockchain enhances the perimeter security strategy of computer security, not by keeping walls, but by constantly monitoring walls and all information inside. The increasing complexity of modern systems, including weapon systems, makes vulnerability more likely and less perceptible.

A typical American warship, like an Arleigh Burke-class destroyer, combines more than ninety missile launchers with its radar systems, two independent Phalanx defense systems and six torpedo launchers, not to mention many other weapon systems.[23] The challenge is for all these combat systems to work together. The secret to the success of the US Navy is system integration, which is currently being implemented by the Aegis Combat System. This is a centralized command-and-control (CCS) system that establishes a proper connection between sensors and weapons, just as a boxing brain connects eyes and fists. But centralization is the weak point, when the brain shuts down, the whole system fails. That is why the blockchain can be used.

The Navy can use a blockchain database architecture to structure its next-generation combat systems around decentralized decision nodes. This speeds up fire control, thereby (greatly) improving survival. Artificial-intelligence processors loaded into different weapon systems can coordinate their activities and verify that they are working from the same data. In the 20th century, processing power was expensive, but data was cheap. That is why, in 1969, it made sense to centralize on-board decision-making in a single Aegis brain. Today, processing power is cheap and data is more expensive. Therefore, twenty-first century naval combat systems are likely to use blockchain technology.[24]

SUPPLY CHAIN MANAGEMENT

Many industry organizations are working to use blockchain technologies in supply chain logistics and management. There is a growing concern about security systems supply chain management, which is increasingly using commercial off-the-shelf (COTS) components for embedded software systems. And these components may contain intentional vulnerabilities that the opponent can exploit at the time of his choice. This threat has been

[23] MaidSafe. "Evolving Terminology with Evolved Technology: Decentralized versus Distributed". Medium. 4 December 2015. https://medium.com/safenetwork/evolving-terminology-with-evolved-technology-decentralized-versus-distributed-7f8b4c9eacb

[24] "Arleigh Burke-Class (Aegis) Destroyer". Naval Technology. https://www.naval-technology.com/projects/burke/

made sensational by the novel Ghost Fleet, in which China has downed the entire fleet of F-35 aircraft by a deliberately embedded commodity circuit board error.[25]

Blockchain offers a solution that tracks the life of every circuit board, processor, and software component from production to user. The card design company can use blockchains to log the design iteration of each circuit. Manufacturers may report all models and serial numbers of each card manufactured. Finally, distributors can report the sale of circuits to system integrators, who can log the distribution of circuits to a particular aircraft assembly, etc. In this context, blockchains maintain a permanent record of transfers of assets between owners, thereby creating a derivative.

Many weapon systems are designed with a lifespan of 30 years or more. However, the computing technologies used by these systems have rarely been made for more than a decade. As a result, replacing obsolete parts becomes more difficult over time. Furthermore, in several countries it is prohibited by law to use a component whose origin cannot be ascertained. Loss of ownership makes some parts unusable, even if they are functional and in high demand. This would give the resellers an economic incentive to track their identified off-the-shelf commercial components in a block to retain their origin, which in turn adds value.

Decentralized technologies are not dealt with separately in the Hungarian Defense Forces, but international research and development is already under way. However, NATO's C4ISR and the US Department of Defense (DARPA – DoD) have already launched their own blockchain programs,[26] developing a secure, decentralized messaging application for the military under the name SBIR 2016.2.

FLEXIBLE COMMUNICATION

Bitcoin uses a peer-to-peer messaging model that delivers every message to every active node in the world in seconds. All nodes in the Bitcoin network contribute to this service, including smartphones. If a node's terrestrial, wireless, or satellite Internet service is interrupted, a bitcoin message can be sent through alternative channels such as high-frequency radio, fax, or even barcode-based and manually. Upon receipt, the service node checks the message and forwards it to each associated participant. Nodes can independently aggregate messages into new blocks.[27] Finally, the consensus mechanism ensures that invalid messages and blocks generated by rogue operators are ignored. Together, these protocols ensure that the traffic of authenticated messages can be reliably relayed anywhere in the world, even though communication paths, individual nodes, or the blockchain itself are attacked. Cyber superiority is not individually maintained by the nodes, but the network system can be kept controlled with current and expected data.[28]

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[25] Babones, S. "Smart 'Blockchain Battleships' Are Right Around the Corner". *The National Interest,* 17 May 2018. https://nationalinterest.org/feature/smart-battleships-are-right-around-the-corner-25872

[26] Singer, P. W. and Thatcher, C. "Technology's dilemmas: Are we wired to respond? an interview with P. W. Singer". *Vanguard,* 11 May 2015. 32-34. https://vanguardcanada.com/2015/05/11/technologys-dilemmas-are-we-wired-to-respond/

[27] Malik, A. et al. "Application of Cyber Security in Emerging C4ISR Systems". In *Crisis Management: Concepts, Methodologies, Tools, and Applications.* Hershey: Information Science Reference, 2014. DOI:10.4018/978-1-4666-4707-7.ch086

[28] Swan, M. Blockchain - Blueprint for a new economy. Gravenstein: O'Reilly Media. 2015.

MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

The Maven project[29] has been running since April last year. The program, called the Algorithmic Warfare Cross-Functional Team (AWCFT), is designed to scan machine-generated digital photos and videos of drones with machine learning, as well as blurred patches of cancer on x-rays or skin lesions.[30] In this case, the task is to identify objects, such as cars, in the still and motion pictures. The amount of footage that drones carry is so large that human analysts can no longer cope. That is why Artificial Intelligence is used for this purpose, which, thanks to machine learning, will be better at recognizing and classifying objects. For many years, Artificial Intelligence has been more effective than humans.

Today, at least 90 countries have drones, 16 of them even armed drones, including many non-state groups. Many of these vehicles are not very sophisticated in robotics, but most are remotely controlled. Autonomy is becoming increasingly apparent in the management of different vehicles. For example, the Guardium, developed by G-NIUS, is an Israeli unmanned ground vehicle (UGV) used for combat and defense along the Gaza border. The vehicle is self-propelled, but people are responsible for the weapons on it.

Paul Scharre (US Security Expert) also believes that Artificial Intelligence applications do not require major modifications to military tasks and can be integrated into weapon systems just as easily as civilian solutions.[31]

Combining the planted camera systems[32] with blockchain and Artificial Intelligence would be really effective. To do this, we should also take advantage of machine vision enhancements using image recognition and image analysis. This would make it easier to prevent terrorist acts or other crimes or to perform other national security tasks. Identifying crimes and persons wanted would not require so much time and resources. Countries with limited financial and infrastructural resources realized the need to enhance information operation developments.[33] Such a system could be a cost efficient implementation to increase crime prevention results.

CONCLUSIONS

Blockchain technology reverses the computer security paradigm. First of all, it is reliable because both internal and external users have to compromise on the network. Second, it is transparently secure and does not rely on malfunctioning nodes, but rather on a cryptographic data structure that makes manipulation extremely complex and immediately apparent. Finally, blockchain networks are fault tolerant, coordinate trusted nodes, and reject untrusted

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[29] Berta, S. "Maven projekt - a Google könnyen pótolható". Sg.hu. 6 June 2018. https://sg.hu/cikkek/it-tech/131574/maven-projekt-a-google-konnyen-potolhato

[30] Haig Zs. "Connections between cyber warfare and information operations". *AARMS* 8/2. 2009. 329-337. http://m.ludita.uni-nke.hu/repozitorium/bitstream/handle/11410/1900/13haig.pdf?sequence=1&isAllowed=y

[31] Scharre, P. "Killer Robots and Autonomous Weapons With Paul Scharre". Podcast. Council on Foreign Relations. 1 June 2018. https://www.cfr.org/podcasts/killer-robots-and-autonomous-weapons-paul-scharre

[32] "Hamarosan itthon is beindulhat a mindent látó Nagy Testvér". *Népszava,* 22 October 2018. https://nepszava.hu/3012846_hamarosan-itthon-is-beindulhat-a-mindent-lato-nagy-testver, Accessed on 20 April 2020.

[33] Haig, Zs. "Az információs hadviselés kialakulása, katonai értelmezése". *Hadtudomány* 21/1-2. 2011. 12-28. http://mhtt.eu/hadtudomany/2011/1/HT-2011_1-2_4.pdf

ones. As a result, blockchain networks not only reduce the likelihood of failure, but also significantly increase the cost to the enemy to reach. Decentralized blockchain technology is only a decade old. This means that its full potential is currently unknown.

Accordingly, it is recommended to develop organic expertise in blockchain technologies within the Central Defense Management Authorities. It is worth looking for partnerships with the industry to develop synergies for the development of blockchain-based technologies and the mutual benefits they bring.

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SYRIAN KURDS, ROJAVA AND ALTERNATIVE SOCIETY BUILDING IN MIDDLE EAST

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ABSTRACT: *Answering to local expectations and the need for a reliant partner for the US Army in the fight against ISIS, a Kurdish-based de facto autonomous territory emerged in Northern Syria, which later turned into a multicultural entity. The characteristically leftist political, social, and economic changes implemented by the new regime differ considerably from the government models practised in the region; however, they also trigger significant criticism. Although in 2018 and 2019, the entity suffered important losses in territory due to the geopolitical interests of Russia, the US, and Turkey, the Autonomous Administration of North and East Syria still could be a solid pillar in Syria's future. This is not only due to its strategic and military importance, but also because the political system could provide, nevertheless, after some changes, an alternative for the Middle East in terms of multicultural governance, women's rights and society-building based on mutual respect.*

KEYWORDS: *Nation-building, Syria, Kurds, Society-building, Self-governance, Middle East, Turkey, civil war*

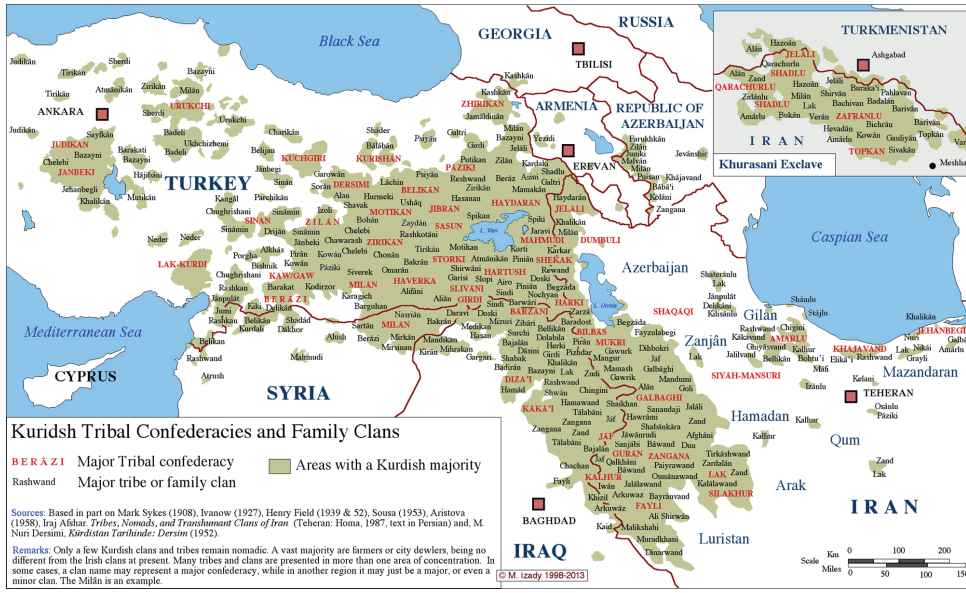
INTRODUCTION

The social, political and economic landscape of the Middle East has been reshaped by conflicts like the ongoing one in Syria. This civil war has created at least four different models of society building in one country, out of which this paper would like to examine the one implemented in the northern region. The aim of this paper is to present the distinct socio-economic model invigorated there, and the geopolitical challenges the model faces and creates.

To this end, Section I. presents the main characteristics of the Kurdish population generally, while Section II. focuses on the Kurds living in Syria and their history before the Arab Spring. Section III. shows the main features of the socio-economic changes implemented in Northern Syria after the Syrian regime's withdrawal. Section IV. briefly describes Damascus' approach towards Rojava, while Section V. presents the Turkish perspective of the ongoing community-building. Section VI. concludes and gives some perspectives regarding the future of the territory.

I. KURDS – A COMMUNITY IN A STRATEGIC PERIPHERAL LAND

Rojava, *West* in Kurdish, is the colloquial name to describe the *de facto* autonomous region in Northern Syria, officially called Rojava–Democratic Federation of Northern Syria. The territory is the southward extension of the Kurdish populated area in Turkey.[1] Kurds, who number around 30 to 40 million, are deemed to be the biggest nation on earth without a state of their own.



Map 1 *Kurds in the Middle East*[2]

The region inhabited by the Kurds is a peripheral one lying along the geopolitical fault line between the power centres in the Middle East. Nevertheless, keeping positions in Kurdistan is a major goal for all these countries, not only because of prestige, but also due to the fresh water and oil resources there. However, the borders separating Kurds were permeable for centuries, permitting not only a vivid economic cooperation between the different tribes, but also providing refuge in case of need. In the last decades, frontiers became more secured, protected by wire-mesh fences, minefields and air surveillance, reducing crossing only to authorized points and persons. Nevertheless, this feature faded to a certain extent as regional instability grew. The fight against the *Islamic State* (ISIS) have proved that cooperation among the communities on the different sides of the border is still alive.

Some argue that there is no single Kurdish nation. Taking Andersons's definition for the nation: 'an imagined and sovereign community limited from other nations',[3] there

1 Vanly, I. Ch. "The Kurds in Syria and Lebanon". In Kreyenbroek, Ph. G. and Sperl, S. (eds), *The Kurds: A Contemporary Overview.* London, New York: Routledge, 2005. 113.

2 "The Feyli Kurds of Iraq", https://ethnicgeography.wordpress.com/2013/10/07/the-feyli-kurds-part-3-the-feyli-kurds-of-iraq/, Accessed on 24 January 2020.

3 Anderson, B. *Imagined Communities.* London, New York: Verso, 2006. 6–7.

could be counter arguments that Kurds meet these criteria. The Kurdish language itself is derived from the ancient Median language and is divided now into three main groups, the Northern *(Kurmanji),* the Central *(Sorani)* and the Southern *(Pehlewani);* nevertheless, millions of Kurds speak Zaza and Gorani as mother tongue. Due to historical reasons, not only the dialects differ but also the alphabet, according to the country Latin, Arab, Persian and even Cyrillic alphabets are used. The Kurmanji, spoken mostly by Kurds in Turkey and Syria, is the language of around two thirds of the Kurdish population and is official in Rojava and Iraqi Kurdistan; however, in the latter the majority speak Sorani.[4] Despite their territories having been integrated into various countries for almost one hundred years, or in the case of Iran even more, there has been a growing tendency of considering Kurds from other regions' fellow-nationals. This has been strengthened by the existence of pan-Kurdish organizations, like the Kurdistan Workers' Party (PKK), the political co-operation of various Kurdish parties, and the rise of the self-governing territories in Iraq and recently in Syria.

Kurdish society is traditional; the role of clans is still an important point of reference. During the 19th century, traditional Kurdish leaders were not interested in nationalism gaining ground fearing that that would undermine their power within the communities.[5] In 1918, there were great hopes for creating a Kurdish state, the Treaty of Lausanne in 1920 even generated an autonomous Kurdistan within Turkey with the option of holding a referendum on independence. Such hopes; however, vanished after the victory of Atatürk's army. After WWII, a short-lived Kurdish Autonomous Republic was created in Iran, which helped Kurdish language to gain ground in public spaces. Similar effects led to the establishment of the Kurdistan Region in Iraq and Rojava in Syria; however, these latter represent a more complex case of state and society building, due to their social, military and economic role and the weakness of the central states. The only Kurdish region without similar experience is the one belonging to Turkey, where there has been an ongoing armed conflict for independence, and later autonomy, between the state and the Kurdish insurgents affiliated with the PKK for decades.

Since the Treaty of Sevres in 1920,[6] until recently, Kurdish independence has not been seriously considered, mainly due to the complex geopolitical reality of the region. Despite the strong popular support to the PKK on the ground and its communist agenda, not even the Soviet Union supported their struggle for independence due to Moscow's regional interests. Although the PKK was provided support by various communist regimes eager to help the liberation cause elsewhere, none of them dared to get involved into the creation of Kurdish independence without the backing of the Soviet Union.[7] The US wars against Iraq in 1990 and 2003 brought significant changes: Iraqi Kurdistan emerged as a self-governing region, distancing itself from Baghdad, and holding ultimately an unrecognized

4 On Kurdish see for instance "Kurdish Language". The Kurdish Project. https://thekurdishproject.org/history-and-culture/kurdish-culture/kurdish-language/, Accessed on 24 January 2020.; "The Kurdish language". Kurdistan Regional Government. http://cabinet.gov.krd/p/p.aspx?l=12&p=215, Accessed on 24 January 2020.; "Kurdish (Kurdî / کوردی)". Omniglot. https://www.omniglot.com/writing/kurdish.htm, Accessed on 24 January 2020.

5 McDowall, D. *A Modern History of the Kurds.* London, New York: I.B. Tauris, 2007. 467–468.

6 The first peace treaty signed with Turkey after WWI, revised by the Treaty of Lausanne in 1923, after the Turkish War of Independence.

7 "A Mountain River Has Many Bends". Tangled Wilderness. 13. March 2015. http://www.tangledwilderness.org/a-mountain-river-has-many-bends/, Accessed on 24 January 2020.

referendum on independence on 25 September 2017, when the overwhelming majority supported independence. Despite the referendum, the cooperation between Baghdad and Erbil did not end; however, the town of Kirkuk and its surrounding – occupied in 2012 after the collapse of the Iraqi Army – was retaken by Iraqi government forces as a consequence in October 2017.

II. KURDS IN SYRIA BEFORE THE ARAB SPRING

According to various estimations, Kurds make up around 8-10% of the Syrian population, constituting the largest minority and the only one having a specific territorial base. This feature allowed them to form a region of their own after the withdrawal of the Syrian regime in 2012. Unlike in Iraqi Kurdistan, in Syria there was neither prelude to Rojava[8] nor official use of Kurdish, and in Turkey, Syrian Kurds had no possibility to rebel against the state oppression due to the lack of proper conditions for a guerrilla warfare.

Nevertheless, Kurdish population has been autochthonous in Rojava since the 11th century; many of the Syrian Kurds are descendants of those who fled Turkey in the 1920s, after a Kurdish rebellion was crashed there. Their influx soon resulted in transforming the region into a rear base for anti-Turkey Kurdish activity, however, the then acting French administration discouraged any political or military move against the northern neighbour.[9] Yet, the French contributed to the strengthening of the minority identity in order to weaken the Sunni Arab majority in Syria.[10]

After Syria gained independence, due to the lack of trust and because of the diverging visions on the future, Kurds became a minority treated unfavourable. The situation worsened with the spread of the Arab nationalism in the 1950s.[11] After 1946, the first organization to overcome discrimination was the unrecognized underground Kurdish Democratic Party of Syria, established in 1957, with the aim of ensuring Kurdish linguistic and cultural rights, economic development and democratization of the *Syrian* political life. Yet, the exclusion and pauperization of the Kurds resulted in the fact that many of the intellectuals subordinated nationalist feelings to class struggle and Kurds achieved a disproportionately large representation within the Communist Party of Syria.[12]

After declaring the Syrian Arab Republic in 1961, life became even harder: a state organized campaign unfolded against Kurds. The change was related to the discovery of the oil resources in the northeast region of Syria and the Iraqi Kurdistan uprising. A particularly important document was a decree in 1962, which deprived around 120,000 Kurds, or 20 percent of the Syrian Kurds of Syrian nationality.[13] In 1963, Damascus joined Iraq in its war against Iraqi Kurdistan, further deteriorating Arab-Kurdish relations within Syria. Syrian officials considered Kurdish attempts in northern Iraq dangerous as the then head of the Syrian

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8 In the 1930s, there was an attempt to gain autonomy for al-Jazira province, however, turned down by the French authorities. Gorgas, J. T. "Les territoires de marge de la Syrie mandataire : le mouvement autonomiste de la Haute Jazîra, paradoxes et ambiguïtés d'une intégration « nationale » inachevée (1936-1939)". *Revue des mondes musulmans et de la Méditerranée* 2. 2009. DOI:10.4000/remmm.6481, Accessed on 24 January 2020.

9 Vanly. "The Kurds in Syria and Lebanon". 117.

10 This proved to be useful when crushing the revolt against the French rule in 1925.

11 Tejel, J. *Syria's Kurds: History, Politics and Society.* London, New York: Routledge Taylor & Francis Group, 2009. 48.

12 McDowall. A Modern History of the Kurds. 472.

13 On the process see Tejel. *Syria's Kurds.* 49–52.

secret service in Al-Hasakah compared the Kurdish cause to the example of Israel in a document compiled for the government, arguing that while Israel was an 'imperialism'-created *fait accompli* for the Arab world, Kurdistan, a second 'Judastan' could be the same made by 'communists'.[14] Nevertheless, the disclosure of the plan generated indignation, Syrian Kurdish political parties recognized the importance of wording and since the 1970s they have dropped the term 'Kurdistan' and use the word 'Kurdish' instead.[15]

In order to weaken Kurdish presence forced Arabization, deprivation of citizenship and property, and removal of population became practice in the Syrian–Turkish border region.[16] For instance, in 1973 and 2007, Syrian authorities confiscated Kurdish owned arable lands and gave them to Arab families brought from other parts of the country to change the ethnic composition.[17] When the settlement program was stopped in 1976, there were already 41 new villages in the *hizami al-'arabi,* the 'Arab Belt' for settlers.[18] Nevertheless, despite these attempts, the territory remained mostly Kurdish populated, and the overwhelming majority of the Kurds monolingual, unable to speak Arabic.[19]

During the reign of Hafez al-Assad, in the eyes of the Sunni Arab majority Kurds became allies of the oppressing regime, because they contributed to the repression of the Sunni revolts in the 1980s.[20] However, on the contrary, Kurds were generally not favoured, and the 1980s and 1990s saw further regulations to suppress Kurdish language and identity, although some Kurds were co-opted by the regime during Hafez al-Assad's reign.[21] This oppression had not changed prior to the Arab Spring, and the existence of tensions became visible by such events like the Qamishlo uprising in 2004.[22]

As Kurds live in four countries, they have frequently been subjects of or partners in foreign involvement into the affairs of the neighbouring states. While in the 1960s Damascus helped Baghdad in a war against Iraqi Kurdistan; in the 1980s they sided with Iraqi Kurdistan against Baghdad due to the disputes between al-Assad and Iraqi leader Saddam Hussein. Syria also provided shelter for the reorganization of and recruitment to the PKK after the group had to flee Turkey following the military coup there in 1980.[23] This help was so important, that in 1996 PKK-leader Abdullah Öçalan openly declared that Syria

14 Vanly. "The Kurds in Syria and Lebanon". 121–122.

15 McDowall. A Modern History of the Kurds. 478.

16 "Syria–The Silenced Kurds". Human Rights Watch Reports 8/4. 1996. https://www.hrw.org/reports/1996/Syria.htm, Accessed on 24 January 2020. Between 1954 and 1961, the population of Hasakah province grew by 27 percent, which cannot be explained merely by natural increase. McDowall. *A Modern History of the Kurds,* 473.

17 "Persecution and Discrimination against Kurdish Citizens in Syria". Office of the United Nations High Commissioner for Human Rights. http://lib.ohchr.org/HRBodies/UPR/Documents/session12/SY/KIS-KurdsinSyria-eng.pdf, Accessed on 24 January 2020.

18 McDowall. A Modern History of the Kurds. 475.

19 Vanly. "The Kurds in Syria and Lebanon". 116.

20 Vanly. "The Kurds in Syria and Lebanon". 125.; McDowall. *A Modern History of the Kurds.* 477.

21 Tejel. *Syria's Kurds.* 65–68.

22 On 12 March 2004, after atrocities at a soccer match between the Kurdish supporters of Qamishlo and the Arab supporters of Deir Ez-Zor during which the Syrian security forces acted against the Kurds, killing six people, including three children, Kurdish protesters burned down the local Ba'ath Party office and toppled the statue of Hafez al-Assad. After the events the Syrian Army recaptured the town, killing over 30 Kurds, and arresting 2,000, while many Kurds fled for KRG in Iraq.

23 The popular support for the PKK was extremely strong in Kobanî and in the Kurd Mountains – today Afrin region – in north-western Syria. Allsopp, H. *The Kurds of Syria. Political Parties and Identity in the Middle East.* I.B. Tauris, 2015. 103.

had no Kurds of its own and those living there were all refugees from Turkey.[24] The Syria–PKK cooperation lasted until 1998, when Turkey managed to achieve the break of that, with strengthening the relations with Israel, and threatening Damascus with a military intervention.[25]

III. ROJAVA – A COMMUNITY-BUILDING PROJECT

As Syrian authorities withdrew from the Kurdish regions in August 2012, when the battle for Aleppo started, control remained to local forces. The already existing underground *Democratic Union Party* (PYD) and the *Kurdish National Council* (KNC) formed the *Kurdish Supreme Committee* (KSC) for governing and administrating the territory and the PYD-affiliated *People's Protection Units* (YPG) became the force of armed self-defence. Later PYD renounced cooperation with KNC after the latter, in close cooperation with the Iraqi Kurdistan, whose President, Massud Barzani is a partner of Turkey, insisted on sharing power within Rojava, and tried to form its own militia, a rival to YPG. Since then, the KNC, supported by Turkey and Saudi Arabia, has been strongly opposing the existence of the autonomous administration, similarly to the *Syrian National Council* (SNC).[26]

However, states and political scientists generally reject the idea of territorial autonomy in the third world because it impedes 'nation-building', and is therefore 'retrogressive'. Some scholars agree that as most states do grant neither collective nor individual human rights and communities are not protected against state abuse, autonomy should be provided where it serves justice and human dignity, since then it is 'progressive'.[27] In strengthening the international recognition of the PYD and that of the YPG, the siege of Kobanî was a turning point. Then, at the peak of the ISIS, US policymakers impressed by the local resistance established working relations with the YPG.[28] As the US program to train and equip Syrian rebels to fight ISIS had proven to be a failure by that time, the YPG managed to stabilize its position as a reliable ally of Washington. Alongside the war against ISIS, another articulated US goal was the promotion of democracy in the MENA region.[29] This also largely resonated with the developments in Rojava, where the situation developed compared to the previous administration, even if some call that 'a new form of a decentralized non-state government

24 McDowall. A Modern History of the Kurds. 479–480.

25 Cagaptay S. "Syria and Turkey: The PKK Dimension". The Washington Institute. 5 April 2012. http://www.washingtoninstitute.org/policy-analysis/view/syria-and-turkey-the-pkk-dimension, Accessed on 24 January 2020.

26 In the beginning the SNC, formed in Istanbul on 23 August 2011, was hoped to become a Syrian government in exile. Such hopes failed; however, many countries have recognized it as a partner, although Kurds have barely been involved into the SNC: only the small party of Kurdish Future Movement in Syria is represented. A member of the Kurdish Future Movement, also a member of the city council in Darbasiyah in Jazira, was arrested by the PYD administration on 1 April 2017. "Member of the Kurdish Future Movement arrested by Kurdish Self-management forces in al Darbasiya city in Hasaka governorate on April 1". Syrian Network for Human Rights. 1 April 2017. http://sn4hr.org/blog/2017/04/01/member-kurdish-future-movement-arrested-kurdish-self-management-forces-al-darbasiya-city-hasaka-governorate-april-1/, Accessed on 24 January 2020.

27 Safran, W. "Spatial and Functional Dimensions of Autonomy: Cross-national and Theoretical Perspectives". In Safran, W. and Máiz, R. (eds), *Identity and Territorial Autonomy in Plural Societies.* London, Portland: Frank Cass, 2000. 19–20.

28 Hassan, H. "The Battle for Raqqa and the Challenges after Liberation" *CTC Sentinel* 10/6. 2017. 2.

29 About the US policy in the Middle East see Echagüe, A. "The United States: redefining engagement?". In Kausch, K. (ed), *Geopolitics and Democracy in the Middle East.* Madrid: FRIDE, 2015. 181–193.

without hierarchy'.[30] The ideological basis for the implemented social and economic changes stems from the thoughts of the imprisoned PKK leader Abdullah Öçalan, who is considered to be the spiritual leader of the PYD.

The growing military importance of the PYD and YPG had led to changes in how power is exercised in Rojava by the time they started to expand their control to territories populated by Sunni Arab majority. Those territories long opposed the Syrian regime because of being oppressed by Damascus and to some extent were supportive to the ISIS, regarding the terrorist group a guardian angel of Sunnis. As a consequence of this, a secular Kurdish rule would not have been an appropriate reason for Sunni Arabs to fight for or even to tolerate being subjugated to. Understanding the need for a change, as early as 2013, the PYD called for the creation of a progressive multi-ethnic region in wider Rojava, beyond the ethnic borders of the Kurds. The change was reflected also in the constitution of 2014, unrecognized by Syria, and in the renaming of the territory to *Rojava–Democratic Federation of Northern Syria,* in December 2016.

As the political system changed, the military approach also had to be subjected to changes. The *Syrian Democratic Forces* (SDF) – a multi-ethnic and multi-religious alliance of Kurdish, Arab, Assyrian, Armenian, Turkmen and Circassian militias – was founded in October 2015, and declared the official defence force of Rojava by the December 2016 constitution. The SDF–US Army partnership has facilitated the cooperation between Kurd and Arab forces, because the latter started to see SDF and Rojava as an American project and a 'life insurance' since US military presence makes it difficult for Damascus to attack the liberated areas.[31] Due to the growing share of non-Kurdish population in the extending territory of Rojava, the SDF cannot be considered any more "a subsidiary of the YPG"[32], or simply a tool for Kurds to expand their influence in predominantly Arab areas. According to Pentagon estimations, in March 2017 the SDF was made of Kurd forces in 40 percent and Arabs in 60 percent.[33] The role of women is also important: in 2016, they made up about 30 to 40 percent of the YPG in the Women's Protection Units (YPJ),[34] while on 10 July 2017, the first Arab female battalion was organized on the outskirts of Raqqa.[35]

After the administrative reform of July 2017, Rojava–Democratic Federation of Northern Syria was composed of three regions, Jazira (Hasakah), Euphrates (Kobanî), and Afrin, while some territories under SDF control were not organized into them (in blue on Map 2). The Turkish interventions in 2018 and 2019 led to changes both in territory and administrative organization of the territory. The region was renamed to Autonomous Administration of

30 "A Mountain River Has Many Bends".

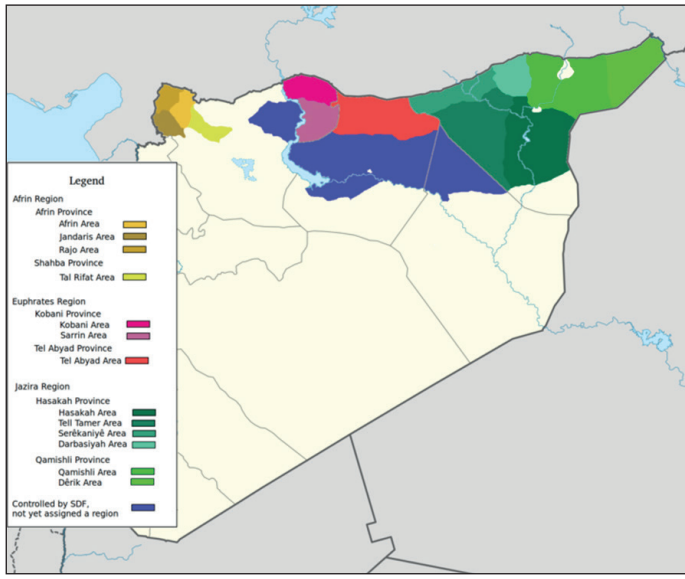
31 Hassan, H. "The Battle for Raqqa". 4.

32 "Global powers seek to revive diplomatic process". The Economist. 12 February 2016. http://country.eiu.com/article.aspx?articleid=1363937520&Country=Syria&topic=Politics, Accessed on 24 January 2020.

33 "News Transcript of the Department of Defense Press Briefing by Gen. Townsend via teleconference from Baghdad, Iraq". US Department of Defence. 1 March 2017. https://www.defense.gov/News/Transcripts/Transcript-View/Article/1099469/department-of-defense-press-briefing-by-gen-townsend-via-teleconference-from-ba/, Accessed on 24 January 2020.

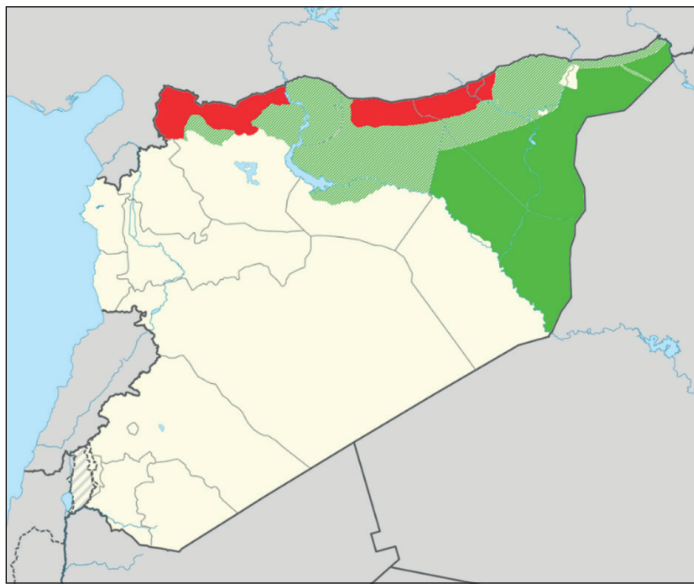
34 Sido, K. "Rojava – a protection zone for religious and ethnic minorities in northern Syria?". Gesellschaft für bedrohte Völker. June 2016. https://www.gfbv.de/fileadmin/redaktion/Reporte_Memoranden/2016/Northern-Syria-research-trip-2016.compressed.pdf, 5. Accessed on 24 January 2020., Baumstieger, M. "Rojda Felat". Süddeutsche Zeitung, 8 November 2016. http://www.sueddeutsche.de/politik/profil-rojda-felat-1.3239571, Accessed on 24 January 2020.

35 "SDF creates female Arab battalion in eastern Syria to fight patriarchy and ISIS". Al Shahid. 12 July 2017. https://alshahidwitness.com/sdf-female-arab-battalion-eastern-syria/, Accessed on 24 January 2020.



Map 2 *The regions of Rojava in mid-2017*
(Source: https://en.wikipedia.org/wiki/Democratic_Federation_of_Northern_Syria)

North and East Syria (NES), based on the regions of Jazira, Euphrates, and Afrin (despite the fact that the seat is occupied by Turkey), and local councils of Raqqa, Manbij, Tabqa, and Deir ez-Zor; under the leadership of the 70-member General Council, however, the power of the regions has decreased as seen on Map 3.



Map 3 *NES in January 2020, dark green: SDF controlled territories, light green: SDF-control with Syrian military presence, red: Turkish-held territories*
(Source: https://en.wikipedia.org/wiki/File:Claimed_and_de_facto_territory_of_Rojava.png)

Regions, as parts of the structure of the Democratic Autonomous Administration (DAA), are seen to be similar to the *Group of Communities in Kurdistan* (KCK), established in 2005, to implement Öçalan's democratic confederal model in the regions of Kurdistan. The KCK is an institutionalized umbrella structure overseeing its member organizations: the PKK in Turkey, the PYD in Syria, the Kurdistan Democratic Solution Party in Iraq and the Kurdistan Free Life Party in Iran, nevertheless, leaving them a great room for manoeuvre or autonomy.[36] The DAA system in Rojava covers the three regions, comprises their legislative, judicial and executive councils and one general coordinating council acting for all the cantons. Each region has a government, which while ensuring cooperation with the others, implements its own policy and provides services. Policing is provided by the Asayish ('security' in Kurdish), a force organized in the regions. There is no federal government in Rojava.

A guideline elaborated by Öçalan and implemented by the SDF is the vision of the 'democratic nation' according to which all ethnic groups must participate in the local government. The main political force of Rojava is the *Movement for a Democratic Society* (TEV-DEM) a multi-ethnic, leftist coalition, in which the PYD has a crucial role but which includes Arab, Turkmen, Assyrian and further Kurdish forces; however, all of them allied with the PYD. Practically, this means that although decentralized institutions are being built, power is heavily centralized in the hands of the PYD.[37] As political views diverging from that of the PYD are excluded, the system implemented is not inclusive in the sense of political diversity.

After decades of Arabization, the current administration shows respect to multilingualism: the authorities commonly use three languages, Arabic, Kurdish written with Latin alphabet, and Aramaic.[38] Official signs of the administration and street signs in Christian villages are trilingual.[39] Peaceful ethnic co-existence and the prevention of the alienation of the non-Kurdish elements of society are priorities; that is why the use of the flag of Kurdistan is not encouraged; however, officially not banned.[40]

The 2016 constitution is unique in the Middle East, as it recognizes gender equality, minority rights, direct democracy and strives for social equality, while prohibits among others polygamy, forced or underage marriage. Declared gender equality is almost unique in the region, women not only have equal rights, they form an important and recognized pillar of society and the military, too. A further implemented Öçalan guideline is that institutions must have both male and female leaders. These changes affect everyday life fundamentally. For illustrating this, the conservative, ethnically mixed and tribe-dominated, even largely ISIS-supportive town of Tell Abyad, previously subjected to forced Arabization, could have served as a blueprint. Before the Turkish invasion of 2019, two co-mayors, one of which a Kurdish woman in her late 20s, ran the town; while in the local council, with Arab majority,

[36] Khalaf, R. M. Governing Rojava: *Layers of Legitimacy in Syria.* London: Chatham House, 2016. 10–11. https://www.chathamhouse.org/sites/default/files/publications/research/2016-12-08-governing-rojava-khalaf.pdf, Accessed on 24 January 2020.

[37] Khalaf. Governing Rojava. 10.

[38] An ancient language in the Middle East belonging to the Afro-Asiatic language family and the Semitic subfamily. The Aramaic, now endangered and spoken by several hundreds of thousand people, served as a lingua franca in the region for centuries.

[39] Sido. "Rojava…". 22.

[40] Khalaf. *Governing Rojava.* 23.

the representation of the minorities was ensured. Teaching was provided in both Arabic and Kurdish instead of solely Arabic.[41]

The administration is not attempting to create a distinct political entity in Rojava: Syrian identity cards, documents, and currency are still used. Similarly, Syrian legal system is applied if there is no conflict with the regional constitution; however, a distinct court system has been created in which lower courts' decisions are made with the involvement of citizens, while at higher levels the participation of trained jurists is compulsory.[42] Sharia is not practised as the leading principle is secularism in Rojava; however, the diminution of men's traditional domestic authority causes social unrest.

Decision-making is based on local communities, in accordance with traditions; decisions are made collectively and aspiring to unanimity.[43] Due to security reasons, until today, there were only partial elections,[44] but during the assignment of local leaders and councils some rules were respected. The councils already existed underground before the Arab Spring, when they were tools for the local population to solve problems on their own; however, these authorities were persecuted by the regime.[45] After the autonomy was implemented, the councils became the backbone of the administration, assuring legitimacy and efficiency at the same time. Planned regional elections of 2014 and 2018 were postponed.

Primary and secondary education is free and carried out in mother tongue, in contrast to the Arabic-language instruction before 2012. However, the curriculum influenced by Öçalan's views is triggering criticism, and diplomas issued by the regional authorities are not recognized elsewhere. In September 2017, despite Damascus' approval, the PYD rejected the proposal of the UNICEF to take over the 2,000 schools operating in Hasakah in order to teach a standardized curriculum, as it turned down the intention to set up schools in the Al-Mabrouka displaced persons camp in rural Hasakah.[46] Another issue emerged with the private schools first exempted from applying the regional curriculum. After some disputes in September 2018, a deal was achieved between the regional authorities and the local Syrian Orthodox archbishop, allowing for Assyrian private confessional schools to

41 Van Wilgenburg, W. "Young female mayor breaks boundaries in Syrian town freed from Islamic State". Middle East Eye. 1 July 2016. http://www.middleeasteye.net/in-depth/features/young-female-mayor-breaks-boundaries-syrian-town-freed-552711157, Accessed on 24 January 2020.; "They freed a Syrian town from ISIS. Now they have to govern it". *The Washington Post.* 30 October 2015. https://www.washingtonpost.com/world/the-challenges-of-governing-after-the-islamic-state/2015/10/30/8985938c-7673-11e5-a5e2-40d6b2ad18dd_story.html?utm_term=.5833e928052b, Accessed on 24 January 2020.

42 Ayboğa, E. "The new justice system in Rojava". 13 October 2014. http://www.biehlonbookchin.com/justice-system-in-rojava/, Accessed on 24 January 2020.

43 Baher, Z. "The Experiment of West Kurdistan Has Proved That People Can Make Changes" Co-operation in Mesopotamia. 12 March 2016. https://cooperativeeconomy.info/the-experiment-of-west-kurdistan-has-proved-that-people-can-make-changes/, Accessed on 24 January 2020.

44 That election took place in March 2015 in the then controlled mostly Kurdish populated area, amid the boycott of the KNC. Under the previous regime functionaries were chosen and nominated by the Baath Party.

45 Lebsky, M. "The Economy of Rojava" Co-operation in Mesopotamia. 14 March 2017. https://cooperativeeconomy.info/the-economy-of-rojava/, Accessed on 24 January 2020.

46 The reason in both cases was the non-implementation of the Rojava administration approved curriculum influenced by Öçalan's views. Al-Wasl, Z. "PYD Refuses UNICEF Proposal to Administer 2,000 Schools in Hassakeh". The Syrian Observer. 8 September 2017. https://syrianobserver.com/EN/news/22370/pyd_refuses_unicef_proposal_administer_schools_hassakeh.html, Accessed on 24 January 2020.; Khalaf. *Governing Rojava.* 18.

teach in the first two grades the region's curriculum, and in grades three to six the Damascus-approved one.[47]

Higher education has also been created: a college providing teaching in Kurdish opened in Afrin in September 2015,[48] while in Qamishlo the Rojava University opened in 2016, in cooperation with the Paris 8 University, with colleges of medicine, engineering, agricultural studies, communications and computer sciences, while the college of petroleum has been located in Rmelan city. After the Turkish invasion of Afrin in 2018, the college closed, however, in October 2019 it was announced that the University of Gaziantep, Turkey, would open faculties in the Northern Syrian towns of Afrin, Al-Bab and Azaz.[49]

Since the outbreak of the civil war the ethnic and religious composition of Syria has radically changed due to the exodus of many belonging to minorities and the arrival of internally displaced persons' (IDP) to certain areas, what is true for Rojava, as well. For instance, before 2011 there were some 50 Yazidi villages in Hasakah/Jazira province, many of them no longer inhabited.[50] As population exchange has become practiced widespread by every administration in Syria, some fear that the installation of Rojava could lead to ethnic cleansing despite the official slogans. However, there have been some examples to this, for instance tens of thousands of Arabs left the mentioned Tell Abyad due to the fear of retribution when the YPG took it in 2015,[51] the general situation is the contrary, the number of the Arabs have doubled in Rojava since the beginning of the conflict,[52] as many of the some 1.3 million IDPs in Rojava belong to that group. Another Arab fear is attached to the recruitment of military-age people from the region under Rojava control, which sporadically produces protests showing the lack of trust between the groups. The Turkish invasions of 2018 and 2019 have also altered the ethnic composition of the concerned regions, however reliable data is not available. What is known, for instance, is that in April 2018 a Kurdish-majority 'elders council' was established in Afrin, indicating that even the Turkish invaders considered the town a Kurdish-majority one.[53] Yet, Amnesty International warned that Turkey and her allies were committing human rights violations in Afrin.[54]

After the Kurdish forces started to occupy non-Kurdish populated areas, a special administrative regime, the military council, was introduced. The first one to set up was the Manbij military council in April 2016, composed of Arabs, Kurds, Assyrians and Turkomans

47 Souleiman, D. "Syriacs protest Kurdish authorities over Syria school curriculum". Yahoo News. 12 September 2018. https://news.yahoo.com/kurds-christians-split-over-syria-school-curriculum-041427147.html, Accessed on 24 January 2020.

48 That was the first Kurdish-language higher education institution in Syria, and one of the main reasons for the creation was the commuting difficulties between Afrin and Aleppo due to the outbreak of the Civil War. Drwish, S. M. "Suriye'nin ilk Kürt üniversitesi tartışmalara neden oluyor". *Al-Monitor.* 18 May 2016. http:// al-monitor.com/pulse/tr/originals/2016/05/kurds-rojava-afrin-first-university-ideology-ocalan.html, Accessed on 24 January 2020.

49 Erkoyun, E. "Turkish university to open faculties in northern Syria" *Reuters.* 4 October 2019. https://www.reuters.com/article/us-syria-security-turkey-education-idUSKBN1WJ0Z3, Accessed on 24 January 2020.

50 Sido. "Rojava…". 22.

51 "They freed…".

52 Sido. "Rojava…". 24.

53 "Interim local council established in Syria's Afrin". *Hürriyet Daily News.* 12 April 2018. http://www.hurriyetdailynews.com/interim-local-council-established-in-syrias-afrin-130227, Accessed on 24 January 2020.

54 "Syria: Turkey must stop serious violations by allied groups and its own forces in Afrin." Amnesty International. 2 August 2018. https://www.amnesty.org/en/latest/news/2018/08/syria-turkey-must-stop-serious-violations-by-allied-groups-and-its-own-forces-in-afrin/, Accessed on 24 January 2020.

with the aim of administering the town and the region after being captured from the ISIS. The reason behind was that Manbij is not only of strategic importance, but is also an Arab-majority town with many ethnic groups, which made such a precaution necessary before the offensive.[55] In August 2016, similar military councils were formed for Jarabulus and Al-Bab, both located in the neighbourhood of Manbij and taken by the Free Syrian Army (FSA) and the Turkish army in August 2016 and February 2017, respectively. The fourth military council was formed in December 2016 for Deir ez-Zor; however, the town's siege was lifted in September 2017 by the Syrian Army, leaving Deir ez-Zor out of Rojava.

After the liberation of Manbij, a Legislative Assembly was formed which in March 2017 created the *Democratic Civilian Administration of Manbij and its Surroundings* with two co-presidents to replace the military administration.[56] The composition of the council, having 71 Arab, 43 Kurd, 10 Turkoman, 8 Circassian, 1 Armenian and 1 Chechen members, shows the multi-ethnic feature of the region, and is also a good example of the ethnic inclusion the new administration is eager to emphasize.[57] At first, the territory was incorporated into the Shahba region, created early in 2016, to administer the multi-ethnic territories between Afrin and Kobanî cantons; however, it was left outside the region system at the administrative reorganization in late July 2017.[58]

From economic point of view the territory and the population of Rojava was long discriminated against by the regime; however, Syria had to rely on Rojava as 70% of the wheat was produced there and also the oil extracted had an important share in the national production. These sources contributed substantially to the economic self-reliance of Rojava after the withdrawal of the Syrian state.[59] While the other regions are predominantly agricultural, Jazira is an economic engine; however, oil-refineries had to be built there since before the war such industry was concentrated in other parts of the country. Afrin profited a lot from the devastation of Aleppo, a significant part of the famous soap industry found refuge there.[60] A major challenge was to rebuild water, electricity and road infrastructure, either destroyed during the war or collapsed after the withdrawal of the regime.[61] Before capturing the Tabqa Dam in May 2017 and some minor dams earlier, electricity retailing

55 In 2019, following the withdrawal of US and other Western troops from northern Syria, the Syrian Army and Russian military police entered Manbij to prevent a Turkish and a Free Syrian Army offensive.

56 "Manbij Democratic Civilian Administration Council takes office". *ANF News.* 12 March 2017. https://anfenglish.com/news/manbij-democratic-civilian-administration-council-takes-office-18957, Accessed on 24 January 2020.

57 Some locals were complaining that the PYD dismantled the elected local council that had been operating prior to the ISIS occupation, and brought its own appointees historically linked to the regime and thus distrusted. Khalaf. *Governing Rojava.* 20.

58 After the administrative reorganization of Rojava in July 2017, Shahba was divided into two: the Tell Rifat area i.e. the western part of the region was incorporated into the Afrin region, while the Manbij area was left outside of the region system.

59 These also contributed to the survival of Rojava after a considerable number of IDPs arrived in the territory. According to the minister of economy of Afrin in 2014, Rojava can support a population two or three times larger than that lived there before the conflict. "Efrîn Economy Minister Yousef: Rojava challenging norms of class, gender and power". DIHA. 22 December 2014. http://diclenews.com/en/news/content/view/436354, Accessed on 24 January 2020.

60 "Efrîn Economy Minister…".

61 Evran, S. "Efrin Is Being Rebuilt, Calls for Support and Investment" The Rojava Report. 6 May 2014. https://rojavareport.wordpress.com/2014/05/06/efrin-is-being-rebuilt-calls-for-support-and-investment/, Accessed on 24 January 2020.

was also a major problem, but the possession of these dams helps to supply the region with electricity and drinking water.

The economic model implemented in Rojava is an agrarian form of socialism based on cooperatives.[62] The economic policy is not aiming either a capitalist or a communist regime, but seeking a 'people's economy' based on cooperatives and communes, and provides general welfare and funding for science and technology.[63] Banking is limited to handle savings and helping the communes; resource of financing is the output of the projects.[64] Economic changes also resulted in the limitation of private property to two forms: personal (cars, electronic goods and personal belongings), and property based on direct use. The principle 'ownership by use' became the central idea, meaning that when a property is being used by a person or persons, the users own the land and structures but are not entitled to sell them on an open market.[65]

After the seizure of power and the abolishment of the right to large private property, around 2/3 of the big property was 'socialised', i. e. put at the service of the population.[66] Aside from property owned by use, in principle any other property became common, held in stewardship by councils that are entitled to turn over these public goods to individuals for use. Local councils manage some 3/4 of the land while in the case of industry this share is 1/3.[67] Oil industry is under the control of the councils and managed by the workers' committees. Services like education, job provision–mainly in institutions–electricity, water, healthcare and security are provided by the Democratic Autonomous Administration (DAA) governance, the regions for a fee. In Hasakah parallel services are sometimes available, due to the existence of the regime enclaves.[68]

Regions and councils implement their own economic policy; however, there is an *Institute for Economic Development,* an authority that regulates import and export trade, issues trading licences to individuals and elaborates modernization projects for the agriculture and industry in Rojava. Planning is crucial as the economy is still relying on agriculture and has been hit by the embargo imposed by neighbours, nevertheless, the situation improved after Iraqi Kurdistan opened the border in June 2016. Everything produced in Rojava is inexpensive, as the economic model aims rather a social approach and redistribution of wealth than accumulation or creating a stock exchange. Other goods are brought from Iraqi Kurdistan or smuggled from Turkey or other parts of Syria, but expensive in every case.

Rojava started cementing its achievements during 2017, as the fight against the pseudo-state of ISIS became more likely to come to an end and the regime recaptured vast areas. In July 2017, the Syrian Democratic Council, the political wing of the SDF, decided to hold communal, local and parliamentary elections on 22 September, 3 November 2017 and 1 January 2018, respectively, which the Syrian deputy foreign minister called a "joke".[69] These elections, however, were postponed due to the fighting, and have not been organized to date.

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62 Baher, Z. "The Experiment of West Kurdistan Has Proved That People Can Make Changes"

63 Lebsky. "The Economy of Rojava"

64 Yousef, A. "The Social Economy in Rojava". Kurdishquestion.com. 26 May 2015. http://kurdishquestion.com/oldarticle.php?aid=the-social-economy-in-rojava, Accessed on 24 January 2020.

65 "A Mountain River Has Many Bends"

66 Lebsky. "The Economy of Rojava"

67 "A Mountain River Has Many Bends".

68 Khalaf. *Governing Rojava.* 19.

69 Barrington, L. "Elections in Kurdish-led areas will not divide Syria: minister". Reuters. 7 August 2017. https://www.reuters.com/article/us-mideast-crisis-syria-kurds/elections-in-kurdish-led-areas-will-not-divide-syria-minister-idUSKBN1AM0LM, Accessed on 24 January 2020.

IV. ROJAVA SEEN FROM DAMASCUS

On 15 September 2017, Buthania Shaaban, a political adviser to the Syrian President, openly stated that Syria considers the SDF an illegitimate force, similarly to the ISIS, and would fight until regaining control over the whole country.[70] The statement came after the break of the siege of Deir Ez-Zor, one of the most important victories the Syrian Army has achieved since 2012, with significant Russian support though.[71] Just a few days later, in the context of the then coming referendum on independence in Iraqi Kurdistan, Syrian foreign minister Walid al-Moualem expressed Damascus' readiness to negotiate with the Kurds about the demanded autonomy within Syria once the war against ISIS was over.[72] These statements show some confusion; revealing that the relation between Damascus and Rojava was ambiguous during the last years.

As Turkey showed serious intents to interfere into the events in Syria after the outbreak of the Arab Spring, Damascus became determined to keep its northern neighbour out. It offered citizenship to the Kurds deprived from that due to the Decree of 1962. However, as clashes intensified in other parts of the country, and the Syrian government realized that it had no sufficient forces to maintain power in the north, it searched for a local actor who was able to provide security but did not bring the territory out of the Syrian state, and was willing to prevent Turkish military from entering the country. After the President-ordered killing of Mashaal Tammo,[73] founder and fellow activist of the Kurdish Future Movement Party, a vocal critic of the Syrian President and, more importantly, the Kurdish collaborator of the Turkey-backed opposition, the Syrian National Coalition (SNC), local power in northern Syria shifted to the PYD. The Syrian regime not only had some experience of cooperation with the PYD due to its connection to the PKK, but there had also existed a complementary activity between them, for instance the PYD helped to crack down on Kurdish anti-regime demonstrators in Afrin in early 2012, for its own interest which, however, coincided with that of the regime.[74]

The first town abandoned by the Syrian administration was Kobanî on 19 July 2012, followed by several others in the following days. The government forces withdrew without resistance, while the YPG prevented the rebelling Free Syrian Army (FSA) from entering the towns. During those months, the Syrian Army, YPG, FSA, and ISIS were all present in what later became Rojava. Clashes between YPG and the Syrian Army were sporadic; the first one occurred on 21 July 2012, just two days after the start of the withdrawal, in Qamishlo.

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70 Hamidi, I. "Head of Kurdish People's Protection Units: Damascus Declared War against us". Asharq Al-Awsat, 17 September 2017. https://aawsat.com/english/home/article/1026421/head-kurdish-peoples-protection-units-damascus-declared-war-against-us, Accessed on 24 January 2020.

71 The Russian support has long been vital for the survival of the Ba'ath Party regime. First, after signing an agreement on the Soviet (Russian) use of Tartus naval base in 1972, the Soviet Union helped to quell the majority Sunni insurgency against the regime by the early 1980s. Second, the Russian military intervention into the Syrian civil war in September 2015 clearly saved the regime from failing. On the history of Russian-Syrian partnership see Van Benthuysen, J. "In-between anarchy and interdependence: from state death to fragile and failing states". *Third World Quarterly* 36/1. 2015. 32-34. DOI:10.1080/01436597.2015.976015

72 Jadallah, A. "Damascus Says Syrian Kurdish Autonomy Negotiable: Report". US News. 26 September 2017. https://www.usnews.com/news/world/articles/2017-09-26/damascus-says-syrian-kurdish-autonomy-negotiable-report, Accessed on 24 January 2020.

73 "Assad ordered killing of Kurdish activist Mashaal Tammo: Leaked files". Al Arabiya English. 10 October 2012. https://english.alarabiya.net/en/2012/10/10/Assad-ordered-killing-of-Kurdish-activist-Mashaal-Tammo-Leaked-files.html, Accessed on 24 January 2020.

74 Cagaptay. "Syria and Turkey: The PKK Dimension"

The withdrawal was not complete: some area had been kept by the regime, the so called security boxes[75] in Qamishlo and Hasakah, both important centres of Christian presence.[76] Anti-regime rebels usually considered Christians and other minorities as supporters of the regime and the mutual distrust between the sides led to the situation that the state had enough popular support to keep key positions in these areas, such as government buildings, border crossing points to Turkey, or the Qamishlo airport, even when the PYD/YPG seized the neighbouring regions. Similarly, the PYD was able to organize, and 'neutralize' the Kurdish populated Sheikh Maqsood neighbourhood in Aleppo amidst fierce confrontations between the rebels and government forces.

Since then, the relationship between the regime and Rojava mostly could have been described with expressions like mutual tolerance, even need sometimes, or live and let live, due to the parallel fight against the common enemies, the ISIS and Turkey. This mutual reliance paradoxically led to situations like the praising of the YPG for its fight against Islamists by President Al-Assad in January 2013, at the same time when he failed to provide support for the Syrian Army confronting the YPG attempting that time to dislodge Syrian forces from the Kurdish territories.[77] There were rumours that in 2014, during the siege of Kobanî, the Syrian Army furnished the YPG with military support; however, the YPG denied this.[78] Similarly, when the Syrian reconciliation minister visited Rojava in April 2015, he enunciated that Damascus would provide further support for "Kurdish forces to defeat the terrorist organization", and that there was no objection to the use of Kurdish flag if "everything remains within a united Syria".[79] Last summer even presidential adviser Buthaina Shaban confirmed the weapon supply for the Kurdish forces when they had fought with ISIS, regretting that after joining efforts with the US, the SDF "lost contact with the regime".[80]

A new era came in early 2018, when Turkey attacked the Afrin region with ground forces. Although Turkish military interventions and their various consequences will be detailed in Chapter V, they made clear the mutual interest for cooperation between the Autonomous Administration of North and East Syria and Damascus to minimize Turkey and its allies' influence in Syria. The reason is not only the tangible Turkish military presence on Syrian soil, but also that Turkey aims to carry out long-term policies. After the Turkish invasion of Afrin, due to a settlement policy applied there by Turkey, the previously predominantly Kurdish-inhabited region turned into an ethnically mixed Kurdish-Arabic one.[81] As men-

[75] The two city centres with the bazaar and government buildings were kept by central administration and fortified by the regime security forces. In Qamishly, the airport also remained in the hands of Damascus.

[76] Christians form around 10 percent of the population and traditionally have good cooperation with the Alawites, the backbone of the Assad-regime. Christians' rights were recognized by the 1973 Constitution and respected by the regime. They are overrepresented within state administration and armed forces.

[77] Van Wilgenburg, W. "Kurdish Forces Clash with Main Syrian Opposition in Syria, Reports Say". Rudaw. 17 January 2013. https://web.archive.org/web/20130118175834/http://www.rudaw.net/english/news/syria/5666.html, Accessed on 24 January 2020.

[78] "Syria Providing Military Support to Kurds in Battle Against ISIS". *Haaretz.* 27 October 2014. http://www.haaretz.com/middle-east-news/1.623051, Accessed on 24 January 2020.

[79] Behlewî, D. "Syrian minister: we are providing military, financial support to Kurdish fighters". Rudaw. 19 April 2015. http://www.rudaw.net/english/middleeast/syria/19042015, Accessed on 24 January 2020.

[80] "Buthaina Shaban: We provided SDF with weapons". ARK. 2 September 2019. https://www.arknews.net/en/node/12620, Accessed on 24 January 2020.

[81] Izady, M. "Syria: Ethnic Shift 2010-mid 2018". 2018. https://i.redd.it/umzbb3cu7lc21.png, Accessed on 24 January 2020.

tioned above, this region had been an important stronghold of the PKK in Syria, therefore weakening the Kurdish element there means decreasing the potential of the PKK.

Similarly to early 2018, another such cooperation between the Autonomous Administration of North and East Syria and Damascus was necessary in late 2019, when Turkey carried out another attack with ground forces 'to secure' the SDF-held areas just south to its border after the Trump administration ordered the withdrawal of the US forces from Rojava on 6 October 2019.

Despite the predominantly peaceful co-existence between the regional and the Syrian administrations, there were clashes between the sides first in the enclaves, later on the front-lines. For instance, in early 2013 the Syrian Army (SAA) attacked the YPG-held 'neutral' Sheikh Maqsood neighbourhood in Aleppo, when FSA fighters sought shelter there. In April 2016, fighting escalated in Qamishlo between local YPG and Syrian Army forces, after the Syrian forces started shelling a civilian neighbourhood as a response to an ISIS detonated car bomb in the town, and only the order of the top leaders of the two sides was able to ease the tensions.[82]

Just months later, in August 2016, fighting erupted between local YPG and government forces in Hasakah, where the Syrian Air Force had bombed Kurdish held territories for the first time since the beginning of the conflict. According to sources, the reason was the government's discontent with the Rojava call of disbanding the National Defence Force, the backbone of state presence in Hasakah.[83] After several days of fighting with the Asayish, the regime forces lost the majority of the territory previously controlled in the town; however, since an agreement was reached between the sides, they were allowed to keep key government buildings in the centre.

In 2017, Soner Çağaptay, the political scientist of *The Washington Institute for Near East Policy,* identified four possible scenarios to which Rojava could be subjected, (1) the Transnistria model of a Russian vassal, (2) the Kosovo model of independence with partial recognition, (3) the Iraqi Kurdistan model of Turkish protection, and (4) the 1975 Algeria model of forced reintegration.[84] It cannot be excluded that Damascus will try the fourth option;[85] however, it is highly questionable whether Syria will have an opportunity and the capabilities for such a move.

The second and third Turkish military invasions in 2018 and 2019 respectively, detailed in Chapter V, have also resulted in decreasing chances for an easy solution. Furthermore, the planned weakening of the Kurdish majority, due to Turkish settlement policies detailed in

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82 Sary, G. "Rojava's Tortuous Relationship to the Syrian Regime". LSE. 19 September 2016. http://blogs.lse.ac.uk/mec/2016/09/19/rojavas-tortuous-relationship-to-the-syrian-regime/, Accessed on 24 January 2020.

83 "Syrian regime forces bomb Kurds in north for first time". *Hürriyet Daily News.* 18 August 2016. http://www.hurriyetdailynews.com/syrian-regime-forces-bomb-kurds-in-north-for-first-time.aspx?pageID=238&nID=102997&NewsCatID=352, Accessed on 24 January 2020.

84 Cagaptay, S. "Rojava's Future: Four Models Explained". The Washington Institute. 5 June 2017. http://www.washingtoninstitute.org/policy-analysis/view/rojavas-future-four-models-explained, Accessed on 24 January 2020.

85 In the 1970 peace accord between Baghdad and the Iraqi Kurds, Saddam Hussein was willing to give autonomy to the Kurdish region but the two sides could not agree on the question of Kirkuk. In 1974, the Iraqi Kurds restarted their struggle against the regime with Iranian and Israeli support. In response Saddam negotiated a deal with Iran (Algiers Agreement), leading Tehran to halt its support for Iraqi Kurdish groups. After that Saddam crushed the Kurdish revolt and forced his own version of autonomy on Kurdistan. Farouk-Sluglett, M. and Sluglett, P. *Iraq Since 1958: From Revolution to Dictatorship.* London: I.B. Tauris, 2001. 187–189.

the next chapter, in the northern areas of Syria might seem to help also Damascus but it is predictable that any settlement will rather increase Turkey's influence in the region instead of that of Damascus, of course, at the expense of the SDF.

V. TURKISH INVOLVEMENT – ROJAVA AS A THREAT FOR A NATO MEMBER STATE

The Arab Spring in Syria posed Turkey a dilemma. During the preceding decade under the then Minister of Foreign Affairs Ahmet Davutoğlu, Turkey adopted the so called zero-problems foreign policy with its neighbours. The relations with Syria were cordial at least, starting even before the AKP era in Ankara. The two countries set aside their conflicts in 1998 when Damascus finally ended the presence of the PKK in Syria and forced Abdullah Öçalan to leave the country.

In the first months of 2011, the Erdoğan government tried to convince the Assad regime to react peacefully to the demonstrations and negotiate with Islamist and secular opposition fractions. By the summer of 2011, it became obvious that the Syrian government had no intention in sharing power, and both the demonstrators and regime became more violent. Both the Turkish approach to the Syrian conflict and Damascus' own reaction were heavily influenced by the Egyptian revolution and the Libyan civil war, where two long time dictators were deposed. In Ankara's understanding the fall of Hosni Mubarak and Moammer Qaddhafi indicated a similar fate for Bashar al Assad, hence Turkey threw its lot with the opposition.

Ankara had two objectives in the Syrian crisis. First, to support the opposition to overthrow the Assad regime, and second to contain the activities of any PKK related organization within Syria. In the first years of the civil war, Turkey focused on building up and equip the Free Syrian Army (FSA) with the assistance of Qatar and Saudi Arabia. Ankara also allowed foreigners to cross freely the country to join the armed opposition and jihadist groups in Syria. Most of the so called "foreign fighters" joined the Syrian al-Qaeda (Al Nusra Front) and Islamic State of Iraq and Syria (ISIS).

Until 2014 the Syrian Kurds received less attention from Ankara, mainly because they were internally weak, engaged in internal struggles and the opposition of the Assad regime in North Syria, rival to the YPG, had significant military power and international support. The situation changed at the siege of Kobanî as demonstrated in Chapter III. The military cooperation of the most powerful military of the world and the small non-state actor considered to be a terrorist organization rang the bell in Ankara, and from that moment the Turkey's attention started to increase towards the "Rojava issue".[86] This was strengthened by the fact that from 2015, the YPG fought a two-fold campaign: while fighting according to US objectives to liberate Raqqa, the "capital" of ISIS, the now rebranded *Syrian Democratic Forces* also aimed to connect the Kurdish populated entities of Qamishlo, Kobanî, and Afrin. The Erdoğan government considered this a vital threat and by 2016 containing the YDG expansion had overshadowed even the previous top priority of Turkey in Syria: the overthrow of the Assad-regime.

[86] Egeresi Z. "Törökország Szíria-politikájának változása: a főbb dinamikák". *KKI Elemzések* 8. 2020. 9. https://kki.hu/wp-content/uploads/2020/01/08_KKI-elemzes_TUR-SYR_Egeresi_20200121.pdf, Accessed on 24 January 2020.

For Ankara, the PYD/YPG is nothing more than an offshoot of the terrorist organization PKK. The threat of connecting YPG-controlled areas along the whole Turkish-Syrian border therefore triggered the first open Turkish military intervention in Syria on 24 August 2016.[87] During Operation Euphrates Shield, the Turkish forces and parts of the FSA occupied the last segments of the ISIS "border" area with Turkey, and separated definitely the Kurdish held territories of Afrin and Kobanî/Qamishlo. The occupation was not only a military move, Turkey had far-reaching plans with the region, therefore it started an alternative society building by the resettlement of Syrian Turkomans and establishing institutions there.[88]

In 2017, Turkey tried to expand its presence in Syria, moving both eastwards and westwards. The PYD intended to use conflicting interests of the international actors present on Syrian soil so when Turkish/FSA troops moved against Manbij to the West, the Kurds invited US troops to patrol in the Manbij area. When Turkish/FSA troops deployed against the city of Tell Rifaat to the East, the PYD invited Russia to act as a guarantor in the city and in the whole of Afrin canton in March 2017.[89] Gradually Ankara became extremely frustrated by the PYD moves and understood the need to involve more the great powers (US and Russia) to be effective against the Syrian Kurds.

Early 2017, Turkey together with Iran and Russia launched the "Astana format" of negotiations, a new proposal to bring together the Assad regime and those Syrian opposition parties which were willing to negotiate a ceasefire. Coordinating with Moscow and Tehran made Ankara an almost equal partner in the Syrian civil war although Turkey backed forces fighting against the regime and thus Russia and Iran. The Erdoğan administration used its newfound influence to push for a new military offensive against the YPG, which coincided with the Syrian government's offensive against Eastern Ghouta, near Damascus.

Operation Olive Branch, the Turkish/FSA invasion of Kurdish-held Afrin canton, started on 20 January 2018. Damascus and Russia offered protection to the SDF if they handed over the region, but the Kurds refused the offer. By mid-March 2018, the SDF had been defeated and its forces withdrawn to other Kurdish-held areas. Tell Rifaat and the Menagh Air Base were handed over to the Syrian Army and Russian troops to prevent it falling into the hands of Turkish and FSA forces.[90] Gradually, Operation Olive Branch turned into a humanitarian disaster; it led to the displacement of 150,000 people,[91] mass human rights

[87] Turkish President Erdoğan stated that Turkey should be protected against *"the terrorist groups of Daesh and PYD that threaten our country in northern Syria"*. "Erdogan says Syria operation aimed at IS jihadists, Kurdish PYD". Daily Mail Online, 24 August 2016. http://www.dailymail.co.uk/wires/afp/article-3756119/Erdogan-says-Syria-operation-aimed-IS-jihadists-Kurdish-PYD.html, Accessed on 24 January 2020.

[88] Jarabulus border town under FSA control has been a show case: the town was connected to the Turkish electrical grid in September 2016, at the same time a new hospital was created there under the Turkish Ministry of Health, and in October 2017, the Turkish Post (PTT) opened a branch in the town.

[89] Iddon, P. "The power plays behind Russia's deconfliction in Afrin". Rudaw. 10 September 2017. https://www.rudaw.net/english/analysis/10092017, Accessed on 24 January 2020.

[90] Russian forces were allowed to take over the airport even earlier, in October 2017. Illingworth, A. "Russian forces raise their flag above major Kurdish base in north Aleppo". Al-Masdar News. 22 October 2017. https://www.almasdarnews.com/article/video-russian-forces-raise-flag-major-kurdish-base-north-aleppo/, Accessed on 24 January 2020.

[91] "Syria: Humanitarian Fund series – 'Living here has taught me how strong I really am.'". United Nation's Office for the Coordination of Humanitarian Affairs. 7 August 2019. https://www.unocha.org/story/syria-%E2%80%9Ci-wonder-if-i-will-ever-go-home%E2%80%9D, Accessed on 24 January 2020.

violations against the remaining local population,[92] and to the colonisation of the occupied territories by the Turkish forces.[93] The Turkish province of Hatay emerged as responsible for overseeing the activities of the local councils in Afrin canton and for helping with providing basic services. As Syrian researcher Khayrallah al-Hilu explained: *After a few months of giving the armed factions free rein, Turkey has supported military and civilian police forces in order to achieve relative security in the area. Indeed, Ankara has been able to pull strings in Afrin among the armed factions and military and civilian police, along with their various specialised departments.*[94]

Until today, the last round of Turkish military involvement in Syria started in September 2019. By that time, the confrontation between Turkey and the US reached new heights: Ankara decided to purchase the Russian made S-400 Triumph missile system, while Washington removed Turkey from the F-35 fifth generation fighter program. The US Congress threatened the Erdoğan administration with sanctions, while the Turkish President lobbied several times with Donald Trump to pull out US troops from NES. The withdrawal of troops from foreign mission was one of the campaign promises of the US President, although this was contrary to his administration's declared policy.

The withdrawal of the US troops was debated for a longer period of time. US Secretary of State Mike Pompeo and Turkish Foreign Minister Mevlüt Çavuşoğlu announced a deal in June 2018 aiming at joint patrolling in Manbij area and the withdrawal of YPG forces.[95] However, this agreement did not satisfy Turkey because it did not solve the problem of YPG presence along the Turkish-Syrian border. From Turkey's perspectives: *Ankara's primary objective is to create a militarily protected safe zone that will be liberated from terrorist-designated YPG-entities, prevent the YPG's territorial continuity in the eastern part of the Euphrates River, and then open up a territorial zone to protect Turkey's border against, according to the Turkish narrative, any terrorist infiltration. The area mentioned is 40 km deep, 550 km long and harbours 22 US military bases.*[96]

While Washington and Ankara continued their negotiations on a future "safe zone" in the border area, Turkish President Erdoğan kept threatening with a military invasion of the region. US diplomacy finally averted a new conflict by agreeing with Turkey on a new proposal regarding the territory between the Tigris and Euphrates rivers on 7 August 2019.

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92 "Between a Rock and a Hard Place – Civilians in North-western Syria". United Nations Human Rights Office of the High Commissioner. *Monthly Human Rights Digest,* June 2018. https://reliefweb.int/sites/reliefweb.int/files/resources/ohchr_-_syria_monthly_human_rights_digest_-_june_2018.pdf, Accessed on 24 January 2020.

93 "The resettlement by the Turkish authorities continues to the people who have been displaced towards the Syrian North and more than 40 thousand persons have been settled in houses and Camps in Afrin area". Syrian Observatory for Human Rights. 11 May 2018. http://www.syriahr.com/en/?p=91846&__cf_chl_jschl_tk__=aa9ab11cd4d91686579f6808f708f17185d0f2dc-1579954237-0-AdhCoes71czZcwpk6xLXN-FRn5sboA_bSsFkTGv5h9g9N_PDMlNzqp3q4ozEqzsCizMZNlgafqObApyVCiqkM1JHDzHtrw4Fo1x-GhJYky5z3EjT2y_m-FHbcNjxrcfQaGbxMilJtBfkH8E6ElulazZeDGF0j-5dc5HSq6jdxlnducfcNxC2jpQ1y-bhjqPiHWcjI39KuLMG1KwXRP7tHr-0XBrL0p40DAP2HCpAnfDv_DH9uo7dFK-KDgXfzvnSrpCNK-6kcyzImKVnug2pENM4jGw, Accessed on 24 January 2020.

94 Al-Hilu, K. *Afrin Under Turkish Control: Political, Economic and Social Transformations.* San Domenico di Fiesole: European University Institute, 2019. 9. DOI:10.2870/136668, Accessed on 24 January 2020.

95 Kanat, K. B. and Hannon, E. J. "The Manbij Roadmap and the Future of U.S.-Turkish Relations". *Middle East Policy* 25/3. 2018. 111-123. DOI:10.1111/mepo.12365, Accessed on 3 January 2020.

96 Atmaca, N. "Safe Zones and Devil in Details: Turkey is Running out of Options". NATO Defence College. http://www.natofoundation.org/wp-content/uploads/2019/07/NDCF-Atmaca-Paper-260719-1.pdf, Accessed on 24 January 2020.

The buffer zone ("safe zone") was to be 115 km long and 5 km deep. Between Tell Abyad and Ras Al-Ayn/Serakane, the depth of the buffer zone was extended to 14 km. The YPG/SDF agreed to evacuate the area and destroy all defensive positions. US and Turkish forces agreed to conduct joint patrol.[97]

A new crisis emerged when US forces were suddenly ordered to withdraw from NES on 6 October 2019. President Trump's decision was followed by a phone call to President Erdoğan, and also the commander of the SDF, Gen. Mazloum Kobani was informed about the decision. In the ensuing chaos Ankara ordered a limited incursion on a 100 km stretch between the towns of Tell Abyad and Ras Al-Ayn/Serakane. Like in the previous invasions, Operation Peace Spring included Turkish military forces and Syrian opposition groups under the umbrella "National Army", as well. On 15 October, a week after the beginning of the Turkish invasion, the PYD made a deal with the Syrian government. The Kurdish leadership had no other choice but to turn to Washington's foes to deter further Turkish incursion.[98] While Ankara had largely achieved its objectives by that time, there were fears of further expansion of the previously declared 100 km wide and 30 km deep safe zone. Russian and Syrian forces deployed to SDF-held regions on three axis, to Manbij, Tell Tamr and Qamishlo. By the end of October 2019 hopes of NES had been shattered, the PYD and its militia lost its rule in the core Kurdish populated Syrian areas as seen on Map 3. Although President Trump's decision on the full withdrawal was partly reversed, both his Secretary of Defense Jim Mattis and his Special Envoy for the Global Coalition to Counter ISIL, Brett McGurk resigned in protest.[99]

The third Turkish military invasion resulted in mass displacement again, according to estimations around 300,000 people left the area, and Turkish and allied forces again committed mass human rights violations.[100] What is even more worrying is the Turkish President's plan to change the ethnic makeup of northern Syria along the border with Turkey for so-called security reasons. According to Ankara's plan, around 1 million refugees would be settled into 140 villages in the 20-mile-deep area it controls in Northern Syria, in the framework of a reconstruction program requiring more than $26 billion in foreign assistance.[101] The implementation of the program, obviously leading to the ethnic reengineering of the region, has already started.[102]

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[97] Ant, O. "Turkey, U.S. Reach Agreement on Creating Buffer Zone in Syria". Bloomberg. 7 August 2017. https://www.bloomberg.com/news/articles/2019-08-07/turkey-s-akar-says-syria-talks-with-u-s-were-positive-anadolu, Accessed on 24 January 2020.

[98] Ibrahim, A. "Syria's Kurds forge 'costly deal' with al-Assad as US pulls out". *Al Jazeera,* 15 October 2019. https://www.aljazeera.com/news/2019/10/pullout-syria-kurds-costly-deal-assad-191015122222288.html, Accessed on 24 January 2020.

[99] Cooper, H. "Jim Mattis, Defense Secretary, Resigns in Rebuke of Trump's Worldview". The New York Times, 20 December 2018. https://www.nytimes.com/2018/12/20/us/politics/jim-mattis-defense-secretary-trump.html, Accessed on 24 January 2020.

[100] "Syria: Damning evidence of war crimes and other violations by Turkish forces and their allies". Amnesty International. 18 October 2019. https://www.amnesty.org/en/latest/news/2019/10/syria-damning-evidence-of-war-crimes-and-other-violations-by-turkish-forces-and-their-allies/, Accessed on 24 January 2020.

[101] Lynch, C. and Seligman, L. "Turkey Pitches Plan to Settle 1 Million Refugees in Northern Syria". *Foreign Policy,* 18 December 2019. https://foreignpolicy.com/2019/12/18/turkey-pitches-plan-settle-1-million-refugees-northern-syria-erdogan-kurds/, Accessed on 24 January 2020.

[102] "Turkey starts construction of refugee settlements in Syria, Erdoğan says". Ahval. 16 January 2020. https://ahvalnews.com/turkish-foreign-policy/turkey-starts-construction-refugee-settlements-syria-erdogan-says, Accessed on 24 January 2020.

VI. CONCLUSION – WHAT FUTURE FOR ROJAVA?

The Middle East, where due to geopolitics a region called Rojava, now officially Autonomous Administration of North and East Syria emerged after 2012, has long been an instable region. The Kurdish-based entity used the opportunity the withdrawal of the Syrian administration and military presented and brought into light its already working clandestine institutions. With the ongoing international war against ISIS in the following years, the importance of the Kurdish fighters rose offering them the possibility to build society based on ideas extremely different from every other in the region.

The PYD, the leading force behind the transformation of Syrian Kurdistan, has been following a distinct leftist political programme inherited from Abdullah Öçalan and his organization, the PKK. This political vision differs from how Arab Nationalism, Islamism and Zionism intend to build society. Although secularism and socialist ideas are well-known in the Middle East, the equality of women and the egalitarian nature of economy (the existence of cooperatives and communes) create a significant difference in comparison to the Muslim countries. Furthermore, the recognition of the multi-ethnic and multi-religious nature of society and the lack of a nationalist discourse separates Rojava from almost every country in the region, including Israel.

Politically, Rojava is not a plural democracy since governance is based on political exclusion; however, one of the core ideas is ethnic inclusion. Political exclusion ensures the required internal stability during the time of the fight against external threats, such as ISIS or Turkey, but after an eventual ceasefire it could impede the creation of a proper inclusive democracy, which Rojava has been trying to portray itself. Yet, the sustainability of a democratic Kurdish or at least multi-ethnic state in the Middle East is problematic in itself, should peace come without political pluralism, the Rojava experience could turn into a failure.

Geopolitics has traditionally been influencing the fate both of the Kurds and Rojava. Shifting geopolitical balance allowed the PYD to create its self-proclaimed autonomous region in 2012, and to increase its territory between 2012 and 2017, but it also resulted in significant throwbacks and a loss of territory in the past years. The Syrian Kurds have experienced bitter disappointments: both Russia and the US sacrificed Kurdish interests for their own geopolitical goals. The fall of ISIS resulted in a more determined Turkey stepping up against Rojava: since 2016, there have been three ground military operations resulting in significant decrease of the SDF-held territories and weakening their heartland. Nevertheless, Rojava's existence is still a necessity for the international community, which leads to a joint interest in not letting Turkey conquering the whole of the territory the PYD has, and to cooperation between the SDF and the US and Russia simultaneously, despite the latter two being opponents in Syria.

The ongoing Syrian conflict has reshaped the ethnic composition of Syria, yet the case of the Afrin region is particular: with settling Arabs there, the Turkish invaders intentionally decreased the share of the Kurds in a previously predominantly Kurdish, and especially PKK-supporting territory. This ethnic re-engineering might have far-reaching consequences, as it is hardly likely that Turkey will ever allow the recreation of the previous Kurdish stronghold there. Such an ethnic re-engineering might not be the case in the territories occupied in late 2019, where the majority was Arab even before the outbreak of the Civil War. Nevertheless, we cannot exclude that there will be more Turkish attacks against still SDF/YPG-controlled territories where similar problems could occur as in Afrin.

The future of Syria itself is obscure, and so is that of Rojava. It is certain that an independent Kurdish state might not break away from either one or more countries in the Middle East soon, if ever. Deepening cooperation between Rojava and the Syrian regime for a united Syria and for the least possible Turkish influence in it could be more viable. Such cooperation, with strong international pressure and appropriate guarantees for Turkey, eventually could lead to the withdrawal of the Turkish ground forces from Syria on the long run, which is a common interest of Damascus and the Autonomous Administration of North and East Syria. Yet, geopolitics and the actual stance of the Syrian Civil War make such a withdrawal-scenario currently highly unlikely. What is more probable is that Rojava gradually becomes more and more reliant on the Syrian regime, however, due to the existence of the US Army bases in the region and the inadequate resources the Syrian regime has, it will be able to maintain its separateness. International economic and military interests also make this scenario probable; however, as we have seen, shifts in geopolitics easily make the future unpredictable in the Middle East.

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ahr.com/en/?p=91846&__cf_chl_jschl_tk__=aa9ab11cd4d91686579f6808f708f17185d0f-2dc-1579954237-0-AdhCoes71czZcwpk6xLXNFRn5sboA_bSsFkTGv5h9g9N_PDMlN-zqp3q4ozEqzsCizMZNlgafqObApyVCiqkM1JHDzHtrw4Fo1xGhJYky5z3EjT2y_m-FHbcNjx-rcfQaGbxMilJtBfkH8E6ElulazZeDGF0j-5dc5HSq6jdxlnducfcNxC2jpQ1ybhjqPiHWcjI39KuL-MG1KwXRP7tHr-0XBrL0p40DAP2HCpAnfDv_DH9uo7dFK-KDgXfzvnSrpCNK6kcyzIm-KVnug2pENM4jGw, Accessed on 24 January 2020.

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THE RIVER NILE CONFLICT IN THE ASPECTS OF CRITICAL INFRASTRUCTURE PROTECTION

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ABSTRACT: *The aim of this paper is to present the River Nile conflict from the aspects of critical infrastructure protection. It is often stated that the next world war will be fought over water, and there are few regions as tense as the Nile Valley. Egypt and Ethiopia have a severe disagreement, Sudan is in the middle of it, and a big geopolitical shift is being played along the world's longest river. The Grand Renaissance Dam has been under construction on the Blue Nile River in Ethiopia. This dam will be the greatest hydroelectric power plant in Africa. This critical infrastructure has both political and military importance.*

KEYWORDS: *River Nile conflict, critical infrastructure, Grand Renaissance Dam*

INTRODUCTION

At the beginning of this review it is important to explain the definition of the critical infrastructures. Considering that critical infrastructures are a really complex issue, there are several definitions. In particular, the *Ethiopian Grand Renaissance Dam has both political and military importance.* The military aspect is explained by the NATO definition of critical infrastructure.

According to the NATO definition: "Critical Infrastructure is those facilities, services and information systems which are so vital to nations that their incapacity or destruction would have a debilitating impact on national security, national economy, public health and safety and the effective functioning of the government"[1]

The European Union's definition presents critical infrastructure mainly from political aspects:

According to the EU definition: "Critical infrastructures are those physical and information technology facilities, networks, services and assets which, if disrupted or destroyed, would have a serious impact on the health, safety, security or economic well-being of citizens or the effective functioning of governments in European Union (EU) countries"[2]

The above presented two definitions highlight the difference in the focus.

In short, critical infrastructures are:

- Energy installations and networks;
- Communications and information technology;

1 Khan, J. "Critical infrastructure protection within NATO". http://www.cipre-expo.com/wp-content/uploads/2014/02/khan-jahier-nato-cip-within-nato.pdf, Accessed on 30 Jul 2019.

2 "Communication from the Commission to the Council and the European Parliament: Critical Infrastructure Protection in the fight against terrorism: COM/2004/0702". European Union. 2004. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52004DC0702&from=en, Accessed on 30 July 2019.

- Finance (banking, securities, and investment);
- Health care;
- Food;
- Water (dams, storage, treatment, and networks);
- Transport (airports, ports, intermodal facilities, railway and mass transit networks, and traffic control systems);
- Production, storage and transport of dangerous goods (e.g., Chemical, biological, radiological and nuclear materials);
- Government (e.g., Critical services, facilities, information networks, assets, and key national sites and monuments).[3]

In this review, both military and political aspects are relevant in order to understand the sensitivity of the water sharing issue and the dispute between Ethiopia and Egypt.

RISK ELEMENTS IN CONNECTION WITH CRITICAL INFRASTRUCTURES

From the aspects of critical infrastructure protection, there are different elements that affect the security of critical infrastructures. These elements are:
- double dependency;
- special operating environment;
- location;
- domino effects;
- information security;
- IT security.

Double dependency: Critical infrastructures are complex systems, and there is a significant operating dependency between the various infrastructures; furthermore, there is a dependency between critical infrastructure and society, as well.

Another risk element is the *special operating environment* because the operating of a critical infrastructure itself is a high-risk activity.

The *location* of critical infrastructures is also an important factor because human activities (such as wars and armed conflicts) or natural disasters (like hurricanes and floods) also affect the operation and the safety of critical infrastructures.

There are other factors that threaten critical infrastructures, for example, the above-mentioned *domino effect*. In the proper sense, the domino effect is a chain reaction, because the operation of critical infrastructures consists of complex and depending systems. If one critical infrastructure has any error, it could lead to a breakdown in other infrastructures, too.

Nowadays, *information security* and *IT security* are essential with regard to critical infrastructure protection. There is some vital and sensitive information that is cardinal in connection with safe operation. In our days, IT security is as important as physical security. In the 21st century, a cyberattack could also be as destructive and dangerous as a physical one.

[3] "Communication from the Commission to the Council and the European Parliament: Critical Infrastructure Protection in the fight against terrorism: COM/2004/0702".

In short, safety and security comprise evidently one of the most significant factors in the operation of critical infrastructures.[4]

A HISTORICAL EXAMPLE

Throughout history, it has occurred several times that an enemy attacked the critical infrastructure of another enemy or group in order to cause serious damage. Various cyber and physical attacks and sabotage actions have been carried out against diverse critical infrastructures. The results of these kinds of attacks are malfunction and damage; besides, they cause panic and fear in societies, especially in the affected territories, and critical infrastructures could be targets not only of state actors but also of terrorists.

In the 20th century, this kind of attack was relatively well documented. It is important to highlight the attacks against dams.

One of the most significant attacks happened during the Second World War. In Operation "Chastise" during the night of 16-17 May 1943, the British Royal Air Force destroyed three dams in the Ruhr valley, the territory of which was the heartland of the German industry.

The Ruhr valley had significant relevance in the German war industry. On the one hand, the water in the reservoir used to generate electricity, and on the other hand, it played a crucial role in the German war industry. The British Royal Air Force developed a special "bouncing" bomb for this purpose, which was able to destroy the dams. The British Royal Air Force targeted three dams, namely the Möhne, Eder, and Sorpe dams. The dams were burst, and it caused catastrophic floods in the Ruhr valley, and several villages were destroyed. Around 1,600 civilians lost their lives as a result of the attack on the dams.[5]

THE IMPORTANCE OF HYDROELECTRIC POWER PLANTS FOR ETHIOPIA

For Ethiopia, the hydroelectric power plant is of paramount importance. The country's population is currently around 107 million people, which increases by 2.3% per year.[6]

The country is one of Africa's fastest-growing economies.[7]

In order to maintain its economic performance, the country's energy demand is increasing. As a result of the economic growth, between 2002 and 2006 electricity demand increased by 13% annually, while today it increases by approx. 20%.[8]

In order to cover this level of demand/growth, investments, such as the Grand Renaissance Dam are needed. The determination is shown by the fact that the dam is planned to

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4 Bonnyai T. "A kritikus infrastruktúra védelem elemzése a lakosságfelkészítés tükrében". PhD thesis. Budapest: National University of Public Service, 2014. 22-25

5 Mason A. "The incredible story of the dambusters raid". Imperial War Museums. 5 Jan 2018. https://www.iwm.org.uk/history/the-incredible-story-of-the-dambusters-raid, Accessed on 30 Jul 2019.

6 "Ethiopia population". Worldometers. http://www.worldometers.info/world-population/ethiopia-population/. Accessed on 30 Jul 2019.

7 Monteiro A. and Thukwana, N. "IMF sees Ethiopia beating Ghana as fastest-growing Africa economy". Bloomberg. 17 Apr 2018. https://www.bloomberg.com/news/articles/2018-04-17/ethiopia-pips-ghana-as-africa-s-fastest-growing-economy-for-imf, Accessed on 30 Jul 2019.

8 Mondal H. A. et al. "Ethiopian energy status and demand scenarios: prospects to improve energy efficiency and mitigate GHG emissions". *Energy* 149. 2018. 161-172. DOI:10.1016/j.energy.2018.02.067

cost $ 4.7 billion, which is entirely financed from the country's own budget. The size of the investment is illustrated by the fact that 8,500 workers constantly work on the construction.

The Grand Renaissance Dam is not the only hydroelectric investment in Ethiopia. Parallel to its construction, Gibe III (1870 MW) and Genela Dawa III (254 MW) dams are also being built, all of which remain below the Grand Renaissance Dam in size and output of power.

According to the official Ethiopian position, the construction of the dam provides highly mutually beneficial cooperation with the Nile countries, as this development can reduce the East African region's energy shortage, among others, and beyond cooperation in the field of electricity, further economic cooperation will form in the region.

Ethiopia will export electricity to Kenya, reducing Kenya's energy needs and reducing the environmental pollution. Under the current agreements, Ethiopia will export to Kenya, Sudan, and Djibouti. The infrastructure needed for this is being built parallel with the construction of the dam.

EGYPT'S CONCERN OVER RIVER NILE

The main source of the conflict is the Nile itself. The Nile is the longest river in the world (6,700km) and crosses the East African region. One source is the Blue Nile, which originates from the Ethiopian Highlands, and this source branch has more significant water supply. The other source is the White Nile, which originates from the Central African region, including Rwanda. The two rivers meet in Sudan, near Khartoum, and continue their journey through Egypt to the Mediterranean Sea.[9]

There are 11 countries on the Nile: Burundi, South Sudan, Eritrea, Ethiopia, Kenya, Democratic Republic of Congo, Rwanda, Sudan, Tanzania, and Uganda.

However, the construction of the Grand Renaissance Dam is not so beneficial for all those concerned. Egypt has been firmly protesting against the construction of the dam for years. According to the Egyptian viewpoint, the Grand Renaissance Dam could significantly reduce the Nile's runoff and, as a result, even the existence of Egypt could be endangered.

It can also be seen from the above that while the runoff of the Nile is decreasing, the number of inhabitants constantly increases, so the river runoff, among other things, is a key issue. All experts agree that with the building of the dam, the Nile's runoff will be reduced, and less water will reach Egypt.

The reason for this is that the massive reservoir behind the dam has to be filled with a volume of 74 cubic kilometers and to fill this vast area, the Nile will be partially deflected, so it is expected that the water flow will drop in Sudan and Egypt.[10]

At the same time, if the reservoir is fully filled, it will not be able to return to its original, natural state, because through this huge water surface natural evaporation will drastically increase.

The problem is both historical and contemporary.

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[9] "Nile River". In *Encyclopedia Britannica*. https://www.britannica.com/place/nile-river, Accessed on 3 Aug 2019.

[10] Molnár, Cs. "A Nagy Reneszánsz Gát". https://molnarcsaba.wordpress.com/2018/03/22/a-nagy-reneszansz-gat/, Accessed on 3 Aug 2019.

The historical reasons – very often in Africa – can be traced back to colonialism. The first agreement on the Nile was born in 1929 between Great Britain and Egypt. As part of the agreement, Egypt in fact has a veto on all matters concerning the Nile.

The basis for this authorization is that the Nile is the only source of fresh water in Egypt. Virtually there is no other freshwater source in Egypt. Referring to this, the Egyptian party in the current conflict voices that the Nile, for Egypt, is a vital issue.

The second agreement was signed in 1959, which already determined the amount of water that can be used by the countries concerned. According to the agreement Egypt is entitled to 55 billion cubic meters of average annual use out of the 84 billion cubic meters of the Nile. Sudan is entitled to 18.5 billion cubic meters, so basically, the rest of the countries almost barely receive from the Nile.[11]

In fact, in the agreements, all the other affected East African countries were ignored entirely, so in simple terms, the source of the conflict is the unfair distribution of the Nile's water. Egypt's reference is based on the two previous treaties which are not accepted by the other countries, as they have been wholly excluded from the negotiations and the agreement.

The other source of the problem, which today is a growing challenge on the whole African continent, is global warming, which can be observed as a result of global climate change.

The result of warming is drought and the lack of rainfall; the flow of rivers and lakes is continuously decreasing. It is expected that the Nile's runoff will also decrease.

In addition to climate change, another significant problem is overpopulation. Egypt's population is currently around 99 million people,[12] Sudan has a population of 41 million,[13] Ethiopia's population is around 107 million[14]. The total population of 247 million will be around 316 million by 2030.[15]

THE ETHIOPIAN GRAND RENAISSANCE DAM

Since 2011 "The Grand Renaissance Dam" has been built in Ethiopia on the Blue Nile in the Benishangul Gumaz region, which is approx. 600 km northwest of Addis Ababa, the capital of Ethiopia, and 40 km from the Sudanese border. It is planned that the dam will be the largest hydropower plant in Africa when it is completed. It will be the 7th largest one in the world. The dam will be 1,800 meters long and 145 meters high. The power plant is expected to be able to generate 6,000 MW of electricity. By comparison, the Hungarian Nuclear Power Plant is only capable of generating one-third of this.[16]

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11 Crabités, P. "The Nile Waters Agreement". *Foreign Affairs* 8/1. 1929. 145-149. DOI:10.2307/20028752

12 "Egypt population". Worldometers. http://www.worldometers.info/world-population/egypt-population/, Accessed on 7 Aug 2019.

13 "Sudan population". Worldometers. http://www.worldometers.info/world-population/sudan-population/ Accessed on 7 Aug 2019.

14 "Ethiopia population". Worldometers. http://www.worldometers.info/world-population/ethiopia-population/. Accessed on 30 Jul 2019.

15 "Ethiopia 2030". Populationpyramid.net. https://www.populationpyramid.net/ethiopia/2030/, Accessed on 7 Aug 2019.

16 Havasi, Zs. "Enyhültek a kedélyek a történelmi beruházás körül". *Magyar Nemzet Online,* 13 Mar 2015. Https://mno.hu/kulfold/enyhultek-a-kedelyek-a-tortenelmi-beruhazas-korul-1276918, Accessed on 7 Aug 2019.

Figure 1 *Map of North Africa and the place of the Grand Ethiopian Renaissance Dam*[17]

The tension between Egypt and Ethiopia began in 2010; the worst point was in 2011 when the parties began to threaten each other more openly through their various diplomatic channels and the international media. Based on the information leaked by Wikileaks, nowadays, it is evident that beyond the diplomatic missions, the Egyptians also counted on a military operation against the dam that was built.[18]

Egyptians have planned three possible scenarios:
• Airstrike
• Special Operations Forces attack on the ground
• Sabotage action carried out by supported rebels

1. According to security and military experts, Egypt would not be able to carry out airstrikes against the dam. On the one hand, according to open source information, the Egyptian Air Force does not have bombers with sufficient range to be able to fly to Ethiopia without landing and to drop bombs there. Another danger of the Dam's bombing is that just like in the Second World War, when the English Air Force hit the Ruhr rural dams, it would probably result in many civilian casualties, and in addition to the diplomatic consequences, the public would also sound their opinion against them, and it could lead to political or economic isolation. Another barrier to the airstrikes is the air defense of the dam. Given that the dam under construction is a critical infrastructure that is currently the most significant

[17] Mules, I. "Ethiopia, Egypt, Sudan make slow progress in Nile dam row". *Deutsche Welle*. https://www.dw.com/en/ethiopia-egypt-sudan-make-slow-progress-in-nile-dam-row/a-52015611, Accessed on 7 Aug 2019.

[18] Kelley, B. M. and Johnson, R. "Stratfor: Egypt is prepared to bomb all of Ethiopa's Nile dams." *Business Insider*, 13 Oct 2012. http://www.businessinsider.com/hacked-stratfor-emails-egypt-could-take-military-action-to-protect-its-stake-in-the-nile-2012-10?international=true&r=us&ir=t, Accessed on 17 Aug 2019.

investment in Ethiopia, significant military forces have been deployed to protect it, including a considerable amount of air defense.

2. There are also many obstacles to land-based attacks by Special Operations Forces. On the one hand, just like in the case of an airstrike, there is too much distance between the two countries, and therefore it is a severe problem to get to the operation area. The other major challenge for the commando action is that dams and their surroundings in other parts of the world are protected by well-trained forces specialized in critical infrastructure protection. Therefore, blowing up a dam in action carried out by a special unit would be very difficult or even impossible.[19]

3. A sabotage action carried out by supported rebels as an opportunity to prevent the construction of the dam is also a possibility. A secret service operation has more realistic chances than a military action. There was some "classified" information in the reports leaked by Wikileaks that a senior Egyptian politician told an American diplomat that Ethiopia had tried to build a dam as early as 1976, but then the Egyptians blasted the ship carrying the necessary equipment to Ethiopia at sea.[20]

At the moment the realistic threat of a war between the two countries has ceased, and several political talks have begun to resolve the conflict, but for the time being there is no meaningful, concrete agreement on water sharing, in the narrow sense, in relation to the Grand Renaissance Dam.

In March 2017, gunmen attacked the dam with handguns and grenade launchers in the Nile. According to the Ethiopian authorities it was a sabotage action, and the Benisangul People's Liberation Movement, which enjoys the support of Eritrea, was responsible for it. In the attack, 13 attackers lost their lives, and 7 attackers were captured.[21]

The River Nile tension between Egypt and Ethiopia is not only a local issue. It could have international consequences that could affect the Hungarian Defence Forces as well.

There are two possible scenarios for the the Hungarian Defence Forces.

The first scenario is that in the case of a war between Ethiopia and Egypt, the international community and organizations such as North Atlantic Treaty Organization (NATO) or European Union (EU) would deploy Hungarian military and police personnel in various international missions.

The second scenario is that, the "water war" could generate a large number of displaced persons who would try to migrate to the territory of the European Union. The Hungarian Defence Forces would have a task in the protection of the Hungarian border.

CONCLUSION

To sum up, the Grand Renaissance Dam, which is being built on the Blue Nile in Ethiopia, is a critical infrastructure that has not only security but also political and economic significance. In the case of the Grand Renaissance Dam, the main and most realistic threat factor is *"Acts of malicious intent, which are acts of intentional harm that may have a psychological*

[19] "Egypt's limited military options to stop an ethiopian dam project." STRATFOR. 10 Jun 2013. https://worldview.stratfor.com/article/egypts-limited-military-options-stop-ethiopian-dam-project, Accessed on 17 Aug 2019.

[20] Kelley and Johnson. "Stratfor: Egypt is prepared to bomb all of Ethiopa's Nile dams."

[21] Király A. "Lázadók támadtak az épülő Nílus-gátra Etiópiában". https://444.hu/2017/03/02/lazadok-tamadtak-az-epulo-nilus-gatra-etiopiaban, Accessed on 17 Aug 2019.

effect on the harm caused, especially on the companionship."[22] In this particular case, I would also mention the political, military, and economic significance of this.

As shown above, the Grand Renaissance Dam is of paramount importance to the entire East African region. There is a conflict between different interests in this issue. On the one hand, Egypt refers to the previous treaties and, in its view, still has a veto over the investments planned on the Nile, and just like in the past, it will protect every drop of the Nile's water. In contrast, in Ethiopia and Kenya, there is a very significant lack of electricity that is in the process of further development. In my opinion, if the dam is built and the reservoir starts to fill up, then the conflict will flare up again as Egypt will face a decrease in the water level and water flow of the Nile, which will also affect the agriculture, along with drinking water supply, shipping, and other factors. Besides, on the one hand, the flooding of the river will lead to a change in previous agricultural areas and on the other hand, the water supply for irrigation will decrease, which will also reduce the average yield.

The current tensions can only be solved by negotiations, and international cooperation is needed. On the one hand, if the amount of crop in Egypt is reduced, it will have to be replaced from outside sources, with imports, and on the other hand, Ethiopia will have to do everything in the future to reduce the Nile's water supply and, as far as it is struggling with energy shortages, to look for other alternatives. As a result of water management on the one hand, and climate change on the other, the role of water will be appreciated, and it will lead to further conflicts in the future.

The Grand Renaissance Dam is an excellent example of the military and political importance of critical infrastructure protection (including cyber defense), along with the importance of 'traditional' operations'.

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HDR 2020, Nr. 1, 50–55.

Matúš Ivančo – Romana Erdélyiová – Lucia Figuli – Zuzana Zvaková

ANALYSIS OF SELECTED ASSETS AGAINST THE EXTRAORDINARY LOADS

DOI: 10.35926/HDR.2020.1.4

ABSTRACT: *The current security situation in the world creates pressure to improve the protection of critical infrastructure assets against negative events, such as bomb attacks, industrial accidents, explosions, or fire. The research at the Faculty of Security Engineering is focusing on such extraordinary loads. The present paper analyses selected assets against extraordinary load and describes their experimental testing.*[1]

KEYWORDS: *critical infrastructure protection, extraordinary loads, explosion, fire*

INTRODUCTION

The Faculty of Security Engineering, University of Žilina, prepares security engineering experts in courses Security sciences: Crisis management, Security management, Rescue services and Protection of critical infrastructure; as well as in a new study programme Security of Industry. Crisis management focuses on developing theory and practice of crisis management in public administration, risk management in business environment, solution of crisis phenomena, and investigating their economic, social, psychological and other background. Security Management concentrates on the protection of people and property. The scientific research in the area of rescue services focuses on the organization and technology of fire safety, fire engineering, fire safety and fire prevention in technological processes and fire-fighting technology.

The research conducted at the faculty is based on the area of study courses. The common character is security and safety. The Faculty tried to cover the issue of security with interdisciplinary approach focusing on the prevention, repression, and effective solving of security problems and crisis phenomena. With knowledge in methods of crisis management such personnel are able to identify, analyse and assess risks in various types of environment, and to manage preventive activities and adequate response. The Faculty of Security Engineering educates crisis managers, rescue service workers, and experts in managing the processes of protection of persons and property. The scientific research focuses on the development of the theory and practice of security and protection of critical infrastructure, especially in the sectors of energy and transport.

[1] This paper was supported by institutional grant project UNIZA I-19-028-18

EXTRAORDINARY LOADS

All types of threats to critical infrastructure elements, which can cause their failure or damage, could be considered as extreme loads. If the structure has to be safe and functional, it has to resist to external loads. The actions can be classified in accordance with various criteria. In accordance with the standard valid for the design of structures in Europe (Eurocode 1), actions (loads), by the variation in time are divided into different classes.[2] Permanent action (G) that is likely to act through a given reference period and for which the variation in magnitude with time is negligible (e.g. self-weight of structures, fixed equipment etc.); variable action (Q), variable in the time as imposed loads on building floors, beams and roofs, wind action or snow loads. And the third group is that of accidental actions (A), extraordinary loads of short duration, that are unlikely to occur with a significant magnitude on a given structure during its lifespan, but their consequences might be catastrophic.[3] Such actions are earthquakes, fires, explosions or impacts (see Figure 1).

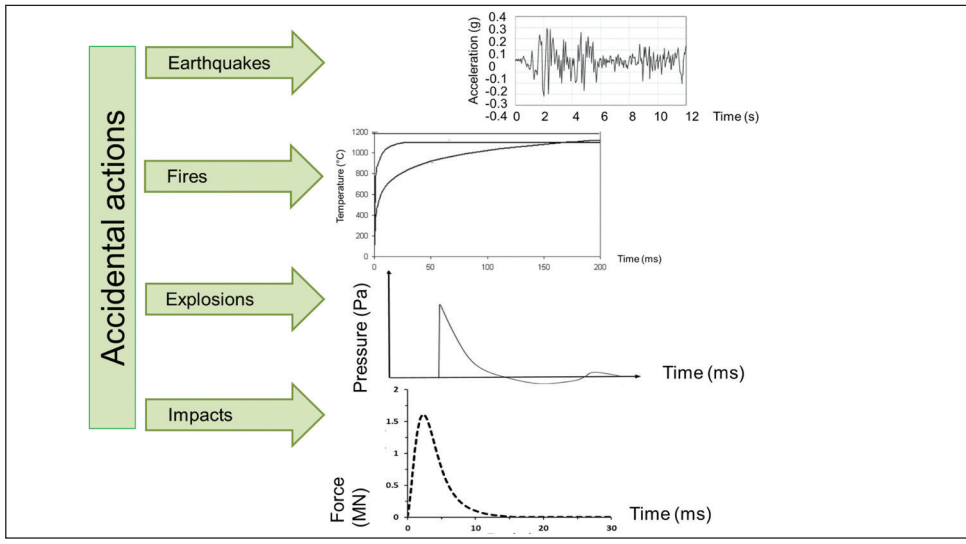

Figure 1 *Accidental actions*

EXPERIMENTAL TESTING

At the Faculty of Security Engineering various experimental tests were conducted to analyse the resistance of selected assets, as parts of critical infrastructure elements, on extraordinary loads. As such elements various structural elements were used.

2 Gulvanessian, H. and Holický, M. *Designers' Handbook to Eurocode 1: Basis of design*. London: Telford, 1996.; Figuli, L. "Reliability of critical infrastructure elements". *Bánki Közlemények* 1/2. 2018. 33-37.

3 Arteaga, A. "Classification of actions". In *Handbook 1: Basis of structural design: guide to interpretative documents for essential requirements to EN 1990 and to application and use of Eurocodes.* Garston Watford, 2004. 75-86.

Burglar resistance

The first experiment was focused on the determination of the dynamic resistance known as burglar resistance, i.e. the ability to withstand violent intrusion in protected rooms or areas following the application of physical force and with the aid of tools (6 different group of tools according to the security classes). As an examined asset glass windows were selected.[4] The windows were fixed in the testing frame. Commercially used window systems were investigated during the experiment. Particular attention was paid to the sensitivity of the type and properties of the support frame to the impact. The nominal glass thickness was 3 mm for wooden samples and 4 mm for samples with PVC frames. In terms of glass size, dimensions are defined by the overall size of the window samples and frames used. The glass surface of the wooden frame windows was 1.22 x 1.05 m and 0.81 x 0.97 m of the PVC frame windows. The mounting of the wooden frame window in the test structure is shown in the following Figure 2.

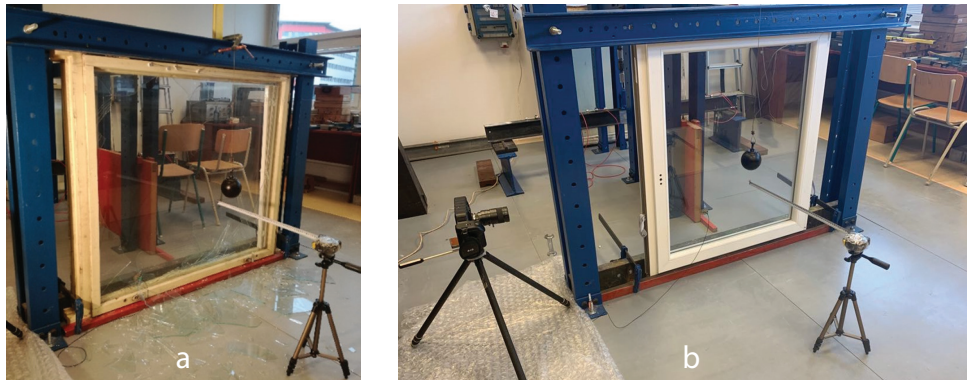

Figure *2 Arrangement of the sample and the measuring instruments (a) wooden frame (b) PVC frame*

During the experiment, 3 windows with a wooden frame and 1 with a PVC frame were used (see Figure 2). Various sizes of steel ball (2.644 kg and 4.571 kg) were used in the test, which were gradually released from pre-determined distances. Each measurement was recorded with a high-speed camera and an accelerometer sensor. Individual drop heights were increased until the glass panel was damaged. Subsequently, the total impact energy values were evaluated.

The second round of testing of burglar resistance involved various barriers and parts of protection systems (safes, reinforced walls etc.), see Figure 3.

[4] Figuli, L. et al. "Experimental investigation on the ball drop impact resistance of traditional glass windows". In Gattuli, V., Bursi, O and Zonta, D. (eds.) *ANCRiSST 2019 Procedia, 14th International Workshop on Advanced Smart Materials and Smart Structures Technology*. Roma: Sapienza Università Editrice, 2019. 123-126.

Figure 3 *Testing of burglar resistance*[5]

Blast resistance

The field tests were focusing on the measurement of overpressure and its influence on steel beams. POLONIT was used as the explosive. The weight of charges selected: 2.3 kg (pipe bomb), 4.5 kg (explosive belt) and 9 kg (bomb vest – it was not detonated because of a high overpressure of the 4.5 kg explosive charge which caused a damage to the steel beam structure). The explosive charges were used together with 25 g of ignition explosive PLNp10. The sensors were placed at the height of 1.6 m, at the angle of 45° from the normal line in the distances 2 m, 5 m, and 10 m from the source of the explosion (see figure 3). One of the sensors was orientated in parallel with the steel beams in the distance of 5.5 m opposite of a gabion wall and in the distance of 3 m from the source of explosion (we wanted to record the reflected blast wave). The explosive charges were placed at a wooden base at the height of 10 m. The structure consisted of a steel frame and four wide flange steel HEB 100 beams and 12 IPE 120 steel beams with a span of 1,770 mm. For convenience the beams were tested in the vertical positions and simply supported. They were loaded mainly to bending caused by the blast pressure as the axial stress due to the fact that self-weight was practically negligible.[6]

[5] Boros, M. "Vplyv deštruktívnych prostriedkov na zisťovanie prielomovej odolnosti rôznych mechanických zábranných prostriedkov". Thesis. University of Žilina, 2016.

[6] Figuli, L. and Papan, D. "Single degree of freedom analysis of steel beams under blast loading". *Applied mechanics and materials* 617. 2014. 92-95. DOI:10.4028/www.scientific.net/AMM.617.92

Figure 4 *Field tests – blast resistance*

During the blast test pressure, strain and acceleration were measured. The measured parameters were compared with the analytical and numerical model. The behaviour of such blast loaded structures were described. Other tests were made by Štoller, J. and Zezulová, E.[7]

Fire resistance

The last area of testing and numerical simulation to describe the resistance of various elements was the research against the effect of fire. Fire resistance and loss of stability of selected structural elements were done. The elements were concrete elements with various area sections. Concrete beams with encased steel profiles (see Figure 4.)

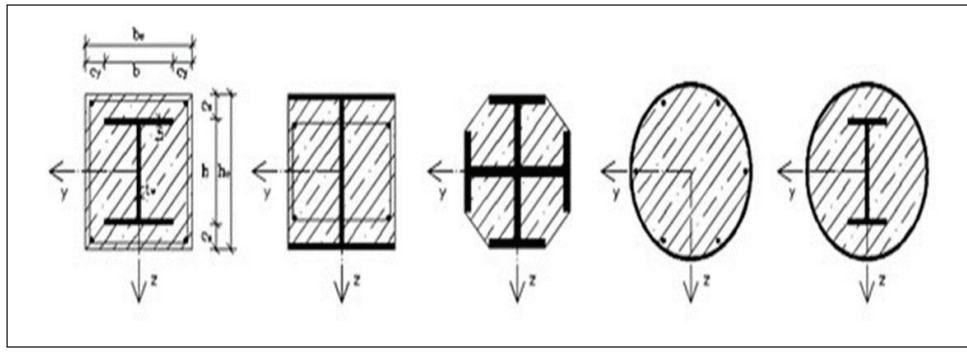

Figure 5 *Cross section of elements for fire resistance analyses*

As we have already mentioned temperature distribution in a circular cross-section were examined. The elements were exposed to fire for the duration of 120 min. Numerical simulation was done using finite element methods in ANSYS (see Figure 6).

7 Štoller, J. and Zezulová, E. "The Application of Fibre Reinforced Concrete for Protective Shelter from Auxiliary Material". *Key Engineering Materials* 755. 2017. 374-381. DOI:10.4028/www.scientific.net/KEM.755.374; Štoller, J. and Zezulová, E. "Field Tests of Cementitious Materials Suitable for Force Protection and Critical Infrastructure Protection". In *2019 International Conference on Military Technologies (ICMT),* Brno: IEEE, 2019. 1-8. DOI:10.1109/MILTECHS.2019.8870067

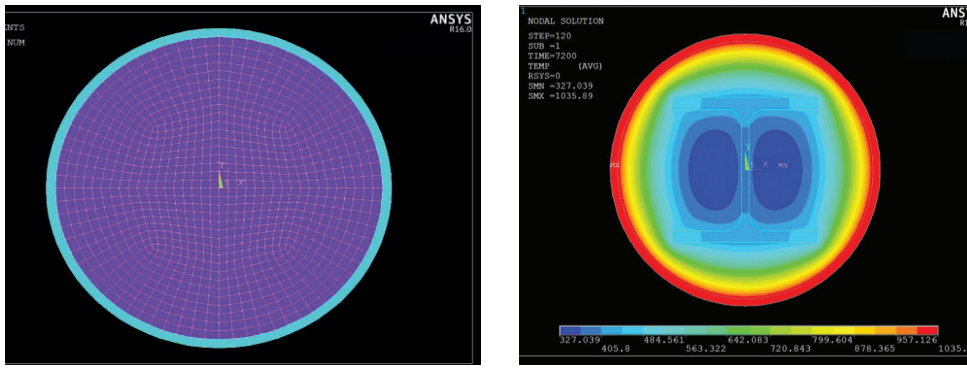

Figure 6 *Numerical simulation of temperature distribution by ANSYS finite element method*

CONCLUSIONS

In order to predict the disruption of and damage to critical infrastructure elements it is important to take into account the structural resistance of such elements. A structural-reliability analysis of so called accidental actions is required. For structural-reliability analysis maximum load arising from the treat scenarios has to be set, and geometric and mechanical characteristics of the critical infrastructure element have to be known. The paper describes such treats in the form of extraordinary loads and the various tests conducted at the Faculty of Security Engineering.

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Štoller, J. and Zezulová, E. "Field Tests of Cementitious Materials Suitable for Force Protection and Critical Infrastructure Protection". In *2019 International Conference on Military Technologies (ICMT),* Brno: IEEE, 2019. 1-8. DOI:10.1109/MILTECHS.2019.8870067

HDR 2020, Nr. 1, 56–68.

Lt Col András Füleky

SOME INTERRELATIONS AMONG MARTIAL ARTS, PERSONALITY DEVELOPMENT, AND MILITARY CAREER

DOI: 10.35926/HDR.2020.1.5

ABSTRACT: *In my study, I attempt to present a diverse set of requirements through which a valuable person may be characterized for a professional army in the long term, with the use of a scientific description of the concept of human talent.*
In the second half of the article, I explain in detail the personality-, character- and ability-shaping effects of martial arts. Following the psychosocial development process introduced by Erikson I analyse the specific life-course model provided by Japanese martial arts, which focuses on the lifelong exercise of budō.

KEYWORDS: *budō, talent, self-development, Erikson's model of military career*

INTRODUCTION

The current efficiency of socialization for military career is the key to the future of quality armies. In addition to providing military technology meeting modern requirements in order to defend the country and conduct other missions regulated by law, the opportunity to learn modern combat procedures is also provided, and the necessary financial resources in proportion to the country's financial capacity are allocated. However, all this is useless if the personnel operating the entire system is suitable for the determined mission only in a limited way.

In my paper I present, along with the principles of human talent, a diverse set of requirements characterising a person valuable for a professional army in the long run. I present the personality-, character-, and ability-shaping effects of martial arts. Finally, I outline a model career that focuses on the lifelong exercise of Japanese martial arts, *budō*[1].

THE TALENTED PERSON

According to the Collins English Dictionary, talent: "is the natural ability to do something well."[2] Talent is usually interpreted as a specific set of special qualities necessary for a given activity, that is, many favourable conditions for the successful implementation of an activity, which makes a person faster as an average one trying to do the same.

[1] *budō* – a collective word for Japanese martial arts. In the transliteration of Japanese words, the internationally accepted Hepburn-methodology is applied, with the base written in italics. Some Japanese words have already become international therefore they are not highlighted specifically.

[2] "Collins English Dictionary". https://www.collinsdictionary.com/dictionary/english/talent, Accessed on 13 February 2020.

According to Báthory and Falus (1997)[3], talent is a characteristic feature of an individual to create valuable achievements in an area of life. Factors contributing to talent include high levels of intelligence, specific orientation in the given activity, and the intensity of action (interest, perseverance). According to the interpretation of Gabler–Ruoff (1979)[4] a person is talented if they have physical and psychical attributes and conditions which forecast a high-level performance in the chosen activity with greater probability than incidental cases. In the field of acquiring knowledge, information processing, or problem solving a talent has inherited features, hereditary and learned features, influenced both by cultural and environmental factors. This means that talent is a totality of a large number of factors.

Research in talent is a very important field of science for raising future generations. It is obvious that not all of the mentally and physically healthy children are able to give high quality performance in art, sciences, human studies, or sports. The successful long-term development of a country is based on the effectiveness of its current educational system, and on the proper orientation of children and young people there.

The specific intelligence that is important for successful military career has not been studied very frequently so far, and to my knowledge, the specific interpretation of talent for particular military fields is also rarely researched in this aspect. Intelligence as a problem-solving ability consists of several sub-areas. These parts work independently in the brain in accordance with their own rules. It is a well-known fact that certain intelligence factors are not equally present in all persons but are existent differently.

Grouping of talent based on Gardner's (1983)[5] theory:

- Linguistic intelligence: this affects the understanding of a written and spoken language, the ability to learn languages, and is also used for achieving certain objectives;
- Logical and mathematical intelligence: the ability to solve problems logically, apply calculations and perform scientific tasks;
- Musical intelligence: it enables the creation, recognition, and presentation of musical patterns;
- Physical and kinaesthetic intelligence: it provides an opportunity to solve problems with body and body parts. It makes one use their mental abilities to coordinate physical movements. It is closely connected to mental and physical abilities;
- Spatial intelligence: it allows the use of the patterns of broader and narrower space;
- Social Intelligence:
  – Interpersonal Intelligence;
  – intrapersonal intelligence.

[3] Báthory Z. and Falus I. *Pedagógiai Lexikon.* Budapest: Keraban Könyvkiadó. 1997. 34-36.

[4] Gabler, H. and Ruoff, B. A. "Zum Problem der Talentbestimmung im Sport". *Sportwissenschaft* 9/2. 1979. 164-180.

[5] Gömöry K. "Az iskolai tehetségfejlesztés pszichológiai háttértényezőinek vizsgálata felső tagozatos korban". PhD Értekezés. Debreceni Egyetem BTK, 2010. 68.

The 2 × 4 + 1 Factor Talent Model by dr. Endre Czeizel[6], illustrates the complex system that can define a talent. According to these factors, the following ones are considered basic principles:
- special mental capabilities;
- general intellectual capabilities;
- creativity;
- motivational capabilities.

These basic capabilities can be influenced by the following system:
- families;
- school;
- peer groups;
- society.

There is also a so-called fate factor that allows or prevents potential capabilities from becoming a real talent. It can be of biological nature, social character, or self-destructive fate. It can be stated that it is family which is primarily responsible for the first steps in the development of childhood capabilities, and it is often family that does not recognize a child's capabilities or has no opportunity to develop it. Consequently, an outstanding capability is lost.

According to Gagné's differentiated capability and talent model[7], a person with different capabilities to develop talent needs development (learning, training, practice), which is primarily determined by intrapersonal and environmental factors.

Initial capabilities (areas of aptitude):
- Intellectual: high problem sensitivity, attention capability, information processing speed, selective encoding, memory capture, memory, inductive/deductive conclusion, association, mother tongue culture (speech ability, way of communication, specific terminology, metacommunication, global intellect);
- Creative: originality, ingenuity, sense of humour;
- Social sensitivity: leadership ability, tact, empathy, self-awareness;
- Motor: strength, coordination, endurance, flexibility;
- Other: sensual perception, healing.

Intrapersonal Factors:
- Physical: complexion, stamina, and general health;
- Psychic: cognitive/affective abilities, habit-based implementation stereotypes;
- Motivation: needs, values, interest;
- Will: concentration, endurance;
- Personality: temperament, character traits, disorders.

Environmental factors:
- Environment: physical, social, micro / macro level;
- Person: parents, teachers, contemporaries, mentors;

6 Balogh L. "A tehetséggondozás elvi alapjai és gyakorlati aspektusai". Pedagógiai Műhely 34/4. 2009. 5-20. Gömöry. "Az iskolai tehetségfejlesztés pszichológiai háttértényezőinek vizsgálata felső tagozatos korban". 22-23.

7 Balogh L. *Pedagógiai pszichológia az iskolai gyakorlatban*. Budapest: Urbis Könyvkiadó, 2006. 119.

- Obligation: activities, training courses, programs;
- Events: encounters, decisions, coincidences.

Fields of talent operations differing by age:
- Sciences: language, different disciplines;
- Strategic/logic games: go, chess, simulators;
- Technology: mechanics, information technology;
- Art: visual, drama, music;
- Social activities: education, school, politics;
- Business: enterprises, trade knowledge, legal and economic knowledge.

The countries of the developed world meet increasingly frequently the lack of qualitative and quantitative human resources during the modernisation of various fields of state responsibilities, including national defence. This problem is coupled by the extremely high training costs of the crews and detachments of cutting edge military technology. This is the factor that necessitated the research enabling the identification of specific suitability, which may increase the success ratio.

In the light of the above aspects in the course of military career orientation and selection, the capabilities to be tested suggested by colleagues and personal experience:
- General level of knowledge: broad perception, convergent and logical thinking, analysing and synthesizing thinking, memory;
- Specific level of knowledge: skills;
- Divergent thinking (creativity): problem sensitivity, fluency, flexibility, originality, imagination, elaboration;
- Motivational forces: thirst for knowledge, interest in the new, playfulness, self-realization, communication, sense of duty, control demand, instrumental use, creativity;
- Commitment to the task: perseverance, concentration, subject/topic-result, dedication, relaxation;
- Insecurity tolerance: risk taking, nonconformism, openness to experiences, adaptation and resilience, sense of humour.[8]

THE EFFECT OF MARTIAL ARTS ON SHAPING PERSONALITY

Budō is a Japanese word, a concept which means following the warrior's tradition from the reality of daily life and death, consequently through the culture of movement. It regards the development of personality as its main goal. In terms of martial arts, *budō* expresses all the intellectual and practical heritage that originate in the medieval and Edo-period Japan. The theories matured in medieval Japanese *budō*s, which laid the fundaments of *denshō*s (martial arts dissertations), proved their values in the real struggles of history, and their results and experience can be directly applied to other, similar practical methodologies. This is also

[8] Révész L. "Az élsport alapjai". College of Physical Education. https://docplayer.hu/1202861-Dr-revesz-laszlo-testneveles-elmelet-es-pedagogia-tanszek-foepulet-ii-80-revesz-mail-hupe-hu-az-elsport-alapjai.html, Accessed on 13 February 2020.

the reason why Japanese martial arts are so unique and became widespread throughout the world.[9]

Nowadays, *budō* is widespread not only in Hungary, but throughout Europe, however, the cultural, historical, ideological background and contexts behind its nature of competitive sport have remained undisclosed so far. This area of Japanese culture, also called *budō* culture, has a rather low amount of authentic international – primarily English-language – literature, and only one or two books available in Hungarian. The contents of Japanese-language martial arts dissertations, their philosophy, morality, the psychological aspects of religion, and the mediated patterns of behaviour, are of great importance and value to the people of the modern age as well.

The question arises as to what the defensive character of martial arts can give to members of combat units in an activity that basically uses aggressive, offensive tools and methods. I will try to answer this below, but pre-highlighting the most important elements: *budō* helps with self-control, discipline, and position recognition.

It can be stated that a human personality is subject to permanent change and development. Certain personality traits develop before birth. However, this does not mean that people come to the world with ready-made interest, abilities, and characters. These qualities therefore constantly change during an individual's life and activities. At the same time, everybody has had a certain nervous system structure since birth, concerning the brain structure in particular: a determined strength of the nervous system, its balance, and the mobility of the basic neural processes (excitement and inhibition). This is the basis of which the development of a person's psychic qualities will take place, including the formation of the totality of individual peculiarities and abilities. Further development of human abilities, temperament and character depend on these qualities. However, the evolution of these characteristics is not determined fatalistically, it is not the only basic condition on which an individual's personality depends. Among the capabilities, it is the higher-level nervous activity that takes the lead, but the nervous system type does not remain constant during human life, but undergoes a significant change as a result of education and training. Consequently, one's personality (character, interest, abilities, etc.), in spite of the fact that it is highly dependent on the congenital capabilities, always bears one's experience gained through life, the effects of training and socialisation. Therefore, it can be stated that one's personality is influenced by the patterns from the environment and other educational and shaping factors.

In Japan, it is believed that one becomes a mature personality after turning 46 years of age. The unmistakable character of a person develops and individual, creative solutions are made for the emerging problems.

The most important factor in *budō* is the flexible mind that enables one to recognize their weaknesses and overcome them with persistent practicing. *Budō* teaches how uplifting it is to work through perseverance and follow a chosen path. Spiritual control, the most difficult moments of critical moments: your sword, as well as your actions, signal your spiritual state. The sword is your mind. You have a full heart to face your opponent, or the tasks of life, while the turmoil in your mind must be minimized. This kind of duality, this separation is the most difficult task.[10]

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[9] Szabó B. "Yoroppa ni okeru Budō rikai". In: Bu to chi no atarashii chihei: Taikeiteki budogaku kenkyu o mezashite. Kyoto: Showado, 1998. 168.

[10] Kiyokazu M. "Technika lélek és test a budó kultúrában". In *Mi a budo kultúra?*. Budapest: Forum for Budo Culture, 2002. 6-7.

In *budō*, the most important thing is to guess, to feel the opponent's next move. This requires experience. For example, in *kendō*[11], during the fight, the optimum distance from the opponent *(maai)* must be maintained, while holding the centreline *(chokusen)* to keep the opponent under control. If you feel the *maai* and the centreline, you will instinctively feel the most appropriate moment of attack, when spirit, sword and body will unite. But if you are consciously looking for this moment, you will become less successful. This is the concept that characterizes *budō* itself so strongly.

One can be considered an experienced and advanced person in both martial arts and life if they are able to rely on previously acquired knowledge and experience beyond the necessary preparation when facing a challenging task, thus gaining confidence.

A short list of personality traits developed by *budō*:
- Integration into community;
- Team thinking;
- Adaptability;
- Good cooperation capability;
- Balance;
- Conflict tolerance;
- Conflict management;
- Good problem-solving skills;
- High-level commitment;
- Discipline;
- Monotony tolerance;
- Endurance;
- Stress tolerance;
- Physique;
- Excellent behaviour;
- Sense of duty;
- Aspiration for perfection;
- Reliability, independence;
- Solid decision-making ability;
- Renewal ability;
- Need for development;
- Personality creating and carrying values.

It is also possible to develop skills even at an advanced age with the use of *budō.* It may take up to 50 years to learn the basics of *budō.* Over the age of 60, one begins to physically weaken. After that, one begins increasingly relying on reason and spirituality. Over the age of 70, the whole body begins to weaken, but by that time the unmistakable consciousness has developed. The series of *dan* examinations [12] is actually training the mind. *Budō* is the path to perfection, which is for a lifetime. Maintaining pure consciousness is the most important, so one can always respond flexibly to the events around them.

[11] *kendō* – lit. sword way, the Japanese martial art of swordsmanship.
[12] *dan* – a Japanese system indicating the training level. It is in use in modern martial arts as well.

Decades of dedicated practicing of *budō* – whichever school based on any credible basis it is – provides continuous physical, physiological and personality development for the follower of the path, during which the body adapts and perfects for the given type of movement.

Referring to the Meinl-Schnabel movement-training model, a brief review of the essential features follow, which are refined through *budō*'s type of movement and are developed to skill level for the practicing person:

1. High-level, variable, formally accurate execution of the style motion structure with perfect timing. This is the level of creative fine coordination;
2. The process of movement is characterized by optimum and expedient use of muscles, coordinated force communication, perfect synchronization, and lack of unnecessary movements. Therefore, the practice involves a very small number of injuries;
3. Perfect and also selective information perception and processing;
4. Optimum use of sensory capacity;
5. Extremely detailed and accurate observation, memory of the movement, and definition. This is already a level for which practicing is not always enough, it is rather the question of capabilities;
6. Fear may occur, but it can be handled properly, and transformed into an advantage;
7. Perfect perception of the "must" and "exist" values, i.e. the full knowledge of the most effective and/or exemplary movement and the proper assessment and adaptation of one's own capability level. It also detects a slight deviation from the "must" value;
8. Changes in external and internal conditions do not affect execution, conditions do not interfere;
9. Both internal and external control systems work perfectly. In other words, in terms of regulatory domain dominance, closed-end movement skills [13] and open-type movement skills[14] are also at high levels;
10. Perfect corrections, perfect anticipation at every stage of the activity, while the personality is manifested in both motion and execution;
11. In the case of capabilities, backsliding occurs only at very high stake-stress;
12. Fatigue matches the physique, but it can be compensated with other techniques. The given physical and nervous system load has a balanced influence on the actual physiological state, the considerable experience and adaptability helps with avoiding the mutual weakening of the loads. Movement processes are characterized by significant control of energy consumption;
13. Cortical supervision is limited to the time of decision making, and motion control is automatic. As a result, nervous system fatigue occurs only after a long time.[15]

Over time, through intense practice of martial arts, many abilities develop in an individual, which are well adapted to the individual and group capabilities expected as a result of military training. These include perception ability, response skills, fast under-

[13] Environment is constant and easy to influence, movement ability is of permanent character and fine-motor, performance, and learning are its typical features.

[14] Environment changes, hard to influence, the movement ability is variable, perceptuo-motor (detection, sensing), decision and learning characterises them, involved tactical skilfulness.

[15] Nádori L. *Az edzés elmélete* és *módszertana*. Budapest: Magyar T. E. 1991. 164-181.

standing and mastering of the correct motion structure, optimum synchronization, reception and processing of information, proper way of using sensory organs, observation, motion memory, independent and fast processing of fear, perfect perception of "must" and "exist" values, necessary introvertism, assertiveness, anticipation and abstraction capability, limited aggression ability, minimization of psychic fatigue with its limitation to physical reasons.

A dedicated person skilled in *budō* has a large number of other outstanding capabilities, including:

1. During training, with equal workouts, he/she achieves better results than his/her peers, and develops faster;
2. Bears the load of training relatively well, and responds favourably to the increase of the load which can be increased sooner;
3. Learns movements more quickly, and acquires more complex technical elements. As a result of the new form of movement, he/she develops organically, psychically, with better results;
4. Applies and implements technical and tactical instructions at a high level;
5. Uses the knowledge and gained experience creatively in struggle and solves unexpected situations expediently, applies original solutions;
6. Tough, persistent, usually hard-working, and more ambitious when overcoming difficulties, willing to take on the fatigue of training, his/her work is conscious, and he/she cooperates with his peers in a creative way.

BUDŌ AS A CAREER MODEL

Erik H. Erikson published his ground-breaking theory of 8 stages of lifelong psychosocial development in 1950.[16] His theory expanded psychoanalytic concepts of psychosexual development to include the importance of social dynamics; it transcended then current thinking that psychological development culminated in early adulthood, acknowledging that systematic human development continues throughout the entire life cycle.

Comparing the psychosocial development model produced by Erikson with *budō*, it can be observed how the practice of *budō* in the process of self-development influences self, self-image, self-knowledge, and self-esteem. If a person chooses *budō*, one must be aware that the first step towards the *dōjō*[17] must be made by the person interested. The practice of *budō*, if begun in early childhood, promotes the development of a strong personality, the ability to shape the environment and self-reliance (orientation towards internal control) become natural. Continuous positive competence motivation greatly enhances self-esteem and positive self-image. In the Erikson model of the psychosocial development process, it is known that each stage includes a particular conflict, that is a crisis situation.

[16] Kivnick, H. Q. and Wells, C. K. "Untapped Richness in Erik H. Erikson's Rootstock". *The Gerontologist* 54/1. 2014. 40-50. DOI: 10.1093/geront/gnt123

[17] *dōjō* – "the place of following the road" which means the place where one can practice a given martial art.

Stages	Ages	Basic conflict	Important event	Description	Budō method	Military career
1. Oral Sensory (Infancy)	From birth to 18 months	Basic Trust vs. Basic Mistrust	Feeding / HOPE	In newborns the first love and trust towards their nurturer develops or is taken over by the feeling of mistrust	parental harmony	
2. Muscular Anal (Early Childhood)	From 18 months to 3 years	Autonomy vs. Shame, Doubt	House-breaking / WILL	The infant's energy is focused on physical skills like walking, holding, and regulating the constrictor. The child learns control and is taken over by shame and doubts in case of failure.	parental harmony	
3. Loco-motor Genital (Play Age)	Between 3 and 6 years	Initiative vs. Guilt (Self-restraint)	Inde-pendence / PURPOSE	Increasing child independence, growing initiative, risk of too much violence, getting guided by sense of guilt.	parental harmony, establishing and transferring way and rhythm of life,	Parental example (military family, environment)
4. School Age (Latency)	Between 6 and 12 years	Industry vs. Inferiority	Schooling / COM-PETENCE	Need to learn new skills to fight inferiority, failure, and incompetence	Establishing cooperation with peers, building self-image through new knowledge and skills, achieving appreciation, satisfying newly appearing need for output	Parental orientation (satisfying the interests of the child)
5. Adole-scence (Puberty and Adole-scence)	Between 12 and 18 years	Identity vs. Confusion	Relation-ships with children of the same age / FIDELITY	The adolescent has to establish identity in connection with career, sexuality, politics, and religion	Exercising Budō is a fundamental principle in shaping ego. It is a main advisor, manifestation of the sense of commitment, finding the role fitting individual, establishment of correct ways of problem management	State orientation, education in military secondary school

Stages	Ages	Basic conflict	Important event	Description	Budō method	Military career
6. Young Adulthood	Between 19 and 40 years	Intimacy vs. Isolation	Love relations / LOVE	Young adults need intimate relationships, otherwise they face and fight the sense of isolation	Significant influence on a developing personality, surfacing special capability-factors	BSc/MSc training, advancement from junior officer positions to staff officer assignments
7. Middle Adulthood	Between 40 and 65 years	Generativity vs. Stagnation (Self-Absorption)	Parent role / CARE	The adult should find the way to support and encourage the next generation	Increasing responsibility for the community, taking leading role in a community, commitment to traditions develop, increased expectations from the community coupled with the pressure to meet them	Rising from mid-level leader to high-level leadership, occasionally research and summary of experience in scientific research
8. Older Adulthood (Maturity)	From 65 to death	Ego, Integrity vs. Despair	Assess-ment and acceptance of career path / WISDOM	The issue of loneliness and satisfaction with life gets the foreground	Respect by the community, summary of oeuvre, contribution to the development of acquired knowledge to a higher level	Soldiers retire, taking advisor role

Figure 1 *Psychosocial stages of life (developed from Erikson's model by the author)*

In the latency period from the age of 6 to puberty, there is a high level of interest in accommodating new knowledge/skills during which the child requires cooperation with peers. The new knowledge/skills significantly determine the self-image and the child uses them to gain recognition. Since this is a very sensitive period, a proper manager can develop a desire for recognition and performance without creating an overvalued personality image and various failures do not produce a feeling of inferiority. Children's training in *budō* requires special attention from the coach. A great deal of experience and teaching ability are needed to remain in this narrow path. In any case, this is the period of time that can mean a life-long commitment, or a seclusion.

Budō acts as the main advisor in the quest for identity in adolescence (role confusion) and self-consciousness, since that is the period when young persons – due to the lack of experience – discover how difficult it is to find the most suitable activity that matches their character and capabilities. This conflict is made particularly complex by the diversity of leisure opportunities in our time, which entice and divide the lives of adolescent people into so many directions. Practicing *budō* is a commitment, a life-organizing principle, and since both the teaching and the master in this age of quest serve as a model for the young, it can

highlight the role of its talent. It is also the master's primary responsibility to maintain the balance between the adolescent's adherence to a group and the discovery of his/her own self, including the resolution of conflicts within the group. During this period, the master also plays a mediator role between the parents and the adolescent in resolving the friction caused by the aspirations of independence.

Early adulthood is a turning point in practicing *budō*. At that time, there are significant changes in the life of young people. Studies do not only mean changes in their daily schedule, but in many cases they need to get settled in another region of the country. In many cases, higher education entices the individual abroad. The other major change is in the personal relationship. The chosen partner does not always accept the previous habits, and the fear of losing him/her also forces the young adult to make a decision.

In addition, *budō* also has a significant impact on the developing personality, which is the result of a very complex process with the ability made to be highly sensitive to certain areas. However, this can also be a big burden. Therefore, such kind of effective and purposeful attitude is not accepted in all life situations by the environment. Of course, a *budō*ka having appropriate time and intelligence will find the balance, the form acceptable for everyone, while maintaining efficiency.

Adulthood is the period of settling, where human creativity develops at the highest level in a lifetime. Since we are talking about a *budō*ka with up to 20 years of experience and a high degree of *dan*, the question of setting up an independent *dōjo* may also come up. At this stage of life, the conflict mainly evolves around the delicate balance between family and profession, the balance between the two, and the time management. Adult responsibility here is not only about raising offspring but also about the future of the practiced *budō* branch. Since in this age the person is one of the determining members in the given school, the education of the beginners is of not only an individual need but also an expectation. Stagnation, which is the dark side of adulthood, is not typical for those practicing *budō* for a long time.

Old age is a kind of reward for life in *budō*. In Japan, a person who has turned 61 enters the gate of old age. Since that time on, he/she has been regarded as an elderly person, and has been entitled to unconditional respect not only in the world of *budō*, but also in daily life. This age is a period of epitome, which means the recapitulation of the results, successes, or even failures of a long active life. Looking at the entire life of a person it can be stated that it is in the old age when *budō* values may be of great help. *Budō* gives the devoted person who practiced it a complete life program that not only manifests itself in the *dan* degrees, the hierarchy, but in the evolution of the personality, in the spiritual way as an old master becomes wise.

In Japan, the 61st year of age may generally bring the attainment in *budō*, the 8th *dan* and the highest, *hanshi*[18] instructor level for a person practicing *budō* since childhood, where the integrative-analytical thinking reaches a very high level. There are several reasons why there is no known old-age crisis, why the issues "Did it make sense for my life?", or "How much I didn't realize!" do not emerge in these people. One of the reasons is the entirety of *budō*, the other one is the feeling of achieving, coupled with the consciousness that in Japan a person at the age of 61 is regarded more like a middle-aged person, so he/she still has long decades to complete the transfer of the knowledge acquired through his/her talent

[18] *hanshi* – the highest degree, which can be earned after dan 8. Often translated as Grand Master.

and ability with the greatest respect. The person should feel that the community needs him/her and is a decisive part until the last moment of his/her life.

Many decades of exercise in *budō* can lead to a healthy, balanced personality development also because the person has appropriate time to progress from Dan to Dan, to meet the challenges and the ever increasing demands physically, mentally, and psychologically. If someone has not yet reached the next level, it is obvious that he/she will not get the degree, and will continue practicing, and developing. This way there will not be confrontation with a role that goes beyond his/her capabilities. Because there is a strong and merit-based hierarchy in *budō*, the decline is not typical parallel with continuous practice. It is noteworthy that if a person dedicated to practicing *budō* becomes limited in continuous practicing for some reason, then he/she finds the specific way of developing his/her abilities over time.

The other characteristic of old age, the feeling of passing away, the fear of death, is reduced in a person practicing *budō* for two reasons. On the one hand, the culture in which *budō* is embedded has developed over several centuries and is able to accept passing away through religious teachings. On the other hand – for practical reasons – *budō* deals with death just enough not to be completely alien to the *budō* practitioner at the end of his/her life. The admirable calmness of the old *budō* practitioners is said to be precisely because they are already close to death and do not separate life and death as sharply as a young *budō*ka, who is still frightened by the idea of departing. That is why the great masters state that the true depth of practicing *budō* can be truly experienced over 70 years.

However, there are significant public health and social values as well in the practice of *budō*. Through practicing martial arts since childhood or adolescence the brain of the person remains much fitter at old age. Although experience has shown that the time of starting practicing and the number of years spent practicing *budō* are also critical for maintaining cognitive abilities at old age, even if the practice of *budō* is dropped in adulthood, there are significant benefits stemming from it. This is probably because of the complexity of the motion system and the later-understood philosophical background, as a lifestyle is coupled with many years of practice and learning, therefore it is likely to create alternative brain connections that are able to counterbalance the cognitive decline associated with aging.

At old age, most people face a number of locomotor problems resulting in a significant decrease in activity for real and/or perceived reasons. This is another blow to the slowing metabolism that is already at an advanced stage, so the weight gain and lack of energization make a vicious circle. People whose life is accompanied by practicing *budō* until old age, have many advantages. The pace of life established over decades, physical and mental activities, make the body much more prepared for the challenges of old age. It is noticeable that these elderly masters do not practice less actively as opposed to the physiological rules of competitive sports, nor can be stated that they are less effective. They simply possess a vast amount of movement experience, deep knowledge of the human body and anatomical features and their abilities. They have a completely different approach than a “novice” practicing merely for 20-30 years. And since they are completely free of unnecessary muscle use and movement, it is obvious that they need less energy to carry out the same form of movements and perform with the same efficiency. These elderly masters are usually more skilful in their everyday life than their peers, which can be attributed to the lifelong exercise of complex forms of movement. Interestingly, when they nevertheless come to the inevitable time of physical decline, and when the techniques practiced indefinitely are discussed or when they enter into an inspirational environment, such as their own beloved dojo, they completely change, forgetting all physiological barriers. This is the true value and true depth of *budō*.

CONCLUSION

Budō is an opportunity, a kind of preparation for military career, and here I mean not only acquiring the self-defence techniques necessary for military service, but of developing a set of skills that also serves to relieve the nervous system. In the life of the Hungarian Defence Forces, both in the preparation system and the free-time activities of the service members, some branches of the Japanese *budō* have been present for decades, primarily for their combat efficiency. My *budō* idea differs from this practice in that it also gives *budō* an opportunity not only to shape an attitude but also to increase the mental stamina of the person through practicing that can be done until very old age, which is important since it may provide a sort of solution for the special crisis situation generated by the extended service time of professional military personnel.

It can be seen from my paper that these do not exclude but rather complement each other in military profession, as both may be necessary. *Budō*, as a lifestyle, a way of life, is a great help in military training, in doing military tasks, and experience shows that it is easier to avoid different deviations, and to reduce the impacts of inward burden on a personality.

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Lt Col András Mező

REPORT ON JAPCC MULTI-DOMAIN CONFERENCE

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"The dodo is extinct because they lost multi-domain capability."

The JAPCC (Joint Air Power Competence Center) hosted a multinational gathering of distinguished speakers and panellists at the annual Joint Air and Space Power Conference in Essen, Germany. The theme of this year's conference was 'Shaping NATO for Multi-Domain Operations of the Future', discussed in four themed panels.

The concept of Multi-Domain Operations (MDO) has emerged in military thinking in recent years. Although there have been no serious efforts to define it precisely so far, there is already news that the armed forces of some advanced NATO countries are entering the implementation phase.[1]

TERMINOLOGY

At the time of writing there is no clear NATO definition of the term MDO.[2] The NATO terminology database defines only the information technology meaning of the word "domain". However, it specifies the terms environment and operational environment, which are used by other NATO publications as synonyms for the word "domain". Such an interpretation of the word is a mistake and misunderstanding of the notion. A closer reading and analysis of the definition of the term operational environment proves that the environment and the operational environment cover sea, land, air, space, enemy forces, neutral and friendly forces, populations, governmental, non-governmental, international organizations, weather, terrain, electronic and chemical defence situation, and information space, etc. The illustration (Figure 1.) shows the

Environment: The surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelations.

Operational environment: A composite of the conditions, circumstances and influences that affect the employment of capabilities and bear on the decisions of the commander.

1 Roblin S. "The US Army's Experimental 'Multi-domain' Units are practicing how to battle Chinese Warships". *The National Interest,* 11 August 2019. https://nationalinterest.org/blog/buzz/us-army's-experimental-"multi-domain"-units-are-practicing-how-battle-chinese-warships, Accessed on 12 August 2019.

2 The meeting of the relevant NATO body, the Allied Joint Operational Doctrine Working Group (AJOD WG) took place between 15-17th of October, discussed the terminology, the meeting report will be released later.

difference between environment and domains. Whilst environment contains the cognitive, virtual and physical dimensions, domains exist in each environment.[3]

This will bring us closer to understanding the concept of multi-domain, that is, a comprehensive understanding of how a commander can use the capabilities available to him in various domains to operate there, in order to make an impact in the same or in another domain. So, part of the operational environment becomes the domain, because that is accessible for military forces and can be used for military operations.

Let us look at how doctrines define the role of the military in their own characteristic domain. Maritime power is derived from the ability of a state or non-state actor to use the freedom of movement provided by the sea to exert diplomatic, economic, or military influence at a time and place of choice. Maritime power has traditionally been employed globally to maintain the freedom of navigation essential to the general economic welfare or survival of states. Conversely, it has been regularly used to disrupt an opponent's sea lines of communication as part of a wider Allied, joint, or combined operation (AJP-3.1, Allied Joint Doctrine for Maritime Operations). Interestingly, we do not find a similar definition in NATO's land operational doctrine. According to Australian land doctrine, however, land power encompasses the employment of an array of land capabilities – from Army and across government – to achieve specified objectives. The Army must always view itself not in terms of simply "winning the land battle", but as a force capable of exerting land power for strategic effect across the modern spectrum of peace, crisis and war. The term land power also raises the Army's concept of itself above this tactical "win the land battle" and accepts that the generation of effects on land also has strategic impact. It is multidimensional: land power may involve the employment of capabilities from all the domains (land, sea, air, space and cyberspace) to achieve results on land (extracted from Australian Land Doctrine). Air Force refers to the ability to use air capabilities to influence the behaviour of actors and the course of events (AJP-3.3, Allied Joint Doctrine for Air and Space Operations). As we can see, it is only the Australian land doctrine, which mentions that the land-based armed forces do not operate in isolation but focus their efforts from all the domains on the land domain.[4]

Such a poorly defined and therefore ineffective operation and cooperation of NATO forces risks the Alliance's inability to co-ordinate joint operations in all domains. Particularly critical is the neglect of the non-physical (cyber) domain.

Obviously, today even the simplest military operations require a cross-domain interaction. A land operation without air support is no longer conceivable, and certain land capabilities (marines and Special Forces) have long been integrated into the surface and sub-surface elements of naval forces and into air forces. Nevertheless, there is no trace of this multi-domain thinking in any current doctrine.

In the absence of a clear definition of the MDO, NATO could take the advanced concepts of the United States (US) and the unclear terminology therein. *"Operations conducted across multiple domains and contested spaces to overcome an adversary's (or enemy's) strengths by presenting them with several operational and/or tactical dilemmas through*

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3 Grest, H. and Heren, H. "What is a Multi-Domain Operation?" In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 2. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

4 Parkinson, J. "Is fluidity the key to effective Multi-Domain Operations?" In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 39. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

the combined application of calibrated force posture; employment of multi-domain formations; and convergence of capabilities across domains, environments, and functions in time and spaces to achieve operational and tactical objectives." This definition is bleeding from many wounds and does not meet the standards of NATO terminology. It is voluminous, contains reference to itself, and excessively narrows the concept, practically defines doctrinal thought, and despite its length does not contain enough specificity to distinguish it from many other similar concepts (e.g.: joint operations, network-based operation). The United States Air Force Command approaches the issue from a command and control perspective, having produced a definition only for Multi-Domain Command and Control (C2). "The coordinated execution of authority and direction to gain, fuse, and exploit information from any source to integrate planning and synchronize execution of Multi-Domain Operations in time, space and purpose to meet the commander's objectives." From the definition it can be concluded that the MDO differs from the previous concept of Allied Joint Operations. Indeed, the definition of Allied Joint Operations does not explicitly require the forces participating in the operations to cooperate closely. The MDO, on the other hand, goes far beyond this point and requires the military to cooperate beyond operational planning to combine combat effects. The extent to which the MDO concept goes beyond current joint operations is an open question at this time. MDO means mutual support in the traditional operational environment of traditional military forces (land, sea, air) and enters into new domains, such as cyberspace and space.

Multinational joint operation:
An operation carried out by forces of two or more nations, in which elements of at least two services participate.

Studying the doctrines in AJP-3.20 we can find a domain definition. "A discrete sphere of military activity within which tactical actions are orchestrated to achieve objectives in support of the mission. They provide a structural framework for military operations and wider defence activity. They may be integrated but have no hierarchy. While the activity is discrete the consequences and effects are interconnected." On the basis of the above definition, NATO's proposed definition (in text box) was submitted to the Allied Joint Operational Doctrine Working Group (AJODWG). The United States (US) TRADOC headquarters adds to this definition a list of the domains: land, air, sea, space, and cyberspace through the electromagnetic spectrum.

Domain: A discrete sphere of military activity within which tactical actions are orchestrated to achieve objectives in support of the mission. (Terminology Tracking Form No 2018-0276)

Of the five domains, the cyber domain is prominent, since it connects the other four. Only through networked information technology devices can the commander understand the evolved air, sea, land and space situation, and can process, interpret, control and influence the platforms in other domains.

Multi-Domain Operations (MDO)
"An operation to conduct activities and generate effects across more than one domain, at the same time in an integrated manner". (TTF-2019-0229)

There are also opinions to extend the concept of a domain to a sixth space, such as the "independent sphere of military activity", which is the cognitive (information, psychological, human, communication) domain. It is argued whether recent counter-insurgency operations have proved that the operations must first and foremost win the support of the population and that not even the most pressing

firepower can prevent the insurgents from delivering their messages (narratives of actual war events) faster and more effectively. Indeed, on many occasions, news of extraordinary collateral damage first appeared in the insurgents' narrative in the world press, and the official NATO announcement, the refutation, came only weeks or months later, when both world and local public opinion were convinced that NATO soldiers committed murders. The MDO must be viable and applicable not only in high-intensity, symmetric warfare, but also in low-intensity, asymmetric conditions. Opponents of the Sixth Domain, on the other hand, argue that the cognitive is heavily subordinated to the cyber domain, since information is from that domain and they consider the cognitive a dimension rather than a domain.[5]

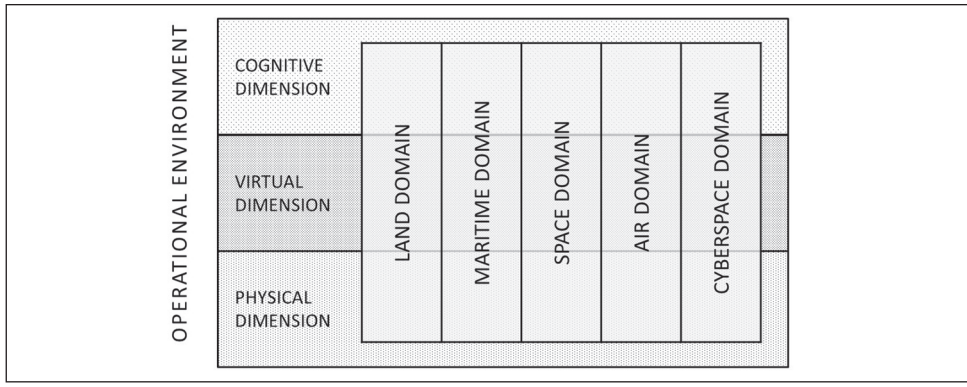

Figure 1 *The five domains in the three dimensions*[6]

The figure above points out that the three dimensions (physical, virtual and cognitive) are overarching the five domains. The "old style" battles concentrated effort mostly in physical domains (land, maritime, air) and dimensions, meanwhile the "new school" has to address all the domains and all the dimensions simultaneously.

HISTORY

These domains, have always existed, even the ancient warlords were already doing multi-domain operations, coordinating the manoeuvre of their ground troops with naval manoeuvres. The disastrous Athenian campaign to conquer Sicily during the Peloponnesian War provides just one example. In 414 BC during the siege of Syracuse, the Spartan strategist Gylippus turned the tide of battle in favour of the Syracusan forces. Gylippus focused initially on the human and political factors, inspiring the Syracusan forces and galvanizing the support of their allies. He then embarked upon simultaneous attacks of the Athenian troops on the land and at sea. By 413 BC, the Athenians had been defeated.[7]

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5 Canovas, J. "Multi-Domain Operations and Challenges to Air Power". In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 48. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

6 Ducheine, P. "NATO's challenges in Multi-Domain aka Full Spectrum Operations, presentation."

7 Reilly, J. M. "Multi-Domain Operations". In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 16-17. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

Did the air count as a domain in this campaign? Or was subsurface water a domain in this case? Certainly not, since Gylippus could not manoeuvre in the air or under the sea and could not achieve any effect in them. Why and when does an existing physical space (air) become a domain? When the first aircraft entered service, it became immediately clear that aviation as a capability was essential for freedom of movement and therefore it was imperative to gain air superiority. In the same way, the deployment of submarines changed the nature of two-dimensional naval warfare into three dimensional. This also leads to a practical definition of the domain: "The critical macro space to which access and control is vital for freedom of operations and therefore superiority therein must be achieved." As the first sputnik was launched, space became the fourth domain. And since the introduction of networked information technology in the military, it has become clear that cyberspace is the fifth one.

The discovery of new domains of warfare has certainly brought the need for unified control of manoeuvre in the various domains. While in the Korean War it was enough to break down force cooperation into days and hours, the concept of Air-land Battle, which was created in the 1980s, required minutes of precision in collaboration between the domains. The MDO requires that sensors transmit data in seconds and that a strike from one domain to another occurs within a fraction of a second.

CHALLENGES

Potential future adversaries of NATO have developed technologies, strategies, and operational doctrines that allow them to fight asymmetrically against the Alliance's military superiority and create a strategic deadlock with attacks from different domains.

The revolutionary disruptive technologies causing the stalemate include newly developed devices, such as ballistic and supersonic missiles, stealth cruise missiles, unmanned aerial vehicles that can be bought commercially and not only for observation and detection, but also for delivering strikes. Continuing the line is high-energy microwave weapons and nuclear weapons that destroy all electrical equipment in a district, without leaving significant radiation behind. In addition, the latter weapon can produce effects in two domains at the same time: blasting a 1 kT nuclear weapon 400 km above the surface could significantly damage or permanently destroy unprotected electrical devices and disrupt the power grids and satellites in space. In parallel with these developments, the potential adversary can enhance the protection of his own air defence systems against electronic suppression by using passive sensors.[8]

China is making huge efforts to control cyberspace. A decisive Chinese superiority gained in this domain would mean that NATO could not see and hear, and would lose its ability to control its weapon systems in a timely and accurate manner. Consequently, initiative will be lost and ultimately NATO's superiority in all other domains would be neutralized.

The domains are interrelated and the effect created in one will definitely have an effect in the other domains. For example, if the opponent intercepted or interfered with the frequencies used to control the satellites, destroyed the ground station controlling satellite, or blinded the satellite itself with concentrated energy beam, it would have a serious impact on the fight in other domains. Plenty of naval and land based communication and navigation systems, weapons systems would be paralyzed, the capacity of satellite detection and early

8 Reilly. "Multi-Domain Operations". 18.

warning systems would disappear, complete weapon systems would get unserviceable without accurate positioning. Ships, airplanes and entire land units would lose orientation, the ability of accurate knowledge of each other's position, ability to effectively fire, and even command and control. Commanders will be forced to manage their subordinates in a "mission command" manner, with little or no feedback from the subordinates.

With the spread of the technology needed to dominate cyber domain, the Alliance finds it increasingly difficult to maintain its dominance in this domain. Many are already questioning whether the Alliance would be able to sustain cyber space superiority permanently and universally. Such an expansion of the capabilities of potential adversaries will change the nature of warfare.

REQUIREMENTS

Such a dramatic change in the operational environment places many demands on NATO to meet new challenges and succeed in fighting (or deterring) near peer enemy forces.

- The first requirement is a new, higher level implementation of the oft-mentioned mission command. In the future operating environment NATO will have no superiority in the electromagnetic spectrum, and communications and IT networks will become unreliable. Commanders have to upgrade the "centralized decision-making, decentralized implementation" to "distributed control, decentralized implementation." The details of this type of C2 are not clear at this moment.[9]
- Commanders must be familiar with the idea that in the future theatre of operation they will have no more comfortable superiority in any of the domains. The loss of aerial and electronic superiority will be extremely sensitive to NATO forces, because they did not have to face such a challenge in the past 60 years, since the Korean War.
- The third requirement is the elimination of the so-called independent (stovepipe) service thinking. The new concept should be based on the interconnection of the five operational domains, their mutual support, and the operational effects among the domains. The effects achieved in each domain must support those in other domains, and create synergies in a complex, all-domain environment. The supporting and supported relationship will change constantly as agile commanders execute strikes from one domain into another. The decisive strike will not occur in one or in another domain, but almost simultaneously in all domains.[10]
- The fourth requirement is that it is not enough for NATO to win the war, but it has to be prepared to win the peace. Moreover, ideally, like the in the Cold War, there will be no armed conflict between NATO and near-peer armies, but NATO's preparedness itself will be sufficient to deter the war. Armies are capable of winning battles and campaigns, but only a committed, whole-of-government policy can win both the war and peace. Isolated military results without other aspects of national power of the member states are not capable of winning the competition against Russia or China.
- The fifth requirement is to find the opportunity for NATO to have proportionate capabilities in all the five domains. While NATO has significant capabilities in physical domains,

[9] Reilly. "Multi-Domain Operations". 22.

[10] Carlisle, H. J. "The complexity of the Multi-Domain Operations". In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 33-37. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

NATO's cyber and space capabilities are currently based solely on voluntary contributions from member nations. Most of the Member States do not have any offensive cyber capabilities at all. The problem does not only arise in the field of capability development. The use of space and cyberspace for military purposes raises enormous legal concerns as well. Unless these are addressed and satisfactorily resolved, we risk yielding the two domains that link the other three, thus making our capabilities isolated and easy to counter. However, the use of these two key domains is not a legal challenge for Russia and China. Collective cyber-defence (including cyber-attacks) is currently prohibited under positive international law.[11] The dominance of space and cyberspace will be vital to NATO, the superiority gained in these two domains does not necessarily mean victory over the other three spaces, but their loss is certainly a defeat.

- The biggest challenge of MDO is to bring together the five domains, to develop an operation control system that not only integrates service-based operations centres, but also enables the commander to visualize operations and make quick decisions.

OPPORTUNITIES

John Boyd's OODA cycle (Observe, Orient, Decide, and Act) helps develop the C2 governance system. The idea is that a Multi-Domain Operations Centre (MDOC) consists of three layers. The first is perception (reconnaissance and intelligence), which allows the commander to understand the operational environment, and to explore the relationships among domains, the second one is the command and control layer. The commander must be mindful of the varying operational tempo and significance of the domains, the light infantry and special operations forces are capable of traveling at 3-4 km, the mechanized, airborne and naval forces reach their destination much faster, the air force is moving at the speed of sound, cyber operations are practically at the speed of light. MDOCs should coordinate multi-domain operations so that they exert their effects almost simultaneously, thereby achieving a complex effect that prevents the enemy from responding adequately. The dominance of cyber and electromagnetic domains is of paramount importance. Without protecting our own networks, NATO forces become out of control, and by gaining and establishing superiority in these two domains, we can deprive the enemy of perceiving and communicating. Finally comes the effect layer, which includes battlefield systems that generate kinetic and non-kinetic as well as information effects.[12]

Here is a possible scenario for demonstrating multi-domain operations. Internet attacks and operations with electronic jamming equipment (cyber domain) have successfully paralyzed the enemy's integrated air defence system, allowing NATO's reconnaissance aircraft (air domain) to fly over and detect enemy strategic targets. According to the information transmitted, the MDOC directs a submarine fire a Tomahawk missile (sea domain) onto the enemy satellite command centre (space domain) in order to paralyse its communication and real time satellite reconnaissance system. The MDOC simultaneously launches an amphibious operation (land domain), taking possession of the enemy's commercial port, thereby cutting off his economic influence.

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[11] Väljataga, A. "Tracing opinio juris in National Cyber Security Strategy Documents." In *Shaping NATO for Multi-Domain Operations of the Future: JAPCC Conference Read Ahead.* Kalkar: Joint Air Power Competence Centre, 2019. 91-97. https://www.japcc.org/wp-content/uploads/JAPCC_Read_Ahead_2019.pdf

[12] Carlisle. "The complexity of the Multi-Domain Operations". 35.

In the example above, each operation initiated from a domain exerts a decisive effect in another domain, and thereby prepares the next operation. The tempo and co-ordination of operations deprive the enemy of his vital skills almost simultaneously and present him with so many problems mutually reinforcing each other's influence that the enemy is unable to prepare and respond adequately.

The current joint force C2 systems are not appropriate for such an operational tempo. What we call joint operations today are in reality nothing more than the coordination of single-domain operations, timing their successive sequences without even attempting to exploit cross-domain strikes in order to mutually support each other. Authority is delegated to the lowest operationally competent level possible, in order to prepare future battlefield commanders to command by mission orders, leave their subordinate commanders to decide within their specified limits and constrains, and leave them to plan and execute cross-domain strikes.[13]

The new dimension of mission command leadership is called distributed control, and this is how MDC2 was defined. Distributed control and decentralized implementation allow for shorter chain of command, faster decision making, and significant C2 benefits. At this moment, we have neither definition of distributed control nor description the concept of it.

Multi-Domain Command and Control (MDC2): Command and control that directs and enables the simultaneous conduct of multiple operations across more than one domain in an integrated manner.

The key to MDOC2 is connecting and sharing information at the highest possible speed in real time. C2 relies on a cloud-based database into which all information collected by sensors from each domain is uploaded. This allows a reduction of the time needed for targeting and delivering strikes. In the complex process of targeting, automated and IT-supported processes immediately determine what action the Rules of Engagement allow. They also determine what collateral damage (?) and what primary and secondary effects are expected, and in which domain (or domains) which weapon systems are best suited to attack the target. This allows the commander, in his or her delegated powers, to take advantage of the short time the target is exposed and instantly strike from as many domains as possible and by the most appropriate platforms.

It is important that data are shared as widely as possible and that the electromagnetic spectrum remains secure. This requires NATO to develop new data sharing mechanisms and standards as well as encryption mechanisms for the multi-domain network. There is a lot to do in this regard, as it is not just a technological issue. For nations, sharing information also raises legal and political issues.

The continuous operation of networks requires the networks necessary for MDO to operate not on a server-client basis, but as a peer-to-peer system capable of self-healing. In case of disruption or destruction of certain network elements, other elements of the network take over their role and pass the necessary information to the recipient. The development of technology makes this possible.

The basic principle of information sharing ("need to know") has to be replaced by a new approach, which recognizes that there is much more risk in keeping back information within

[13] Canovas. "Multi-Domain Operations and Challenges to Air Power". 49.

the Alliance than in potentially unnecessary information sharing. A concept of analysing and interpreting large amounts of data generated in the network needs to be developed. The potential of artificial intelligence for automated data processing and machine learning has to be utilized. The use of these revolutionary disruptive technologies would also be of enormous advantage to our enemies, so we must take immediate action to be able to counteract this advantage first and neutralize this advantage when it appears in the arsenals of China and Russia.[14]

Science provides an inexhaustible range of combat capabilities. It is no longer a dream to have a machine-to-human interface. In the future, commanders will be able to control many command and weapon systems at the same time simply by brains or eyes.

Staying on track, NATO's MDO training environment will need to be developed in the future. A virtual environment should be created where future MDO theory can be put into practice. There is a need for a computer simulation infrastructure where our MD concepts can be tested. Multiple-level MDO attacks must be simulated, based on the potential real enemy's doctrine. The exercise scenarios have to contain deprivation of superiority in one or more domains. Regaining lost superiority and subsequent decisive strikes must also be exercised. The MDO should be tested not only in high-intensity combat, but also in hybrid warfare, proxy war, anti-insurgency scenarios. Efforts should be made to reflect not only the impact on the enemy during the war, but the activities of a wide range of state (police, militia), international (Red Cross) and non-state actors (ethnic groups, criminals) should be also simulated. Ownership of the space domain is crucial, and such scenarios should be injected into exercises as well.

SUMMARY

Huge efforts are being made by NATO and its member states to prepare for the fight against near-peer forces. The new concept is called multi-domain, and it represents an evolution from the previous joint operation concept. In MDO new disruptive technological tools and procedures are widely used. The conference supported our effort in the given concept development task, we were able to expand the community of interest, and we received inputs about the opportunities to address in the future.

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Ye Yudan

THE SCENES OF FUTURE PEACEKEEPING OPERATIONS IN THE ERA OF ARTIFICIAL INTELLIGENCE

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ABSTRACT: *UN led peacekeeping operations began in 1948. Since then, peacekeeping operations have gradually entered an information age that is constantly influenced and defined by computers, the Internet, etc. The invention of computer, whether or not its original intention is limited to the purpose of assisting human beings in numerical calculation, will eventually lead to the generation of intelligent machines that can extend and enhance the abilities of human beings to transform nature and govern society. When artificial intelligence is widely used and has shaped the society into a human-computer symbiotic society, peacekeeping operations must take the initiative to face the new era environment which is different from the past history of human beings, and make efforts to solve the complex problems they are facing.*

KEYWORDS: *peacekeeping operations, scene, era, artificial intelligence*

THE ERA AND ENVIRONMENT OF ARTIFICIAL INTELLIGENCE FOR PEACEKEEPING OPERATIONS

Peacekeeping operation is a great cause reflecting international solidarity and safeguarding the common destiny of mankind. It has helped many countries falling into war to get rid of war and achieve peace. As one of the most effective and powerful tools for the United Nations to promote and maintain international peace and security, peacekeeping operations provide support for the transition from crisis or state of war to political reconciliation in war-torn areas by responding to crises and conflicts and providing basic security guarantees, as well as helping to support new and very vulnerable state institutions in their respective regions. However, the current peacekeeping operations face many challenges and suffer a lot of personnel losses. On March 28, 2018, the Secretary General of the United Nations launched the "action for peacekeeping" initiative in the Security Council, calling for "collective action to improve United Nations peacekeeping operations".[1] As of July 2019, 152 countries and 4 international and regional organizations have endorsed and committed to the declaration of common commitment on United Nations peacekeeping operations.[2] The in-

[1] "Secretary-General's remarks to Security Council High-Level Debate on Collective Action to Improve UN Peacekeeping Operations". 28 March 2018, https://www.un.org/sg/en/content/sg/statement/2018-03-28/secretary-generals-remarks-security-council-high-level-debate, Accessed on 20 August 2019.

[2] "Action for Peacekeeping". https://peacekeeping.un.org/en/action-for-peacekeeping-a4p, Accessed on 20 August 2019.

ternational community decided to make concerted efforts to promote the political settlement of conflicts, strengthen the protection provided by peacekeeping operations, improve the security and protection of peacekeepers, and improve the partnership of peacekeeping, so as to improve the ability of the United Nations to perform peacekeeping tasks and improve the effectiveness of peacekeeping operations through reform. In these efforts to reform and improve peacekeeping operations, artificial intelligence has become an indispensable background and element of the times.

2018 is considered to be the first year for intelligent development to speed up again. Artificial intelligence is different from the previous artificial tools only for physical expansion and performance improvement of human physical abilities and sensory systems, it aims to become a cognitive and reasoning machine with a certain degree of initiative; it is not only a tool used by human beings, but also a thinking assistant of human beings. Artificial intelligence is divided into software and hardware, including virtual robot and physical robot. It can imitate the human way of thinking to "think", or it can analyze and solve problems in a way different from that of humans.

Artificial intelligence came into being with the invention of computer in the 1950s. It was not developing to a higher level than the computer. It experienced a long period of low development. Until the first decade of the 21st century, due to the use of big data and the invention of machine learning algorithm, it began to develop rapidly. Especially around 2018, when the governments of many countries in the world paid more and more attention to artificial intelligence, and formulated policies and plans to lead and promote the development of artificial intelligence in their own countries, which make artificial intelligence present a global trend of cluster development and in-depth development. Artificial intelligence has been or will be widely used in many fields, such as economy, politics, society, national defense and so on. The United Nations website also publishes a special report entitled "UAVs escort humanitarian, development and peacekeeping operations".[3] Artificial intelligence-based machines, including UAVs, will eventually become ubiquitous and easy after a period of development, application and supervision, just like the application of mobile phones in human society. At the present time of geopolitical disputes, we cannot ignore the changes of the times that will have a huge impact on the whole human society. In the future, how to adapt to the inevitable environment of the era of artificial intelligence and how to strengthen the research on the impact and application of artificial intelligence from now on should become the key step and content of "promoting peacekeeping with action" in the global society.

THE SCENES OF FUTURE PEACEKEEPING OPERATIONS

The era of artificial intelligence has just begun. The first 20 years of the 21st century can only be regarded as the beginning of this long era. At present, there are some universities and research institutions in various countries, which have started the tracking research of artificial intelligence development that will last for at least 100 years. At the beginning of the 2020s, we should not only deal with the current problems of peacekeeping operations but also explore the possible evolution path of artificial intelligence, think about the possible scenes of peacekeeping operations in the long development process of artificial intelligence,

[3] "Special report". https://news.un.org/zh/story/2018/05/1008052, Accessed on 20 August 2019.

analyze the major opportunities and challenges of peacekeeping operations in such an era and background, so as to continue to determine the direction and target for the countermeasures we should take.

As a new key technology, artificial intelligence will develop in coordination with energy technology, new material technology and biotechnology in the future. However, in view of the leading role of artificial intelligence in many emerging technologies, it is necessary to analyze the development context and trend of artificial intelligence itself. As a major factor to change the future social production and lifestyle, artificial intelligence will also play a significant role in shaping the scene of future peacekeeping operations. This requires us to comprehensively consider the time dimension of the development of artificial intelligence and the space dimension of future peacekeeping scenes. In the era of artificial intelligence, peacekeeping operations will face more diverse, more complex and more dangerous scenes.

At present, the United Nations has 14 peacekeeping missions, including the United Nations Mission for Justice Support in Haiti (MINUJUSTH), the United Nations Mission for the Referendum in Western Sahara (MINURSO) and the United Nations Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA).[4] These peacekeeping operations in conflict or crisis areas caused by various historical reasons, face different risks. In the era of artificial intelligence, peacekeepers will face not only the existing peacekeeping scenes, but also the more complex new situations caused by artificial intelligence or closely related to the development of artificial intelligence.

In the era of artificial intelligence, peacekeepers in countries or regions that already have political, religious, and ethnic conflicts will encounter a peacekeeping situation in which the original conflicts caused by artificial intelligence are getting worse.

In politics, peacekeepers will be in a more complex environment of election public opinion, and people will not be able to distinguish between true and false information related to the election by their own experience. In the first 20 years of the 21st century, the election in many countries in the world will attach great importance to the use and supervision of Internet public opinion. The election of some political figures cannot even be won without the application of Internet tools such as Twitter. If the former network environment is mainly affected by a large number of "network water forces" employed by some countries or organizations, then in the era of artificial intelligence, the election videos and election articles on the network will be more deeply affected by the development of artificial intelligence technology.

At present, artificial intelligence technology in a natural language, image video and other fields are able to automatically generate very realistic video images of specific natural environments, backgrounds, and virtual characters, and let such virtual characters make statements or dialogues in various languages with sound and mouth pattern matching. Artificial intelligence tools can automatically analyze millions of web articles, automatically debug billions of parameters, and generate "real" articles in various languages. Only relying on human resources, it is impossible to determine which ones belong to real news videos and reports written by human beings, and which belong to "fake" news automatically generated by machines. Many of these AI video- and text-editing tools are cutting-edge technology not the only in some powerful countries. Many poor countries and non-governmental organizations can also master them. Therefore, many political elections around the world will inev-

4 "Where we operate". https://peacekeeping.un.org/en/where-we-operate, Accessed on 20 August 2019.

itably be affected by the large-scale public opinion tools of artificial intelligence network. For some countries with deep democratic traditions and strong self-organization ability of the people, this may only cause some local electoral disturbances. However, for some other countries with serious political opposition or political estrangement, the network public opinion environment, greatly influenced and shaped by artificial intelligence, will mislead the election attitude and alter the voting direction of a large number of people, and may trigger a series of political crises and bloody conflicts. In the era of artificial intelligence, peacekeeping operations will also fall into such a complex network public opinion environment, and the credibility of peacekeeping operations will also suffer many negative effects of artificial intelligence-made fake news.

In terms of religious and ethnic conflicts, it will be impacted by the rapid development of biotechnology due to artificial intelligence. According to reports, Google's latest artificial intelligence AlphaFold program automatically analyzes the three-dimensional structure of human life basic molecules and proteins according to the gene sequence. The structure of protein affects the function of protein. Many diseases that human body will suffer from are related to the change of protein structure. If people can accurately analyze the three-dimensional structure of protein, they will be able to carry out more accurate treatment at the level of human molecular structure. Of course, just as the invention of gunpowder is not for war but may eventually be used for war, there is a great possibility that biotechnology, which is greatly promoted by artificial intelligence, will be used by some stubborn and radical scientists or terrorist organizations to transform the normal human body, thus giving birth to people with some new functions. This will shake the traditional cognition of specific religious groups about how human beings are created, which may be guided and utilized by some political factions or terrorist forces, generate new religious conflicts, and even develop into regional conflicts that need the intervention of the international community. This artificial intelligence-based biotechnology may also be possessed by some countries or terrorist organizations for the development of genetic biological weapons for specific ethnic groups. Through the covert delivery to some people in specific areas, it causes incalculable casualties and the collapse of normal social order. Such new conflicts and crises that have been changed or created by artificial intelligence need peacekeepers who do targeted research and preparation in advance.

The global climate crisis will lead to the destruction of intelligent social infrastructure in some cities and the collapse of normal social order, which will become a new scene for peacekeeping operations in the era of artificial intelligence.

In 2015, under the UN Framework Convention on Climate Change (UNFCCC), nearly 200 countries around the world adopted the Paris climate agreement, which stipulates that countries will strive to keep global warming below 2 degrees Celsius, and urges countries to make further efforts to limit warming to 1.5 degrees. The agreement entered into force in November 2016. Unfortunately, some countries withdrew from the agreement in 2017 due to domestic political needs. Around October 2018, the report issued by the Intergovernmental Panel on climate change (IPCC) showed that the global temperature had increased by 1°C by the second half of 2018. According to this trend, by 2030, the temperature of the earth will increase by 1.5 degrees. This warming range of the climate may be a dangerous critical point, because after crossing this threshold, the sharp change of global climate will, on the one hand, cause a series of dangerous weather phenomena, such as extreme drought, forest fire, floods, strong storms, etc., leading to food shortage crisis for millions of people. On the other hand, in the 2030s or 2040s it may cause great damage to many artificial intelligence

platforms that already widely exist in human society. The automatized and intelligent water and power supply systems that artificial-intelligence society relies on may be on the verge of paralysis, which may lead to the collapse of the normal order in intelligent cities with a population of one million to ten million. The food shortage crisis, coupled with the collapse of production, life, and traffic order on a large scale, will become a new flashpoint for some countries to fall into civil strife, and also a new scene that peacekeeping operations will have to face in the future.

Since the launch of peacekeeping operations after the Second World War, people have always believed that peacekeeping operations are mostly concentrated in underdeveloped and backward countries, which may be beneficial to summarize the history of peacekeeping operations, but very harmful to predict the future of peacekeeping operations. In terms of infrastructure in developed countries, because of the application of a lot of relatively fragile advanced technologies, accidents will also occur as a consequence of major natural disasters, leading to major disasters. In March 2011, a Richter scale 9.0 Earthquake caused two nuclear power plant reactors in Fukushima Prefecture to fail, which eventually led to a small-scale explosion and leakage of hazardous nuclear materials. Japan's nuclear reactor design had not considered the impact of extreme natural disasters, leaving a major hidden danger for nuclear leakage crisis, and the impact of the accident has not yet been fully controlled. In the same way, in the development and evolution of the era of artificial intelligence, intelligent transportation, intelligent water supply and electricity network, intelligent financial system, etc. on which human society relies for operation, will be exposed to the influence of extreme weather, and may fail to function in a large range in major natural disasters such as typhoon, earthquake, flood, etc., thus destroying the normal order operation of the intelligent society. This kind of extensive and significant climate impact will make some originally more developed countries fall into a governance crisis, or even war. Such a serious prospect in the development of intelligent society needs to be clearly recognized by peacekeepers who care for the earth, love, and peace all over the world.

Known or unknown malignant infectious diseases, with the aid of highly intelligent logistics networks, can boost the epidemic in many countries and regions in a very short time, forming a more severe and complex peacekeeping operation scene.

The wide spread of disease has a profound history. For example, the outbreak of plague in Europe in the middle of the 14th century resulted in the death of more than 25 million Europeans between 1347 and 1353. The spread of the epidemic began in Central Asia, and spread from Central Asia to the west, to the Middle East, Mediterranean, Western Europe, and finally to northern Europe by means of commercial exchanges, religious communication, Mongolian invasion, and other ways, forming a catastrophe covering medieval Europe. The large-scale spread of fatal diseases has not disappeared in modern society but has formed an important background that peacekeeping operations cannot escape. In April 2013, the United Nations decided to send a multidimensional integrated Stabilization Mission to Mali to assist the Malian government in restoring political, economic and legal order in the country. Many countries, including China, have sent peacekeeping forces to the United Nations multidimensional integrated Stabilization Mission in Mali. The peacekeeping operation in Mali has been greatly affected by the spread of the Ebola epidemic from South and Central Africa to North Africa, that is, Mali and other countries. Within five months, Ebola killed more than 1,400 people in many African countries, and few villages and communities have survived. Ebola epidemic has become a major factor that peacekeeping forces in Mali have to consider and guard against when carrying out peacekeeping operations.

In the process of the development of intelligent society, Ebola virus, a fatal disease known to human beings, not only continues to spread through traditional channels of transmission, but is also likely to "detonate" the epidemic rapidly with the help of large-scale UAV of intelligent logistics. Small or micro UAVs and bionic micro robots that are actively developed and used by various countries will not only have high mobility like mice and flies, but will not be subject to conventional epidemic prevention methods such as spraying insecticides, setting fire and burning, making the traditional prevention methods and tools of epidemic ineffective. Peacekeepers in an epidemic-stricken area will be seriously affected by the deadly diseases transmitted by the intelligent logistics network. In addition, just as margarine, which was encouraged in the 1950s, was later found to contain trans fatty acids, which increased the risk of heart and brain disease, in the era of artificial intelligence, some food that was invented and produced in a hurry may cause unpredictable risks and new diseases for humans. Such new diseases, as they are not listed in the original disease database, can spread rapidly in the intelligent logistics network. Even if the peacekeepers deployed in many areas take the initiative to prevent them, they will be unable to prevent infections because of the unknown mechanism and the rapid spread of the disease. Because of the food safety crisis, the peacekeepers will also encounter a large number of potential safety hazards of non-combat personnel reduction.

The popularization of artificial intelligence technology has reduced the difficulty of research and production of some weapons of mass destruction, which may lead to a new proliferation crisis of weapons of mass destruction and create a difficult situation that peacekeeping operations have to face.

The proliferation of nuclear, biological and chemical weapons has always been a major threat to peace. Although countries all over the world have formulated the non-proliferation mechanism of weapons of mass destruction and related substances, there is no obvious boundary between military and civil purposes in the relevant research. Today, there are still considerable hidden dangers in the proliferation of nuclear, biological and chemical weapons in many war-torn areas. In October 2018, China, the United States, Russia and another seven countries joined hands. The U.S. conducted diplomatic coordination with several countries, Russia sent special devices and large-scale transport aircraft to transport nuclear materials, China provided technology and site for the safe disposal of nuclear materials, and transferred about 1kg of highly enriched uranium used for experiments in a university in Nigeria. Finally, the fissile material was safely transported to Shijiazhuang, China, to avoid the threat of "Boko Haram" terrorists engaged in terrorist activities in many regions of Nigeria, and eliminate the possibility that these nuclear materials were stolen and made into lethal dirty bombs or high explosive bombs. This joint action of many countries working together to deal with potentially stolen nuclear devices in war-torn areas also sets a model for peacekeeping operations to deal with similar weapons or devices of mass destruction, which can provide operational reference for coming intelligent society to prevent the proliferation of weapons of mass destruction or related substances.

Whether it is harmful nuclear substances, harmful organisms, or chemicals, the research in intelligent society has lowered the threshold of research and manufacturing. Since the intelligent program developed by Google can automatically analyze the three-dimensional structure of proteins for disease treatment, it also has the potential to be used to produce biological viruses with mass destruction effect. With the emergence of technologies such as intelligent additive manufacturing and intelligent synthesis of new chemical explosives, the roadside bombs faced in peacekeeping operations in the past will also be upgraded. For

example, adding new chemical explosives with great lethality or making dirty bombs with large destructive power through intelligent 3D printing technology will create a more difficult battlefield environment for peacekeepers. If the peacekeepers do not have the ability to warn of and resist the threat of such weapons or devices of mass destruction, the development of peacekeeping operations will be unsustainable.

SUMMARY

From the perspective of science and technology, we can have more understanding and thinking about this era, the world and the future of mankind. Although there are different opinions, artificial intelligence is undoubtedly a key opportunity and a major challenge for human beings in this century. In the longer term, artificial intelligence is even a watershed for the development of the human world. Before the large-scale emergence of artificial intelligence, only human beings as the highest-level of intelligence dominated everything in the world. Afterwards, however, humans will enjoy the glory of the highest intelligence in fewer and fewer fields. Of course, artificial intelligence will play the role of human's intelligent assistant for a long time before human studies the nature of consciousness. Such ubiquitous artificial intelligence will drive human beings to an unknown, perhaps better world.

The development of the human world is not necessarily a spiral process. There are many negative factors in the human world, which affect the overall harmony and prosperity of human society. Wars and large-scale conflicts between countries or regions are undoubtedly the worst factors affecting the long-term development of human society. Peacekeeping operations initiated and deployed by the United Nations, the most representative and credible international organization, have helped many countries in conflicts to restore order and protected tens of thousands of civilians. But in this rapidly changing era, UN peacekeeping operations are facing a series of major difficulties and losses. In order to reform peacekeeping operations, to adapt to the trend of the times, and to better cope with the growing challenges of the present and future, we need people who care about world peace to think seriously, put forward effective countermeasures, and jointly help build peacekeeping operations to meet the needs of the era of artificial intelligence.

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HDR 2020, Nr. 1, 86–87.

Dr. Harold E. Raugh, Jr.

THE HUNGARIAN MILITARY HISTORY INSTITUTE AND MUSEUM: PRESERVING AND PERPETUATING MILITARY HISTORY AND HERITAGE

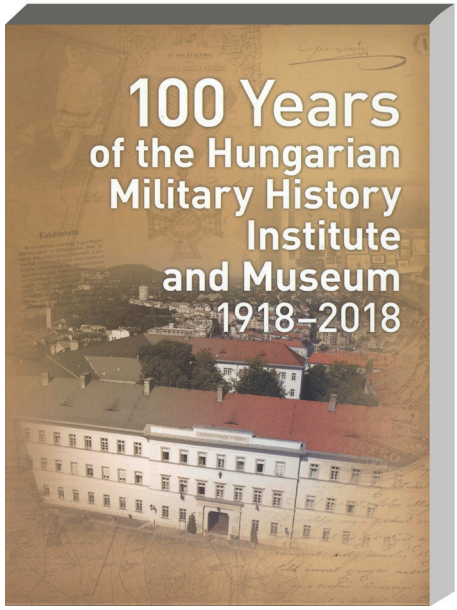
DOI: 10.35926/HDR.2020.1.8

The Royal Hungarian Honvéd Army, one of the four components of the Austro-Hungarian armed forces from 1867 to 1918, was dissolved after its defeat in World War I. The Great War, however, served as the impetus for collecting military memorabilia, artifacts, and "an enormous amount of war booty" (p. 22), and consolidating them in one location with the Hungarian Ministry of Defense's wartime archives. In the chaos that followed the collapse of the monarchy and defeat in the war, farsighted officers were instrumental in instituting the Hungarian Military History Archives and the Military History Museum in late 1918. This is the predecessor of the current Hungarian Military History Institute and Museum.

The following century was tumultuous for the Hungarians. Immediately after World War I, the country became the Hungarian Soviet Republic until Admiral Miklós Horthy established a regency in 1920 that lasted until 1944 and included "affiliation" with Germany during World War II. The Soviet Army occupied Hungary in 1944, and five years later the country was declared the "People's Republic of Hungary" under Communist domination. The Stalinist era was punctuated by the 1956 pro-democracy revolt that was crushed by Soviet tanks, after which the Communist government reasserted itself. In late 1989, the provisional President of the Republic declared the end of the Hungarian People's Republic and the establishment of the Hungarian Republic. Hungary has been a democratic nation since that time and a member of the European Union since 2004.

This well-written and nicely crafted book chronicles the evolution of the organization, mission, and functions of the Hungarian Military History Institute and Museum. The physical building of the Museum, located in the Buda Castle complex in Budapest and providing a panoramic view over the Danube River, as well as its cannon-filled courtyard, are also described in detail. The majority of this volume is devoted to "Collections of the Military History Museum," and consists of twenty sub-sections, each focusing on a specific collection, such as edged weapons, modern firearms, uniforms and equipment, fine arts, archaeological artifacts, manuscripts and documents, and the photo archives. Each section is profusely illustrated with fascinating full color images of the various collections' contents, thus opening a window through which to view vignettes of the Hungarian Army and its leaders though the Museum's vast and well-preserved collection.

The last two chapters of this study highlight the Military History Institute and, impressively, the Military History Archives and the Central Archives. The Military History Archives currently holds historically significant documents from some 4,004 military organizations and individuals, totaling about 7,800 linear meters of paper (with digitization efforts in progress), with another 9.5 million microfilm "shots". The 25-page section on



"The Military History Map Collection" that contains over 400,000 maps and aerial images, is remarkably interesting and informative.

Full of enthralling details and marvelous color photographs, *100 Years of the Hungarian Military History Institute and Museum, 1918-2018,* sets the standard for chronicling an army's endeavors – highly successful in this case – to preserve and perpetuate its military history and heritage.

Sallay, Gergely Pál, ed. 100 Years of the Hungarian Military History Institute and Museum, 1918-2018. Budapest: MoD Military History Institute and Museum, 2018. 240 p.

HDR 2020, Nr. 1, 88–90.

Gábor Ferenc Kiss

FORGOTTEN HEROES, WHO ARE REMEMBERED FOREVER

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Csaba Stenge's work on the history of Hungarian military and aviation has already enriched the country's historiography with numerous volumes and studies. His primary area of research is the history of Hungary in World War II, extrapolating the history of the Royal Hungarian Air Force. His works are published in Hungarian and English. This volume is the author's second book published by Helion & Company.[1]

"Forgotten Heroes" is a fitting title for a work that introduces the ace pilots of the Royal Hungarian 'Honvéd' Air Force. Twentieth-century Hungarian history is full of historical problems and events that lack social consensus; such as the question of the controversial opinions about historical figures. This is particularly true in the field of military history and the Second World War. Although it often seems that there is some form of consensus, the ideological beliefs of individuals and groups often override reasonable evaluation with the concept of hero, and heroism also belonging here. While the aftermath of the Great War ended with the myth of heroism and sacrifice surrounding its victims and participants, this tendency broke down in Hungary and Eastern Europe after the Second World War. In the countries occupied by the Soviet Union, the perception of World War II was wholly subordinate to Soviet imperial and ideological interests. The honvéds[2] were also stigmatized in their own country and their actions were presented through an ideological filter. After the collapse of the communist regime, both national and personal memory and historiography allowed for a more objective evaluation and remembrance. Personal memoirs of veteran pilots were published, and the author himself was one of those who had the opportunity to learn about the great deeds of these brave pilots. The personal writing by Tibor Tobak was some kind of a turning point.[3] We did not just learn who the Pumas had been, or found out who the "Old Puma" was, we were shown that the sky had had Hungarian heroes as well. Historical studies and research soon embraced the topic, attracting numerous researchers including the author, Csaba Stenge, who, in his great work, meticulously explored the history of our pilots.

The aspect of national and military memory also means that besides the well-known and treasured heroes of other nations, we can also list Hungarian airmen who will thus be given a worthy place in the pantheon of Hungarian and international military and aviation history.

In addition to its memorial value, the book also has outstanding scientific and professional contributions. The author's work in English was preceded by extensive research and

1 The first book *Baptism of Fire, The First Combat Experiences of the Royal Hungarian Air Force and Slovak Air Force, March 1939*. Solihull: Helion & Company, 2013.

2 'Honvéd' is a common name of the Hungarian soldier in the World War II. Means a soldier, who defends his/her native land ('hon': Native land, 'véd': defends).

3 Tobak, T. *Pumák földön-égen*. Budapest: Háttér Kiadó, 1989.

well documented publications. First published in Hungarian in 2006,[4] the book on the life of Hungarian aces was followed by a second, revised and expanded edition in 2016[5]. Compared to the Hungarian edition of 2016, the English edition includes many new features and additions. Such being the discovery of new information regarding László Molnár's aerial victories or the rehabilitation of Lajos Benkő.

The main and most extensive parts of the 438-page volume (pages 74–428) are, of course, the biographies of ace pilots. In addition, the personal, professional and historical introductions to the topic are excellently written. The first seventy-three pages consist of the recommendation of Lieutenant János Mátyás, a retired pilot of the Hungarian Royal Air Force, followed by a personal foreword by retired MALÉV pilot Dezső Szentgyörgyi Jr., the son of the most successful Hungarian ace, Dezső Szentgyörgyi. The author's own foreword gives us an insight into the circumstances, the difficulties, the resources being explored, and the individuals and institutions who supported this great work. The general conclusions of the next chapter are drawn from biographical data provided by statistics. The chapter entitled "A Short History of Hungarian Air Victories" is much more exciting. This is a brief overview of the time that began with the air combat in Felvidék, which took place in October 1938, until the end of the war. The contents of this chapter add some historical background to the biographies presented.

When describing the combat performance of fighter pilots, perhaps the most telling figure is the number of aerial victories they achieved. Anyone who can confirm the destruction of at least five enemy combat planes in aerial combat was considered to be an 'ace' pilot in World War I. So it seems simple. Apparently. Firstly, what is considered an air victory is an important question. Then, how to verify the pilot was responsible for the kill? It is crucial information regarding the performance and efficiency of not just the pilot but the unit as well. Stenge devotes a whole chapter to the concept showing the practices of the Royal Hungarian Air Force through contemporary regulations and documents.

There is also a whole chapter on contemporary Hungarian air combat tactics and combat procedures. In addition to technical background and individual quality, this is probably one of the most important factors that can determine the success of a pilot or a flying unit. It follows the tactical development of the Hungarian Air Force between 1938 and 1945. The arc of this is well illustrated by the fact that in 1938-39 Hungarian pilots fought with CR-32 biplane aircraft against the Czechoslovak Avia B-534 fighters, and by 1945 they were flying against hundreds of four-engine US heavy bombers.

If one of the most important indicators of pilots' performance is their kill count, their honours are the visible recognition of this. The military leadership of that time attached importance to these results not only in military aspect. Well-decorated pilots of excellent skill also played an important role in propaganda, both for the military and general public. Of course, these meant not only Hungarian military medals or badges, but also those awarded by the allied air forces. The following section summarizes this diverse system.

After these historical and professional introductions, there is another important chapter, which is a Comparative Table of Ranks of the Air Forces (Hungarian, German, Soviet, and US) involved in combat, followed by a list of abbreviations used in the volume. It is note-

4 Stenge, B. Cs. *Elfelejtett hősök: A Magyar Királyi Honvéd Légierő ászai a második világháborúban*. Nagykovácsi: Puedlo Kiadó, 2006.

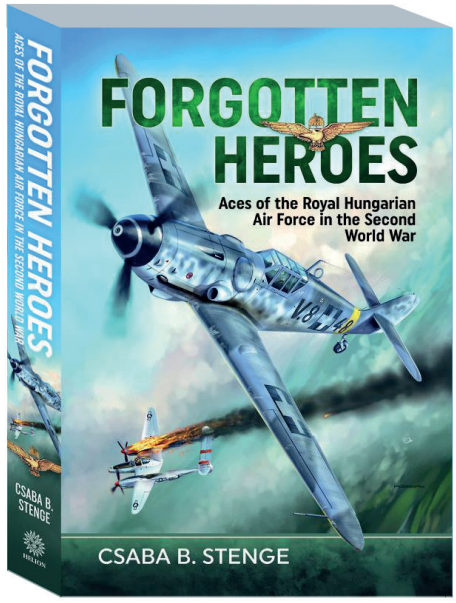
5 Stenge, B. Cs. *Elfelejtett hősök: A magyar királyi honvéd légierők ászai a második világháborúban*. Budapest: HM Zrínyi Térképészeti és Kommunikációs Szolgáltató Nonprofit Kft., 2016.

worthy that the author also provides an English translation of the Hungarian squadrons and the nicknames of the pilots.

After this thorough historical and professional "appetizer" we get to the "main dish", the biographies of ace pilots. These are encyclopaedically processed by Stenge. Under the names of the pilots are the most important flight data: first, the number of kills, successes against ground targets, number of combat sorties and combat hours flown, then the callsign and identifications number. After that is the list of decorations, charted combat victories, and finally, the aircraft flown. These data are followed by the pilot's biography: his family background, years of military service, training, war activities, and the post-war lives and deaths of survivors of the war. Personal accounts of air battles make the story even more lively and exciting. However, these are not just personal recollections: they tell the story and provide an overall evaluation of the World War, the Hungarian Air Force and the Army from the territorial expansion in 1938 to the end of the war and beyond. Because their story did not end in 1945. The survivors could not return home in peace. For the occupying Soviet power and then under the communist dictatorship they became persona non grata, their accomplishments forgotten. Those who stayed in Hungary often awaited death sentence or imprisonment while others had to choose a new country. Famous and little-known names, lives, tragic and uplifting moments. What they have in common is the honour for their homeland, their comrades, combating almost always an overwhelming enemy – enemy air forces or the communist regime: Dezső Szentgyörgyi, 'Drumi', 'Cica', György Debrődy, László Molnár... the list is long.

The biographies are categorized by the number of victories achieved. The first major category is the most successful aces, with a twenty-plus kill count. Then there are the pilots with a ten-plus kill count, and those with a count of five to nine. Beside the fighter pilots we can read about the bomber, reconnaissance, and ground attack pilots, as well as those who achieved their air victories with other air forces. (US Army Air Forces, Luftwaffe).

This richly illustrated volume presents well-documented biographies with multiple unpublished photos; it is the most comprehensive study of the surviving and accessible sources, literature and memoirs to this day. Out of the scattered, incomplete, and monumentally vast database the author created an impressive work due to his great expertise and diligence. Nevertheless, I think it is not only the length and content of the book which is commendable but also the author's effort to reveal the unknown aspects of the past, to commemorate his heroes to professionals and the general public alike, demonstrating his greatness as a premier historian.



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The editors realise that the value and impact of many submissions lie in their timeliness. However, the assessment of papers could take a considerable length of time. To strike a balance between these two contradictory requirements, the editors will respond to each submission with a preliminary assessment within four weeks. Authors are requested not to make further enquiries before three months has elapsed.

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It is difficult to be prescriptive about the use of a certain style in an international multidisciplinary journal. However, as a general guideline, the most important considerations are consistency and clarity: authors may use either UK or US or any other version of English, but not mix them (i.e. no “program” and “programme” in the same paper, except in direct quotes).

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Start all bulleted lists with capital letters. Semicolons are required between bullets and a full stop after the last item in the list.

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Footnote: Scholtz, L. "The South African Strategic and Operational Objectives in Angola, 1987–1988". *Scientia Militaria: South African Journal of Military Studies* 38/1. 2010. 79.
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Reference list: Scholtz, L. "The South African Strategic and Operational Objectives in Angola, 1987–1988". *Scientia Militaria: South African Journal of Military Studies* 38/1. 2010. 77–113. DOI: 10.5787/38-1-80.

Book

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Two or more authors:
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Chapter

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Subsequent reference: Kiras. "Irregular Warfare…". 200.
Reference list:Kiras, J. "Irregular Warfare: Terrorism and Insurgency". In Baylis, J., Wirtz, J. J. and Gray, C. S. (eds), *Strategy in the Contemporary World: An Introduction to Strategic Studies.* Oxford: Oxford University Press, 2010, 185–207.

Internet document

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Subsequent reference: Engelbrecht. "Analysts Welcome Defence Budget Boost".
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Newspaper article

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Thesis

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Subsequent reference: Jordaan. "South African Defence since 1994…" 28.

Reference list: Jordaan, E. "South African Defence since 1994: A Study in Policy-Making". Thesis presented in partial fulfilment of the MMil in Military Sciences. Stellenbosch University, 2005.

Conference paper

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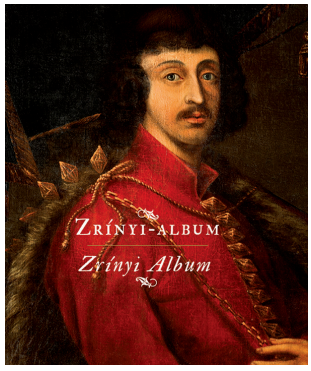

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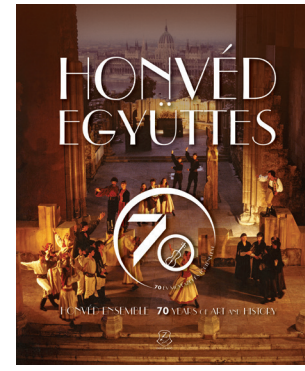

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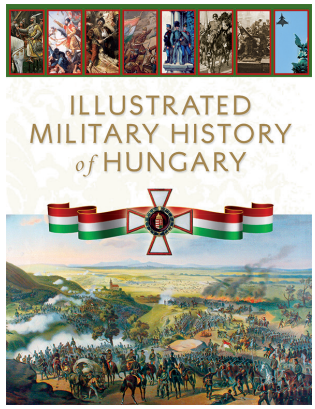

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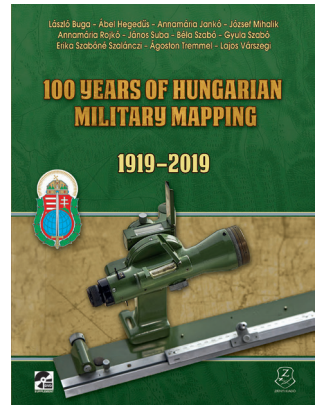

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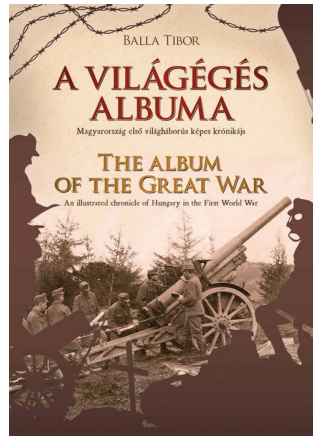

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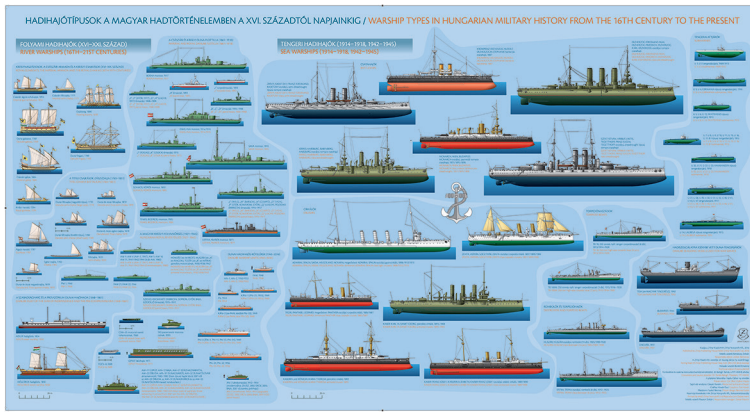

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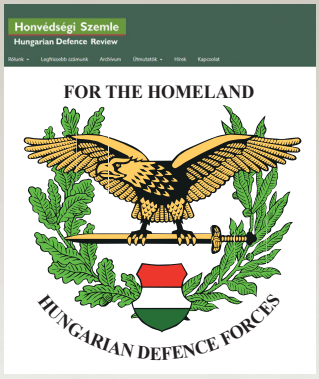

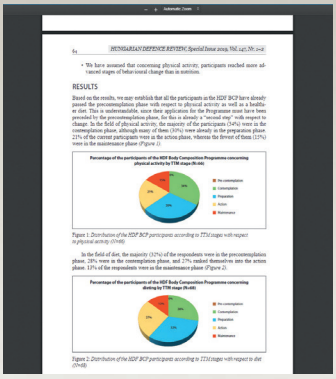

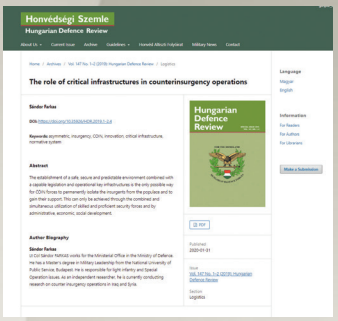

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