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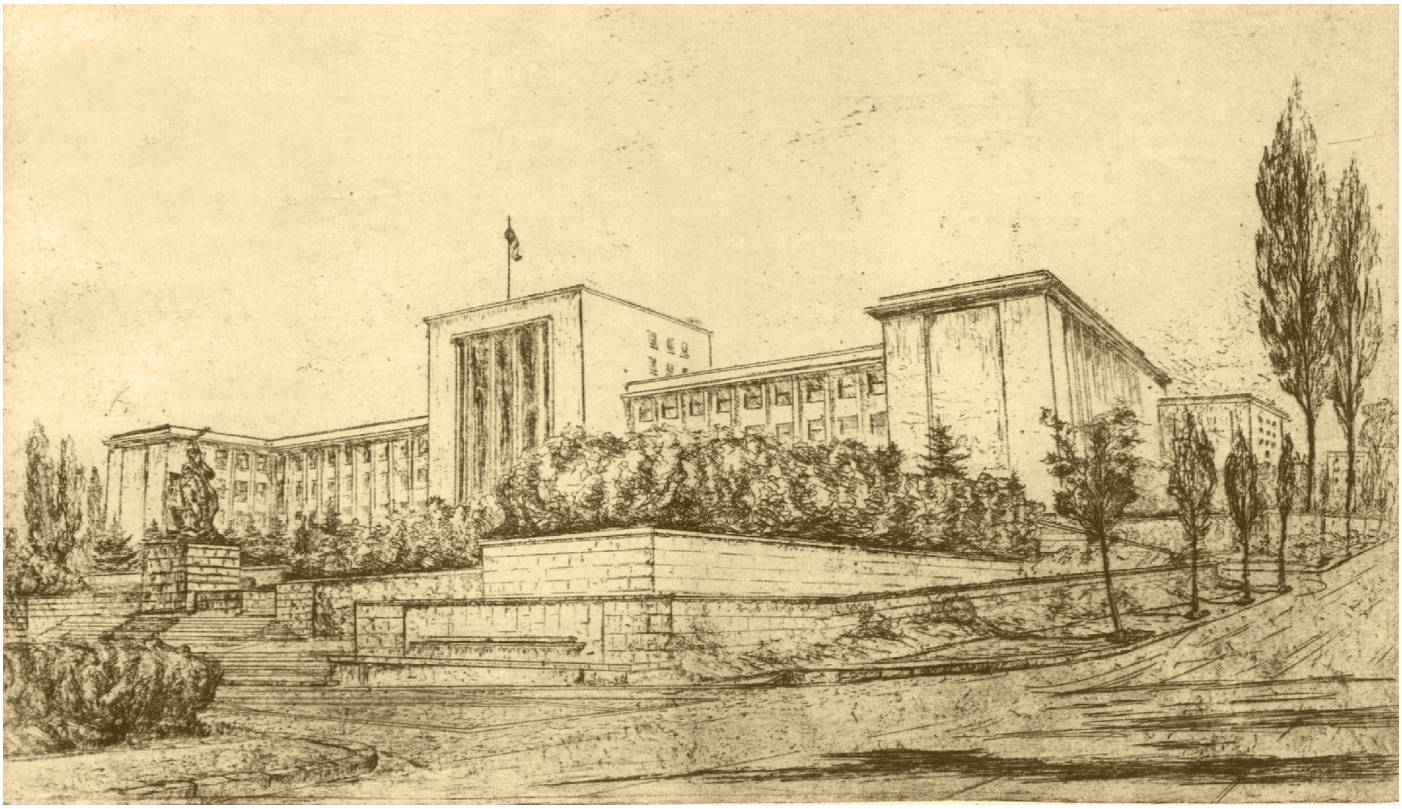

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CONTENT

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THE ROLE AND IMPORTANCE OF A NATIONAL MARITIME SECURITY STRATEGY GIVEN THE "HYBRIDIZATION" OF THE MARITIME DOMAIN

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Maritime strategies have always been part of the solution to strengthen maritime security. in the currently changing geopolitical environment, they apparently need to be readapted to threats that are completely different from the ones in the past: the hybrid ones. in order to cope with this mutant threat comprising all the elements making up the hybrid phenomenon, there is an acute need for revised and even innovative strategic response options. The aim of the paper is to prove that the only way of offering decision-makers a coherent and fully integrated vison, meant to ensure the security of maritime traffic and infrastructure, is the implementation of an adequate maritime strategy. Although it may not be a universal and fully guaranteed solution in this regard, the conclusion of the article shows that it is the only viable and decent answer to the ongoing maritime hybridity.

Keywords: maritime domain; hybridity; maritime strategy.

Throughout history, maritime security strategies came up as capstone strategic documents for addressing the issue of maritime security. For decades, maritime strategies and their implementing plans have been some of the main strategic response options and primary tools and, implicitly, a significant part of the solution for assuring, maintaining and consolidating the *overarching security of the maritime domain*. The idea has been promoted by different experts. For example, one of them, a professor of maritime history, makes a credible case for the maritime strategies of the 20th century emphasizing their importance for the power and influence of a country at peacetime, as well as its possibilities of defence during a conflict (Hattendorf 2013, 1-4).

Yet, in the current security context, when the world is facing elements pertaining to hybrid warfare, riparian states need to understand that, one way or another, the same strategies must cope with that type of threat. The so-called hybridity of nowadays confrontational environment is not a land-centric security issue anymore as it has been continuously extended and expanded offshore, reaching the maritime domain. Actually, hybrid warfare differs from all the others as "it potentially includes and/or combines all domains of warfare" (Najžer 2020, 147). Therefore, taking into consideration that the maritime domain has been transformed into another hybrid environment, the maritime strategies have to continue to represent that sustainable part of the solution for the inclusive maritime security. As shown at the level of military academic community, "a strategy should be proactive and anticipatory; it should clearly define ends, identify ways and develop means for reaching the ends" (Scipanov 2020, 85). In this regard, in the same framework, maritime strategies can be perceived as appropriate and suitable strategic options and tools used for rebalancing and rebuilding the stability and safeguarding the prosperity assured by economic sectors directly associated with the maritime domain. Moreover, this security concern should be on the agenda of every individual maritime nation, of every multinational organizational framework as a cluster of nations sharing the same values, security or economic interests and objectives, nations that together are enjoying and exploiting the benefits and opportunities of the maritime domain.

As shown in the title of this article, its main objective is to bring to attention the issue of the hybridity directly affecting and undermining the maritime security, hereinafter called maritime hybridity. That is in fact our initial and basic assumption that we are going to check: the fact that the maritime domain has already been targeted by hybrid dynamics. Using qualitative research

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methods and analytical procedures we are going to refer to a set of defining aspects from relevant publications dedicated to hybrid warfare in the attempt to raise awareness upon the necessity of shifting the threat perception in the maritime field from the conventional or traditional approach to the one incurred by the combination of unconventional and conventional threats currently manifested. The second research hypothesis would be that, as a normal reaction to the situation, all the strategic tools meant to assure and consolidate the maritime security must be readdressed and reshaped. Arguments regarding this necessity will be brought starting from some existing maritime strategies that acknowledge maritime hybridity and are able to mitigate its undermining goals and effects.

Equally important to mention, this endeavor is conducted in a purely personal note, strictly based on ideas and opinions belonging to the author, which do not represent or reflect, in any way, the official position or policy adopted by the Romanian authorities in the field.

Hibridity in the maritime domain – a new reality?

As shown in one of the most significant current works regarding the maritime domain "the reasons for the importance of the sea can be connected to four broad attributes, stemming from the sea itself: the sea is a source of resources, a medium of transportation, a medium of information and a medium for domination" (Till 2013, 6). It is only natural therefore that the modern approach to sea power cover in large measure "the geostrategic and economic realms" (Najžer 2020, 149). One of the most conspicuous and impactful alert message concerning the imminence of the hybridity rolling out in maritime domain was that raised by Admiral (ret.) J. Stavridis. This prominent figure of both US military and NATO command structure is the author of an article in which hybridity is presented as "spreading into the maritime sphere" (Stavridis 2016, 366) generating a high degree of concern. The fact that a naval flag officer was evidently preoccupied with the evolution of this phenomenon, assessing that hybridity was going to register another level of novelty by pivoting to the maritime domain is notable for many reasons.

Firstly, because that imaginary, but still scary, scenario described by Stavridis talked of a mechanism focused on gradually eroding and directly affecting the maritime infrastructure, luring, influencing and winning the minds of the targeted audiences in the benefit of the hybrid aggressor. At that specific moment in time, that stuff could have been perceived as just simple food for thought. Currently, it could easily be assessed as an accurate, confident and gloomy prediction. At that specific moment, in 2016, the only inadvertence was the time horizon expected and anticipated for the manifestation of the hybrid threats in the maritime domain. Stavridis initially predicted a decade, which in reality was definitely just half of it, if not less.

Secondly, from another angle, the picture depicted by Stavridis can be simultaneously seen as a subtle metaphor, translating the famous 2014 *little green men* showing up in Crimean Peninsula into *little blue men* emerging in the maritime domain. Moreover, regarding its predictive character, that red flag gave us a strong flavor of the possible role played by the instruments of power involved in maritime hybridity, respectively the military, diplomatic, and informational ones. The specific tactics used in that imaginary maritime hybrid aggression described by Stavridis consisted in a combination of hard and soft power, an overlapping of paramilitary and military-style highly kinetic actions, conducted by maritime platforms, completed by cyber-attacks, influencing propaganda and diplomatic interference. Deductively, all those instruments of power are supposed to be used in support of the economic one, due to the tendency of extending control over any disputed zones and territories in the maritime domain and implicitly the access to offshore maritime resources. Shortly, these could be seen as the quintessence and the real stake of maritime hybridity, as "maritime hybrid warfare is based on a series of small individual steps or stages, each of which does not upend the maritime balance of power on its own" (Najžer 2020, 152), but together may have an extremely significant effect.

Because we have already used the 2014 Crimean Peninsula annexation as a well-known reference of the hybrid phenomenon recognition, according to some experts, even that episode had "many maritime elements" (Murphy, Hoffman and Schaub 2016, 4). The list of tactics used included different hostile and aggressive actions such

as chasing, bumping, disabling and damaging, boarding, seizing and confiscating the naval ships of the Ukrainian fleet. In fact, according to the same source, that was possible because the Ukrainian naval forces were literally trapped and unable to go to sea after the scuttling and sinking of a Russian warship in the middle of Sevastopol harbour entrance, almost totally chocked by that voluntarily wrecked naval platform.

Furthermore, it is worth mentioning that the majority if not all of the same tactics associated with hybridity in the maritime domain were used in the 2018 Kerch Strait incident for denying and blocking the free passage through that natural bottleneck and transiting point between Black Sea and Azov Sea. That perception is supported by the detailed description of the incident within the framework of an elaborated analysis belonging to a multinational group of specialists (Ducaru and Hodges 2018, 3), also including two representatives of the New Generation Warfare Center, an organizational entity totally focused on the study of this type of threat. Even though in this specific case that violent escalation of force was considered the end of hybridity (Ducaru and Hodges 2018, 4-8), we believe that it actually did not happen, given the further developments, dynamics and evolutions of the regional security situation and of the maritime security of the Black Sea.

In these conditions, unfortunately, the above mentioned warning raised by Stavridis has gradually become a reality or a *new reality*. A supportive argument for that is the content of an important strategic document belonging to one of the most powerful maritime nations, the United States (US), that has revealed exactly the same thing. Here we are talking about the latest 2020 US Tri-Service Maritime Strategy that acknowledges that this type of *maritime hybridity* is present in the maritime domain. Thus, in its preamble (Navy 2020, 1-6), two state actors, People's Republic of China and Russian Federation, are indicated as excelling in the current competition continuum by employing their own instruments of power for undermining and remodelling the international order and governance to their own benefit, by promoting and pursuing unilaterally their interests. By doing that, both perpetrators are trying to "exert control over natural marine resources and restrict access to the oceans" (Navy 2020, 2).

This combination of getting control over maritime domain resources, of imposing restrictions and impeding in any way on the legally granted rights to access and use sounds illegitimate or even illegal. In real life, in daily routine activities specific to all economic sectors related to the maritime domain, that sort of limitation or interdiction equals implicitly a denial of the freedom of navigation and maneuver. Those denials and interdictions in the maritime domain are far from inducing the idea of a safe and secure environment. This level of unsafety and insecurity affects regionally or even globally the supply chain, a disturbing factor which can generate, in a cascading way, both security implications and repercussions for international community. And that for the simple reason – if we keep in mind the last number - 90 – from the "70, 80, 90 rule" (Garcia 2014, 2), that defining formula for the maritime domain – that 90 percent of the worldwide commerce is assured by maritime transportation. That domino effect will create economic and social security disturbances and imbalances with a high toll on medium and long terms. Actually, it has been already acknowledged that "non-kinetic hybrid warfare has become the preferred way of engaging in coercion and geo-strategic competition" (Najžer 2020, 170).

If we corroborate that piece of information with the assumption presented by the Hybrid Center of Excellence in its dedicated handbook on maritime hybridity, respectively that the sea lines of communication represent a "potential instrument in Hybrid Conflicts" due to the "disturbances in shipping" (Savolainen and Gill 2019, 11) we think that our initial assumption starts to be increasingly concrete and justified.

Even though throughout the earlier invoked new US maritime strategy there are no direct references to any of those well-known concepts directly associated to hybridity, like *hybrid warfare* or *hybrid threats*, *hybrid tactics*, the way of approaching and defining this new reality in the strategy's "Problem Statement" itself tells us tacitly a different story. The invoked vulnerability of the maritime domain to that sort of "malign behavior below the threshold of war" (Savolainen and Gill 2019, 6) does represent an essential hint in terms of hybridity. And here we have in mind the description provided in the content of the first product of Multinational Capability Development Campaign project,

namely Countering Hybrid Warfare (MCDC/CHW), dedicated to facilitating the understanding of the hybridity, and named accordingly in a self-explanatory way – *Understanding Hybrid Warfare.* As part of the conclusions, hybrid warfare is depicted as operating and remaining below those "thresholds of detection and response" (Cullen 2017, 26) which, in our opinion, is basically the same modality of describing the phenomenon in other words.

Anyway, in terms of acknowledging this new hybrid reality, this 2020 US maritime strategy does represent a big step forward. At least, if we compare it with the previous 2015 version (U.S. Navy 2015), which presented the conventional and traditional threats, but did not mention anything about the hybrid threats nor give any clue about maritime hybridity. After a brief analysis, we can state that the same situation is to be found in the case of other relevant maritime strategies belonging to two different security constructs with multiregional ambitions in the maritime domain, North Atlantic Treaty Organization (NATO) and European Union (EU). Neither *Alliance Maritime Strategy* (NATO 2011), nor *EU Maritime Security Strategy* (Commission 2020), mentions anything about maritime hybridity, both of them covering strictly the more traditional and more conventional threats affecting maritime security. In both cases, most probably there could be an explanation and, why not, an excuse for this, respectively their specific years of being designed, developed and launched: 2014 for NATO maritime strategy and 2015 for EU maritime at least when we use as a timeline reference the 2014 Crimean episode.

Therefore, despite the fact that the real potential and the possible existence of the hybrid threats in the maritime domain did not get enough attention, as we have illustrated earlier, this new reality of maritime hybridity has become more and more visible, harder and harder to be ignored. We will thus consider maritime hybrid warfare as "the hybrid warfare which takes place at or from the sea" (Najžer 2020, 152). Next, we will try to identify and explain the possibly best strategic options and solutions for countering this insidious threat.

Maritime strategies – strategic options and instruments for countering maritime hybridity

Based on this new reality, actively tailored by maritime hybridity, we will try to identify and emphasize the strategic solution and sustainable option for a successful formula of dealing with this serious maritime security issue. Definitely, the simple fact that you are totally aware of the existence of a specific threat, no matter its conventional or unconventional character, is an incontestable advantage; yet, just by being aware of the existence of the hybrid threats in the maritime domain, we cannot say that the issue is solved. As shown by Lawrence Freedman, "the conflicts of the 2000 have demonstrated the need for an approach that combines general understanding of strategic behaviour with the specifics of a set of conflicts which are individually complicated" (Freedman 2016, 419).

Regarding strategic tools and solutions for coping with this new reality and for avoiding its turning into a *new normality* or a *new routine*, besides some ad-hoc responsive reactions and neat solutions providing temporary and fragmented problem-solving options to some particular situations, the strategic response option, that integrating solution providing the big security framework, must be a comprehensive one, covering the maritime domain complexity in its entirety and particularly addressing to its specificity. For getting the real sense of the bigger picture of maritime security affected by hybridity, this type of threats and actions can be prevented and countered only by a complete understanding of a series of patterning characteristics and defining factors associated with hybrid warfare, which are fully applicable in this specific case of maritime domain. Among them, we can mention the hybrid aggressor's modality of gradually involving and using its instruments of power. In other words, that is the same orchestrated horizontal and vertical "escalation" of hybridity, graphically depicted in MCDC/CHW project (NATO 2011, 9), or the equivalent of the gradual behavioral changes of the hybrid aggressor. That equivalence can go further and be seen as the variation, intensification and synchronization of its continuously adopted and adapted hybrid actions, tactics and methods for targeting the maritime domain-related "critical functions and vulnerabilities" (NATO 2011, 9) of the targeted part that is under hybrid aggression.

For a better and easier modality of portraying the challenge presented by the maritime hybridity and its specific threats and actions, all the above

factors can be reflected via some simple, but still basic questions that decision-makers should consider. The first question would be: *What exactly is currently going on in the maritime domain, at which scale and with what amplitude?* Or in a simplified version, that would be the big concern regarding the ongoing posture, plans and actions of the hybrid aggressor, and the orchestration of its instruments of power exploited covertly and overtly for hybrid purposes. Probably for answering that you have to look closely at the aggressor's way of doing things and to try to understand and interpret what is happening in reality, beyond any deceptions and blurred perceptions. Additionally, you have to get the real scale of those actions, to see who and what is really behind those actions and to understand their overt or covert character.

The second question would be connected to the first one and related to the possible evolution of that kind of hybrid behavior along a time scale. That could be simply expressed as: *What are the short, medium and long-term intentions and benefits of the hybrid aggressor intrinsically interrelated to the maritime hybridity?* By that we could anticipate the next moves and actions of the same hybrid actor in the same domain and already to crystalize the motivation and the trigger of this hybrid behavior. For that, for understanding the fueling and the combustion of its determination, you have to try to put yourself in the aggressor's shoes, to try to look at the maritime domain in the same way as the hybrid aggressor does and, if possible, with the same virtual lens.

Based on those two previous questions and deep concerns, there is another important question to clarify. The third basic question would be related to the so-called end-state of this maritime hybridity, or *What are the real objectives and desired effects of the hybrid aggression in the maritime domain?* By that it would be easier go deeper into the matter so as to get a more intimate sense of the cumulative gains and benefits of the maritime hybridity planned and committed by the perpetrator. Generally speaking, in this competition continuum, that would not be so difficult for the maritime domain since, as we stated in the previous section of the paper and in accordance with the similar explanation offered in the US maritime strategy, the major motivator looks to be that race for free access and exploitation of maritime resources. That, of course, is naturally corroborated with controlling and exerting influence in more numerous and more extended maritime areas.

If the first three basic questions can be easily seen as predominantly aggressor-centric for the sake of trying to clarify the dynamics of its hybrid aggression, the following ones should be seen as a self-centric radiography of the part targeted by the hybrid aggression that must react and counteract to protect and defend itself.

Therefore, the fourth question should be focused on one's own vulnerabilities and would sound like this: *Which of own maritime domain's activity sectors are the most vulnerable in a hybrid context?* This question is valid just because threats and vulnerabilities work hand in hand, and the probability of increasing the level of the threats rises exponentially with the vulnerabilities.

The next one comes naturally and can be easily phrased as: *What must be done to reduce or even eliminate your specific maritime-related vulnerabilities*? In this case, the message is very clear, and the action is not so hard to predict. All specific vulnerabilities must be identified via an internal mechanism, by involving all the maritime community, no matter if that is done nationally or at multinational level, in a purely individual or regional approach.

The last but not least basic question should be the one hitting directly the core of the issue: *Which are the most appropriate tools and response options against maritime hybridity?* This one is getting us to the core of our present scientific endeavor.

All that construct is supported and somehow validated by the general framework of countering hybridity (Cullen 2017, 17-23). In this specific framework, the first aspect emphasized *is making it clear what the threat is and what to do specifically towards its countering after being discovered and identified*. Regarding this, the countering framework includes the need of setting some decisive and ultimate goals correlated with the level of ambition assumed for that. In addition to *setting strategic goals*, there is a need for *setting thresholds* or establishing those *red lines* that are not acceptable to be crossed.

At this point we have to come back to the problem itself and remind one of the maritime hybridity patterns, the synchronized exploitation of the instruments of power. That brings invariably

in discussion the concept of strategy or more precisely of the grand strategy. According to W. Martel, one of the functions, and we humbly would add the roles, of a grand strategy is "to coordinate, balance, and integrate all types of national means" (Martel 2015, 24). Martel includes on its list of means only the "diplomatic, economic, technological, and military power" (Martel 2015, 25), but in the specific case of maritime domain, due to its complexity and unicity, we would also add the legal, informational, intelligence means in order to "achieve the articulated ends" (Martel 2015, 28). Even though the instruments of power are not invoked directly by Martel, we can easily associate them with those power levers, the *means,* a distinctive part of that inseparable triad composed by *means-ways-ends*. Also, if we translate that in the hybrid aggressor way of thinking and doing things, if we are joining all the existing and deductive dots, this can be easily deciphered as a real and palpable framework and pattern applicable to a grand strategy, focused on hybridity. This assumption is a decent and sustainable one, since according to J. Schmidt, one of the Hybrid COE experts, in case of hybridity, everything is about a strategy, a "hybrid, grand strategy" (Schmid 2019, 5). Definitely, the hybridity manifested in the maritime domain, like in any other domain, is not the result of a chaotic and ad-hoc thinking and acting to do erratic things. Most probably, it is implemented and put into practice in accordance with an elaborated strategy, a hybrid strategy.

For that reason, in these circumstances, we do believe that the strategic option, the desired solution, is right in front of our eyes. All we have to do is to put together all the relevant factors, to answer that set of those basic questions and, on a case by case basis, to establish the legal thresholds additionally to the other relevant ones. Establishing, prioritizing and reviewing, if necessary, the maritime security objectives, corroborated with the maritime security interests, could constitute the working framework for materializing this big solution. That heterogeneous conglomerate could be both the backbone and the starting point for creating and building up a coherent strategy or, why not, for updating an existing one. The same argument can be found in the above mentioned MCDC/CHW work, as one of its key points, in fact a necessity in terms of designing and implementing "a strategy to counter hybrid warfare" (Schmid 2019, 9). Based on this fundament, we have to fully accept and agree that in this specific case of maritime hybridity the most suitable and applicable strategic option and solution would be *a maritime strategy*.

Generally speaking, "we can say that where we can find evidence, or infer, that state leaders have defined large-scale objectives (…) and allocated resources (…) we are dealing with strategy" (Heuser 2020, 20). In this context, we could say that a maritime strategy makes the connection between the political and the military domains, dealing with "the principles governing a war in which the sea is a substantial factor" (Corbett 2915, 8). Therefore, the idea is to come up with a new or to update an existing one so as to decrease the level and degree of maritime insecurity and instability. At the same time, that would be the appropriate tool to restore, maintain and rebuild the maritime security affected by a hybrid strategy. In these conditions, in terms of maritime security, that maritime strategy would be quite the opposite of the hybrid strategy.

Benefits of the strategic response options to maritime hybridity

As we have shown above, "the maritime battle space is complex and multi-dimensional, and success in naval warfare will require navies to overcome a wide variety of threats across different but interconnected environments" (Speller 2014, 173). The maritime strategy can provide a coherent and fully integrated vision for safeguarding the maritime traffic and infrastructure. Maybe this is not a universal and fully guaranteed solution, a one-size fits-all formula, but could be accepted as a compelling, viable and decent enough answer to the ongoing, continuously amplifying maritime hybridity. That way of approaching and revealing things, similarly to what has been done in the specific case of the earlier exemplified 2020 US Maritime Strategy, is a strong point. The simple fact that a completely relevant maritime strategy admits the existence of this kind of hybrid challenge in the maritime domain is a step forward, a real and visible progress, for a number of reasons.

Firstly, when it comes to increasing awareness, through that open way of admitting and revealing the existence of these kind of threats directly affecting the maritime domain, we can assess this approach as being the appropriate one. If you want to face an

issue, to handle it properly and to provide adequate solutions, you have to fully understand that issue, to admit that there is an issue and to strive to manage it. Rejecting or ignoring that specific issue could be an approach, but a temporary one just aggravating and deepening the seriousness and the haziness of the issue itself. On long term we can predict that could be simply a strategic gaffe.

Secondly, that would be a red flag for the end-user community of any maritime strategies. Here we are referring to the maritime community but also to different types of leaders from politico-diplomatic, and politico-military level, CEOs, naval flag officers and commanders accompanied by a multitude of advisors, subject matter experts, any other kind specialists covering different areas of expertise, both practitioners and exponents of different domains as security and defence, economy, technology, law, maritime infrastructure, no matter their institutional affiliation. As a matter of fact, strategy itself, at general level, is the one "making the connection between the military power and the political decision of a state" (Gray 2010, 28). This approach would create a solid ground for increasing the level of awareness and alertness about the hybrid interference in the maritime domain. Since maritime strategy itself is a vehicle of strategic communication, its existence can assure a real wake-up call for those not so or yet aware of the hybridity dynamics in the maritime environment.

Thirdly, these strategic options, the maritime strategies, are also important for improving the maritime security culture, for altering and even changing mentalities, modifying the more conventional mindset regarding the threat perception at least among maritime community members.

Regarding the pragmatic side, taking into consideration and starting from those three meanings of a strategy smartly portrayed by N. Silove (Silove 2018, 27-57) we can assume that all of them would be useful for preserving and consolidating maritime security. On one hand, those "grand plans" could be helpful for implementing the maritime strategies. On the other hand, that "grand posture" and that "grand behavior" in maritime domain could assure both a credible deterrence and a robust response. Finally, the grand plans, posture and behavior on a general level could also be derived from these maritime strategies, constituting collateral benefits of this specific strategies. Therefore, the solution for countering maritime hybridity would be elaborating a maritime strategy capable of covering the following aspects:

- acknowledging the existence of hybrid phenomenon in the maritime domain and offering details regarding hybrid threats and attacks;
- establishing and implementing a framework for countering maritime hybridity;
- identifying concrete solutions, pro-active, pre-emptive and reactive measures, capable to ensure the timely detection, deterrence, and countering of the entire spectrum of hybrid threats.

This triple combination is also the essence of the second product of the MCDC/CHW project dedicated to countering hybridity (Cullen 2017). In this product, *detect, deter and respond* are some interdependent and basic components creating a sort of cycle for countering hybridity. Implicitly, they also represent some viable tools and options in the framework of countering hybrid warfare. That triad is the combination of measures meant to assure an adequate level of situational awareness, enough dissuading, discouraging and preventing measures of any further hybrid aggression or the legitimate reaction in case of crossing the red lines. In our maritime-focused analysis, we can exploit in a creative way our imagination and translate this cycle into something more palpable and fitted for any countering endeavor. Here we refer to a *trident*, resembling the one used as a weapon and scepter by the God of the Sea, Poseidon, whose three little spears or prongs can be associated with those three essential components of hybridity countering strategy. The suggestive image of this reinvented, contemporary trident is depicted below.

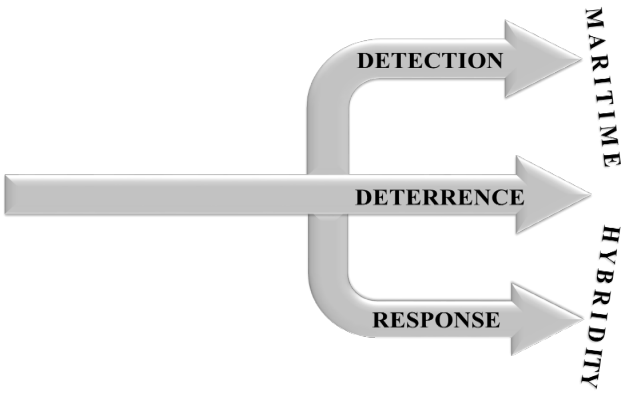

Figure 1 *Countering maritime hybridity "trident"*
Source: author

Conclusions

Maybe initially maritime hybridity was as invisible, insidious, and surprising as the torpedo-related tactics in their early days and those were the specific reasons for its lack of conspicuousness. But apparently, more recently, it has been more obvious, more intuitive and not so ambiguous as it used to be. To acknowledge this fact was one of the specific aim of this endeavor.

So, we can affirm that hybridity in the maritime domain has become gradually an incontestable fact and there is no more room for ignoring this new reality, for diminishing or making it to look less important and significant than it is. No matter how new or old it is, the presence of the hybrid phenomenon in the maritime domain is a reality that must be handled in a proper way. The article constitutes a pseudo-manifest pleading for the need of acknowledging this new reality and for countering it in order to avoid letting it become a new normality. The main focus was on providing a doable and feasible a strategic response option for managing this type of complex threats manifested in the maritime domain. The identified one was the maritime strategy. In this context, a maritime strategy is not only a strategic response option to do that, but also both a tool and a solution for countering maritime hybridity.

Also, we were able to validate and confirm our initial assumptions, respectively that there has been hybridity in the maritime domain, that the maritime strategies could be a strategic solution for countering this maritime hybridity. The latter is a fact validated inclusively through their specific benefits of those strategic response options.

As a strong recommendation, *all the relevant maritime strategies should be updated and readjusted* in order to be aligned with a type of approach similar to the one comprised in the new US Maritime Strategy, and likewise *the countries that do not have such a strategy should try to elaborate and implement such a document as soon as possible*. By that we mean *admitting and emphasizing this new reality, the infiltration and existence of the hybridity in maritime domain*. Among those relevant strategic capstones, we can recall at least two multiregional and multinational-focused maritime strategies, respectively the NATO and EU maritime strategies. Once aligned and synchronized in countering the maritime hybridity, altogether those strategies could make a difference at maritime community level. For, as Geoffrey Till was saying, "…if the seas are not safe, then nothing else can be safe" (Till, Geoffrey 2012, 179).

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THE SECURITY IMPACT OF THE MILITARIZATION OF OUTER SPACE

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The competition for the military conquest of outer space dominated the public agenda during the Cold War. It was the spatial side of the geopolitical competition between the capitalist West and the communist East. It started with the researches for the development of strategic armaments and it ended with the military space programs launched by the great powers of the post-war era, which transformed the outer space into a real theater of operations. A theater currently relieved, by the Cosmic Space Treaty, of weapons of mass destruction. However, the unregulated military action in outer space, and especially the problems of defining the boundary between outer space and atmospheric space, can become explosive at any time. This article aims to present the main space powers, the space military programs they run and the potential security impact of the militarization of outer space.

Keywords: space militarization; Star Wars Program; reconnaissance satellites; Russian orbital service station; Artemis Accords; Outer Space Treaty.

Motto: "A new space race has begun [...]. This race is not [about] political prestige or military power. This new race involves the whole human species in a contest against time".

Ben Bova (1932-2020),
science-fiction american writer

During the 65 years from the launch of *Sputnik 1*, the first artificial satellite of Earth, mankind has transformed space into a theater of military operations, in which space forces operate, in which military exercises take place, and in which technological advancement is more visible than anywhere else. How widespread is the militarization of outer space? What are the main space military powers and what military programs have they developed? And, most importantly, what could be the security impact of the militarization of outer space?

"Star Wars Program"

In October 1949, US President Harry S. Truman (1884-1972) established the *Joint Long Range Proving Grounds* at Cape Canaveral, Florida, a range for testing intermediate and intercontinental ballistic missiles. Two years later, in 1951, in its immediate vicinity, the Air Force transformed *Banana River Naval Air Station* into the headquarters of the Air Force Missile Test Center. In 1964, the two facilities were renamed the *Air Force Eastern Test Range*, which in 1977 became the *Detachment 1, Space and Missile Test Center*, and in 1979 the Detachment 1, Space and Missile Test Center was renamed *Eastern Space and Missile Center* (NASA 1972).

In the mid-1950's, rocket technology in the United States reached the stage where Earth satellites could be launched. The opportunity arose in July 1955, when President Dwight D. Eisenhower (1890-1969) announced that the United States would put a satellite into orbit as part of the American contribution to *The International Geophysical Year* (IGY) 1957-1958. The American *Explorer-1* satellite was successfully launched on February 1, 1958, three months after the Soviets placed Earth's first low-orbit artificial satellite, *Sputnik-1*, on October 4, 1957.

The success of placing artificial satellites on Earth low-orbit led to the creation, on July 29, 1958, of the *National Aeronautics and Space Administration* (NASA), through the *Space Act* adopted by the United States Congress. And, on December 13, 1958, it led to the establishment of

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the *United Nations Office for Outer Space Affairs* (UNOOSA n.d.), the first international body dedicated to peaceful international cooperation in outer space.

NASA took over the laboratories of the *National Advisory Committee for Aeronautics*, including the *Wallops Station* in Virginia and four research centers: *Langley Memorial Aeronautical Laboratory* (renamed *Langley Research Center*), Hampton, Virginia; *Lewis Flight Propulsion Laboratory* (renamed *Lewis Research Center*), Cleveland, Ohio; *Ames Aeronautical Laboratory* (renamed the *Ames Research Center*), Moffett Field, California; and the *High Speed Flight Station* (later the *Dryden Flight Research Facility*), Edwards, California. Later, in 1959, the *Beltsville Space Center* (renamed *Goddard Space Flight Center*) was established in Greenbelt, Maryland, and the Vanguard operations group in Cape Canaveral, renamed the *Goddard Space Flight Center's Field Projects Branch* officially became NASA's first launch team, responsible for launching most pioneering satellite programs, including lunar and planetary probes, and the world's first meteorological and communications satellites (NASA 1972).

In December 1959, the *George C. Marshall Space Flight Center* was established in Huntsville, Alabama, with the mission of launching heavy spacecraft, subordinated to *Marshall's Launch Operations Directorate* from Cape Canaveral – the organization that would create the *John F. Kennedy Space Center* three and a half years later. In December 1964, the launching elements of the *Houston Crew Space Crew Center* (now the *Johnson Space Center*) were transferred to the *Kennedy Space Center* (NASA 1972). In May 1961, astronaut Alan Shepard (1923-1998) became the first American to make a suborbital flight, and at the same time, President John F. Kennedy (1917-1963) announced the launch of the *Apollo Space Program*, through which the United States would transport people to the Moon and back. On December 24-25, 1968, the *Apollo 8* manned mission made its first lunar orbit flight, and on July 20, 1969, the *Apollo 11* manned mission made its first landing on the moon, opening a new stage in human history.

On the other hand, in the late 1950s, during the administration of President Dwight D. Eisenhower, the American scientific circles launched the *Ballistic Missile Boost Intercepts Project* (BAMBI). It was to deploy satellites in Earth orbit to carry interceptor missiles capable of attacking Soviet intercontinental ballistic missiles (ICBMs) shortly after their launch. This interception in the boost phase of multiple independently targetable reentry vehicles (MIRVs), usually with multiple thermonuclear warheads, could have successfully neutralized all warheads. But, the project was abandoned due to the enormous costs involved (Broad 1986).

A decade later, however, the project was revitalized as *High Frontier*. This time, it aimed to create a multi-layered surface-to-air missile shield, which could track, intercept, and destroy enemy ballistic missiles. These issues were included in the report entitled *High Frontier: A New National* Strategy, published in 1982 by Daniel O. Graham, former head of the US Defence Intelligence Agency. As stated on the website of this project, "the foundation of High Frontier concepts was the abandonment of the suicidal and immoral strategy of Mutual Assured Destruction (MAD) for the concept of Assured Survival through the creation of effective defences against ballistic missiles" (High Frontier n.d.).

On the other hand, in 1972, the two hegemonic powers of the Cold War signed *The Anti-Ballistic Missile Treaty* (ABM or ABMT), which remained into force from 1972 to 2002. Under the terms of the treaty, each party was limited to two ABM complexes, consisting of 100 anti-ballistic missiles. This was followed by the signing in 1972 and 1979 of the *Strategic Arms Limitation Talks* (SALT) I and II and then, in 1991, of the *Strategic Arms Limitation Treaty* START 1. All these documents prohibit the placing of nuclear weapons or any other type of weapons of mass destruction in Earth orbit, including split orbital missiles.

Around the same time, in the late 1970s, another group of researchers, led by physicist Edward Teller (1908-2003) – "the father of the hydrogen bomb", proposed the Excalibur Project – which aimed to develop a space-based laser (SBL) able to shoot down dozens of missiles in one fell swoop (DARPA n.d.).

Briefed about the new defence projects, on March 23, 1983, US President Ronald Reagan (1911-2004) announced the launch of a military program called the *Strategic Defence Initiative* (SDI).

The project was intended to ensure the defence of US territory through a shield against strategic ballistic nuclear weapons (intercontinental ballistic missiles and ballistic missiles launched from the submarine), which could have been launched by an enemy state. The missile defence system, which included the installation of space launcher batteries equipped with radars and lasers in outer space, was nicknamed the *Star Wars Program* (SDIO 1984). In 1984, the *Organization of the Strategic Defence Initiative* was established, with the mission of coordinating the research program. And in 1985, within the United States Armed Forces, the *United States Space Command* (USSPACECOM) was created.

In the meantime, many of the research directions targeted by the program failed. The Excalibur Project proved to be unviable, being limited to anti-satellite defence, and the High Frontier, renamed the *Strategic Defence System* (SDS), *Phase I Architecture*, did not gain much confidence. In the late 1980s, researchers at *Lawrence Livermore National Laboratory* introduced the concept of *Brilliant Pebbles*, a swarm of space sensors, which became the basic model for SDS Phase 1.

But the year 1991 radically changed the paradigm. The dismemberment of the USSR made the Brilliant Pebbles concept, designed to counteract widespread nuclear attacks, useless. It was replaced by *Global Protection Against Limited Strikes* (GPALS) – a combined system of mobile ground missiles, numerous low-orbit satellites – *Brilliant Eyes* and the *Pebbles System*. Later, the Brilliant Eyes Satellite System was renamed the *Space and Missile Tracking System* (SMTS), and in the late 1990s it became a low-orbit component of the *Air Force's Space Based Infrared System* (Global Security.org n.d.).

Amid East-West relaxation in 1993, the Bill Clinton administration shut down SDIO and established *The Ballistic Missile Defence Organization* (BMDO), later renamed the *George W. Bush Missile Defence Agency*. On November 20, 1998, *The International Space Station*, the largest space object, was launched into orbit. It was the result of the collaboration of five major space agencies in the United States, the Russian Federation, Japan, Canada and Europe (Howell 2021). Also in 2017, NASA launched the *Artemis Program*, an international program that, by 2025, aims to resume human transport to the Moon, on the lunar South Pole, and then to Mars (NASA n.d.).

In the following years, the *Star Wars / High Frontier Program* – heavily criticized by some (Edward M. 1986), strongly supported by others (Lardner 1992) – though it was not officially mentioned in US documents, continued to develop, in one form or another, without being, however, fully materialized[1]. Theater missile systems such as Patriot and THAAD, Alaska and California ground ICBM interceptors, Iron Dome, Aegis system, Global Positioning System (GPS) satellite navigation are the results of this program (High Frontier n.d.).

In 2018, US President Donald Trump announced the establishment of the US Space Force, publicly stating that "space is the world's newest war-fighting domain" (Kennedy 2019). In 2019, Pentagon officials requested funding for researches into space lasers, particle beams and other new forms of missile defence, so that in 2023 they will be able to test the first such weapons systems in space (Tucker 2019). The first meeting of the National Space Council (NSC) took place on December 1, 2021. On this occasion, Vice President Kamala Harris stressed that "space planners should look down at their home planet as well as out into the cosmos" (Wall 2021). A sign that the US space program has not been interrupted, on the contrary, it has entered into the next stage, of the state policy and the Grand Strategy.

Russian military space program

Unlike the Americans, who developed the space program as a result of the collaboration between the US Army and civilian institutions such as NASA, the Russians devoted this area exclusively to the

[1] Over time, Star Wars Program has been structured into the following researches categories: 1. *Ground Programs*: Extended Range Interceptor (ERINT); Homing Overlay Experiment (HOE); Exoatmospheric Reentry-vehicle Interceptor Subsystem and High Endoatmospheric Defence Interceptor, Ground-Based Interceptor; 2. *Directed Weapons Systems Development Programs (DEW)*: X-ray lasers powered by nuclear explosions; Deuterium fluoride chemical lasers; Neutral particle beam accelerators; Relay mirrors placed in space to direct laser beams; 3. *Space programs*: Space interceptors; Brilliant pebbles; 4. *Sensor development programs*: Boost Surveillance and Tracking System (BSTS); Space Surveillance and Tracking System (SSTS); Brilliant Eyes. See: About High Frontier – Past, Present, Future, op.cit.

military factor.

Between 1947 and 1956, a ballistic and meteorological missile launch pad was built at *Kapustin Yar* in the Astrakhan region (SOROKINA 2021). On February 12, 1955, the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the Soviet Union issued a joint executive order, codenamed *The Tayga Installation*, to establish the domain of scientific research into outer space (Tayga 1957).

On June 2, 1955, the space military base near the town of Tyuratam, in the Kyzylorda region of the Kazakh Soviet Socialist Republic, now the Republic of Kazakhstan, was established. Subordinate to the Soviet Strategic Missile Forces, the 6700 km^2 polygon, the world's first and largest spaceport, is also known as the Baikonur Cosmodrome (Sorokina 2021). In 1957, the *Plesetsk Cosmodrome* was built in the Arkhangelsk region. It was intended for launching smaller spacecraft (such as meteorological satellites) as well as for testing missile complexes (Sorokina 2021).

On October 4, 1957, the Soviet Union successfully launched *Sputnik 1*, the first artificial satellite in a low-elliptical orbit of the Earth. In 1959, the Soviets launched the space program *Luna*, which aimed at the production and placement of satellites and lunar robots for scientific purposes. On January 2, 1959, *Luna 1* was launched, the first man-made object to reach heliocentric orbit (NASA 1959). On September 12, 1959, *Luna 2* landed on the Moon, and less than a month later, *Luna 3* took its first photos of the dark side of the Moon.

Then, in August 1960, the Soviets recovered a spacecraft that carried animals in Earth orbit, and in February 1961 launched a space probe that measured the atmosphere of Venus. On April 12, 1961, Russian cosmonaut Yuri Gagarin (1934-1968) became the first person to travel in space. In the 1960s, the Soviets launched another two other manned space programs. The first one aimed at launching, with a Proton-K missile, a monthly *Soyuz 7K-L1* (Zond) flight mission. The second one aimed at launching, with the *N1 missile*, Moon-landing manned-missions using *Soyuz 7K-LOK* and *LK spacecrafts*. Both programs were unsuccessful (Zak 2020). And on April 19, 1971, the Soviets launched into low Earth orbit *Salyut 1* (DOS-1), the world's first space station. Other seven stations were launched as part of the program. The final module of the program, *Zvezda* (DOS-8), became the core of the Russian segment of the International Space Station and remained into the Earth orbit until 2001 (Tillman 2012). *Mir* was the first modular spacecraft with a larger mass than any previous spacecraft (NASA 2001).

On July 13, 1962, the Soviets made the first launch of an *R-16U ICBM* from an underground shaft (Astronautix 2005). The same ICBMs that were the subject of the *Cuban Missile Crisis* in the fall of the same year, 1962. Also, in the 1960s, they developed the first research in the field of laser weapons and the *R-36ORB Fractional Orbital Bombardment System* (FOBS) (NextSpacelight 1966), banned in 1979 by the SALT II Agreement. In 1962, the Soviets began construction of the *A-35 anti-ballistic missile system*, equipped with A350 exo-atmospheric interceptor missiles with a thermonuclear warhead, a system covered in 1972 by the ABM Treaty (Astronautix 2005). In 1970, the Soviets created a high-powered space laser system (GadsdenTimes 1984), which was combined with an orbiting *Kaskad anti-satellite missile platform* (Teitel 2013), and deployed *R-23M Kartech cannons* on the Salyut 3 space station, as part of the *Almaz – Diamond space project* (Zak 2015). In the 1980s, they were developing the *Polyus – Skif orbital weapon system project* (Teitel 2013), designed to provide defence against anti-satellite weapons. And in 1982, the independent Soviet Space Forces were established within the Ministry of Defence.

The geopolitical collapse of the 1990s, subsequent to the break-up of the Soviet Empire, brought the temporary decline of Russian space programs. The Russian Space Forces were created on August 10, 1992, with the establishment of the Armed Forces of the Russian Federation (Politika 1990). After several reconfigurations, on August 1, 2015, the Russian Federation Aerospace Forces were founded, with independent status (AerospaceForce 2006) comprisinc the cosmodromes of Baikonur, Plesetsk, Yasni (Orenburg area, Urals), Svobodny (closed), Kapustin Yar training ground (Sorokina 2021), Yuri Gagarin cosmonaut training center in the Moscow region, etc.

On February 25, 1992, *the Russian Space Agency* was established. In 2004 it was transformed into the *Federal Space Agency* (Roscosmos), which in 2015 became the *Roscosmos State Corporation*

by merging with the *United Rockets and Space Corporation* (Pandey 2015). Roscosmos is based in Moscow, but its *Main Mission Control Center* is located in Korolyov. Roscosmos works closely with the *Russian Federation Air Force Command*, including the control of the Baikonur, Plesetsk and Yuri Gagarin Center cosmodromes. It is currently developing space science research programs targeting the Moon, Mars and Venus.

Russia has been part of the *Soyuz Project* since 2003, in collaboration with the European Space Agency. "Spacecraft are launched at the Kourou/ Sinnamary cosmodrome in French Guiana. The first launch of the 'Soyuz-ST-B' launch vehicle was carried out in 2011: two of Europe's 'Galileo' satellites were taken into orbit. A total of 20 launches have taken place in the meantime, resulting in some 60 satellites in orbit" (Sorokina 2021). Also worth mentioning is the *Morskoy Start Project* – the only floating cosmodrome in the world, built in the 1990s by the California-based Sea Launch Company, whose shares were split among Russian Federation, Ukraine, the United States and Norway. Currently, the company belongs to the Russian group S7 (which also operates one of the main airlines in the Russian Federation). The first launch took place in 1999 on a mobile platform in the Pacific, near the Equator. The *Zenit-3SL launch vehicle* and a former offshore oil rig were used. A total of 30 spacecraft launches and various cargoes were successfully carried out (Sorokina 2021).

In March 2021, Roscosmos signed a memorandum of understanding with the China National Space Administration (CNSA) for the construction of a permanent base on the Moon. The International Lunar Research Station (ILRS) is described as a future base of comprehensive scientific experiments, which will be built on the surface of the Moon or in the orbit of the Moon and will conduct multidisciplinary scientific research activities, including exploration, use and observation of the Moon, technical checks and long-term autonomous operation (Jones 2021). One month later, in April 2021, Roscosmos announced that it would leave the *ISS International Space Station program* after 2024, and would build a new *Russian Orbital Service Station* in 2025 (Reuters 2021).

Chinese military space program

The Chinese space program began with the development of ballistic missile systems, which later became the starting point for launchers. In the mid-1950s, the Chinese ballistic missile industry developed with the help of Soviet engineers, with the two states sharing the same Marxist ideology. Moreover, the two Eastern bloc partners believed that the newly launched space race between the two systems, Western and Soviet, was the perfect opportunity to demonstrate to the whole world the superiority of Communism over Capitalism.

In 1956, the leadership of the Chinese Communist Party (CCP) adopted the "*Two Weapons and a Satellite*" *Development Plan for Science and Technology*, established for the period 1956-1967. Communist leader Mao Zedong (1893-1976) announced that the Chinese Academy of Sciences had launched *Research Project 581*, aiming to place a satellite in orbit by 1959, to celebrate the 10th anniversary of the People's Republic of China (PRC) (Astronautix 1958).

The project was not successful, but it was followed by two other satellite space programs: *Dong Fang Hong* and *Fanhui Shi Weixing*. In June 1965, the Central Committee of the Communist Party of China decided to develop a launch vehicle, the *Long March 1 missile*. On April 24, 1970, China successfully launched its first satellite, *Dong Fang Hong I* (*Mao-1*), the heaviest satellite placed by a nation in the low orbit of the Earth (Matignon 2019), part of a space program with similar name. The program also initiated the construction of the *Jiuquan Satellite Launch Center* (JSLC) in the Gobi Desert of Inner Mongolia – the first of China's four space ports, and the contruction of the *Dongfeng Aerospace City* (Matignon 2019).

At the same time, in 1966, the Beijing authorities launched the *Fanhui Shi Weixing Satellite Program*, through which, by 2006, 25 recoverable reconnaissance satellites had been built and used for military and civilian missions. The first satellite was launched on November 26, 1975, and returned safely to Earth on November 29, 1975, making China the third country to recover a satellite after the space mission, after the United States and the USSR (FSW, astronautix). There were four models of *Fanhui Shi Weixing* (FSW) satellites, all launched into *Long March rocket orbit* (Astronautix).

Also on July 14, 1967, the party leadership announced the launch of China's Manned Space

Program (Internet Archive 2005) "Codenamed Mission 714", the project aimed to build the *Shuguang-1 spacecraft* and selected the first astronauts. On April 1, 1968, the *Chinese Institute of Space Medicine* was established, and in 1968, construction began on a space center called *Base 27* in the Xichang Mountain Region of Sichuan Province.

The first *Yuanwang-class spacecraft* for tracking and supporting intercontinental ballistic missiles and satellites was launched in 1979 (followed by five more models) (Internet Archive 2007) and the first full-range ICBM DF-5 test was conducted on May 18, 1980. In 1986, Chinese leaders approved the *National High-Tech Research and Development Program*, also known as the *863 Program*, which was implemented over three successive five-year plans (Ministry of Foreign Affairs of the People's Republic of China 2010). The program initially focused on the development of seven priority strategic areas: laser technology, space, biotechnology, information technology, automation and manufacturing technology, energy and advanced materials (Raska 2013). China has now expanded these areas in size, scope and importance to cutting-edge technology products and processes. This program resulted in the *Loongson* family of *computer processors* (Designing Quad-Core Loongson-3 Processor 2009), *Tianhe supercomputers* (Raska 2013) and the *Shenzhou spacecraft* (Shenzou 2017).

On July 5, 1988, the *Ministry of Aerospace Industry* was established. In June 1993, the *China Aerospace Corporation* was founded, in 1999 it became the China Aerospace Science and Technology Corporation, and on April 22, 1993, *the China National Space Administration* (CNSA) was established.

In November 1999, on the occasion of the 50th anniversary of the PRC, China launched the *Shenzhou 1 spacecraft*, which was recovered after a 21-hour flight. It was China's first unmanned spaceflight test (Shenzhou 2005). It was followed by ten other successfully launched models. Since *Shengzhou 5*, launched in 2003, flights have included human crews, with China becoming the third country capable of conducting independent human spaceflight (Space.com 2005). On September 29, 2011, China launched *Tiangong-1*, the first prototype of the Chinese space station (Wall 2018), replaced in 2016 by *Tiangong-2*. On April 29, 2021, Tianhe, the 22-tonne central module of the Tiangong space station, was successfully launched into the low orbit of Earth, indicating the Chinese intention to build a permanent national space station (Jones 2021).

On October 31, 2000, China launched the first *BeiDou-1 regional satellite navigation system* (BeiDou-1) in which China began building its own compass satellite navigation system as an alternative to GPS. On June 23, 2020, the last *BeiDou satellite* was launched, and on July 31, 2020, Chinese leader Xi Jinping officially announced the launch of *China's BeiDou Navigation Satellite System* (BDS-3) (China.org.cn. 2020).

In 2004, Beijing officials approved the *Moon Exploration Program*. This led to the production of the *Chang'e Moon orbiters*, launched on May 1, 2009 (Dooling n.d.). Currently, the number of such missions has increased to five. According to planning by Chinese officials, *Chang'e 6* will be launched in 2024, and will land in the South Pole-Aitken Basin near the lunar South Pole (Jones 2021). *Chang'e 7* will also be launched in 2024, and will perform an in-depth exploration of the lunar South Pole to search for mineral resources (Jones 2021). And *Chang'e 8* will be launched in 2027 and will help establish a *Permanent International Moon Research Station* (ILRS), in collaboration with Russia and other potential partners (Jones 2021). The ILRS plan includes the development of a robotic base that can be further expanded in the 2030s to allow astronauts to make long-term stays on the lunar surface. Since 2019, China has been operating the *Chang'e 4 landing gear* and the *Yutu 2 rover* on the dark side of the Moon (Jones 2021).

In January 2007, China successfully conducted an anti-satellite rocket test, and in 2011, China made its first attempt to send a *Yinghuo-1 class orbiter* to Mars on a joint mission with Russia. Despite the failure, the Chinese persevered in the Mars exploration project, so on July 23, 2020, China successfully launched *Tianwen-1* to Mars. On May 14, 2021, China became the third state to establish communication on the Martian surface, after the Soviet Union and the United States (Planetary Society n.d.). And on January 30, 2022, *Xihe-1*, China's first solar exploration satellite, photographed the H-alpha solar spectral line from orbit (DIGI24 2022)

In December 2015, the *Strategic Support Force*

of the Chinese People's Liberation Army (PLA) was established. It represents the fifth category of Chinese Army forces, with space, cyber, psychological, electronic and strategic intelligence warfare missions (Ni and Gill 2019).

It should also be noted that in 2006, China adopted the *National Medium and Long-Term Plan for Science and Technology Development* (MLP), considered to be its most ambitious national science and technology plan, with a total funding of $ 75 billion. MLP targets 16 national megaprojects in areas such as electronics, semiconductors, telecommunications, aerospace, pharmaceuticals, clean energy and oil and gas exploration. Among the projects developed by MLP are:

- *The Shenguang Laser Project*, which explores inertial fusion (ICF) as an alternative approach to obtaining inertial fusion energy (IFE) - a controllable and sustained nuclear fusion reaction, aided by a series of high-power lasers;
- *BeiDou satellite navigation system - 2*;
- *The technological design of hypersonic vehicles* capable of maneuvering at Mach 5 speeds (6,150+ km / h) and flying at altitudes close to space (Raska 2013).

French military space program

The French space program is the third oldest national space program in the world and the largest in Europe. It made its debut in 1946, when the *Ballistics and Aerodynamics Research Laboratory* was established, followed in 1959 by the *Space Studies Committee* and in 1961 by the *National Center for Space Studies* (CNES).

On November 26, 1965, France successfully launched *Asterix 1*, its first satellite, using the *Diamant A in-house missile* (the first French exclusive launch system and at the same time the first satellite launcher) (Astronautix n.d.). The launch was made from the *Hammaguir base* in Algeria (Varnoteaux 2017). Subsequently, the launches were made with *Ariane rockets*, currently used by the member countries of the European Space Agency (The European Space Agency n.d.).

In 1964, construction began on the *Kourou Space Center* in French Guiana. As stated on the Aerospace Technology website: "situated close to the Equator, at 5.3° North latitude, the Spaceport is well situated for missions into geostationary orbit. Launching near the equator reduces the energy required for orbit plane change maneuvers. This saves fuel, enabling an increased operational lifetime for Ariane's satellite payloads, and, in turn, an improved return on investment for the spacecraft operators. The French Guiana coastline's shape allows for launches into all useful orbits from northward launches to -10.5° through eastward missions to -93.5°" (Aerospace Technology n.d.).

In 1973, France participated in the creation of the *European Space Agency* (ESA) and became its first and main contributor, with 24.5% of the budget of 4.810 billion Euros in 2022 (The European Space Agency n.d.). The Agency's programs are, to date, exclusively civil.

In July 2019, France created the Space Command, which brings together the air and space forces, and in March 2021, it began the first military exercises in space, codenamed AsterX, aiming to test its ability to defend its satellites. According to France 24, "the French government accuses Russia of bringing its Olymp-K intelligence gathering satellite, also known as Louch, near the Franco-Italian military satellite Athena-Fidus in 2017, in what the Minister of Defence, Florence Parly called «an act of espionage»" (France 24 2021).

On 16 November 2021, France launched its first operational constellation of information satellites (SIGINT), communications satellites (COMINT) and electronic intelligence satellites (ELINT), known as CERES (Capacité de Renseignement Électromagnétique Spatiale). This constellation is in addition to the *Syracuse* communications satellites. The *CERES program* is a successor to the previous *ESSAIM COMINT* and *ELISA ELINT micro-satellite programs*. The *ESSAIM Project* explored the use of several micro-satellites arranged in formation, the constellation being launched in 2004. The flight of intelligence satellites arranged in formation, at a certain distance from each other, allows a user to triangulate on a transmitter, regardless of voice or radio frequency. The ELISA demonstrator, who followed the ESSAIM project in 2011, explored the same approach for the role of ELINT (Le Breton 2021).

Israeli space program

Institutionally, the Israeli space program began in 1960, when the National Committee for Space Research was established, which after 1983 was transformed into the Israel Space Agency (ISA).

The country's spaceport is located at the

Palmachim military base on the Mediterranean coast. Palmachim serves as the main test site for *Jericho II ballistic missiles* and *Arrow* missile defence systems (NTI n.d.).

Israel is one of the seven global space powers with autonomy in the production of satellites and launch vectors. Israel's space autonomy is ensured by *Shavit,* the indigenous launch vehicle capable of sending payload into low Earth orbit (*Logsdon*), and by the *space program*, which focuses on the production and launch of telescopes and satellites in the following categories:

- *Ofeq* series of reconnaissance satellites (Astronautix n.d.);
- *Amos* series of communication satellites (IAI n.d.);
- the constellation of high-resolution surveillance satellites, class *EROS* (Earth Remote Observation System) (eoPortal n.d.), with applications in the field of information and national security;
- *TechSAR* space mini-radar satellites (eoPortal n.d.) for military use;
- *Techsat/Gurwin* series micro-research satellites (GlobalSecurity.org);
- *ULTRASAT* (Ultraviolet Transient Astronomy Satellite), micro-satellite for detecting and monitoring transient astronomical events in the near ultraviolet spectral region (Spacewatch.global n.d.));
- *VENμS* class micro-satellites for Earth observation (eoPortal n.d.);
- Multifunctional high resolution optical observation *OPSAT* (OPerational SATellite Uplink), used by *Fourth Echelon* agents. It was originally a device used by *Third Echelon Splinter Cell* agents, but following the disbandment of *Third Echelon* in 2011, the *OPSAT* system is now used by *Fourth Echelon* as standard equipment (Splinter Cell n.d.);
- *SHALOM type hyperspectral satellites* (Spaceborne Hyperspectral Applicative Land and Ocean Mission), developed in collaboration with the Italian Space Agency, which will integrate radar observations with visible infrared and ultraviolet observations (SHALOM – satellite);
- *SAMSON* (Space Autonomous Mission of Swarming & Geolocating Nano-Satellites) nano-satellites for geo-location.

These major research directions were added the *Matroshka/Phantom AstroRad radiation experiment*, a space testing of the mobile high-radiation radiation shielding vest, developed in collaboration with NASA, the German Space Agency, Lockheed Martin Corp. (NASA 2020), as well as the *Israel Network for Lunar Science and Exploration Program* (INLSE), which focuses on laser communications, robotics, remote sensing and other technologies for lunar missions, through which Israel became a member of the *NASA Center for Moon Research* (Howell and SERVI).

Indian space program

Institutionally, the Indian space program began with the establishment, in 1962, of the Indian National Space Research Committee (INCOSPAR) within the Department of Atomic Energy. In 1969, it was replaced by the Indian Space Research Organization (ISRO). Then, in 1972, it was subordinated to the Department of Space and the Space Commission of the Indian Govern (Space Programs of India).

From the very beginning, the Indian space program sought to ensure space autonomy by creating launch vehicles and technology products to be launched into space, especially satellites for communications and remote sensing.

The country's main spaceport was established in Thumba, near Thiruvanathapuram, a location beyond the Earth's geomagnetic Equator. The *Thumba Equatorial Missile Launch Station* (TERLS) was built there. The first homemade rocket, *RH-75*, was launched on November 20, 1967. The first Indian satellite, *Aryabhata*, was launched on April 19, 1975, with Soviet support. On July 18, 1980, India launched the *Rohini* satellite into orbit using an indigenous launch vehicle, the *Satellite Launch Vehicle-3* (SLV-3), joining the "club" of the seven space launch powers (Vikaspedia n.d.).

Since then, research programs have focused on developing:

- *Indian National Satellite System* (INSAT) for telecommunications, television transmissions and meteorological services, launched on April 10, 1982 (eoPortal n.d.);
- *Satellite Remote Sensing System* (IRS) for Natural Resources Monitoring and Management and Disaster Management Assistance, launched in 1988 (Vikaspendia n.d.);
- *Polar Satellite Launch Vehicle* (PSLV) launch vehicles with IRS (Indian Remote Sensing Satellite) observation satellites on board and Geosynchronous Satellite Launch Vehicle (GSLV) class vehicles with GSAT geosynchronous satellites

(Vikaspedia n.d.);

• *CHANDRAYAAN investigative satellites* of the Moon and the Orbiter Mission (Mangalyaan) spacecraft for missions to Mars. The Chandrayaan-2 mission, launched on 22 July 2019, includes an orbiter, a Vikram lander and a Pragyan rover of entirely indigenous production (Vikaspedia n.d.);

• *Cartosat, NovaSAR* and *S1-4 satellites* for optical observation of the Earth and the constellation of *NavIC* navigation satellites;

• *Hyper spectral Imaging Satellite* (HysIS) (Space Programs of India);

• *Gaganyaan program* for human space exploration of the lower orbit of the Earth and the planets of the solar system (Indian Space Research Organisation Department of Space n.d.);

• *The Indian Ballistic Missile Defence Program* (BMD), launched in 1999, which included the development of *anti-satellite weapons* (ASAT): exo-atmospheric radars and interceptors and exo-atmospheric destruction vehicles (Strategic Frontier Research Foundation 2017).

Subsequently, the program expanded to the production of energy-directed ASAT weapons, coorbital ASAT weapons, lasers and ASAT weapons based on electromagnetic pulses (EMPs) and space shields against electronic and physical attacks (Pandit, 2019). On March 27, 2019, India successfully tested an anti-satellite weapon – *the Shakti Mission*.

The Space Defence Agency was created in 2018, with the mission of conducting space warfare and satellite intelligence gathering missions (Sanjeev Miglani; Krishna N. Das, 2019). The agency reports to the *Defence Image Processing and Analysis Center* (DIPAC) in Delhi and the *Defence Satellite Control Center* in Bhopal, representing the growing integration of India's space capabilities (Rajagopalan, 2019).

In March 2019, India conducted an anti-satellite weapon (ASAT) test. Also, on July 25-26, 2019, India conducted its first simulated space warfare exercise, codenamed *IndSpaceEx* (Rajagopalan, 2019).

Japanese space program

Japan is the seventh most powerful space-producing and launch space satellite with positioning, navigation, and timing satellites, which it can launch independently into higher orbits (Wilson, 2020).

Institutionally, the Japanese space program began in the 1950s, when the first structures with responsibilities in the field were created. Following successive transformations in 2003, the merger between the *Institute of Space and Astronautical Sciences* (ISAS) at the University of Tokyo, the *Japan National Space Development Agency* (NASDA) and the *Japan National Aerospace Laboratory* (NAL) created the *Unified Japan Aerospace Exploration Agency* (JAXA). Like other space powers, Japan has developed its space program from the ballistic program. In this sense, the *Pencil Rocket project*, initiated in the 1950s, which aimed at the development of rocket-propelled aircraft (Pencil Rocket), bears witness to this. On February 11, 1970, Japan successfully launched its first satellite, *Ohsumi 1*, with an unguided American *L-4S 5 rocket* (University of Tokyo n.d.). In the 1970s, *Mu / M class rockets*, used in the successful launch of domestically produced satellites (Astronautix n.d.), went into production. This family of missiles also includes the *M-3SII*, the first solid-propelled rocket to leave Earth's gravity carrying the *Halley Armada Sakigake* and *Swiss satellites* (Astronautix n.d.). In parallel, the *H-1 rocket engine* was produced for Delta-type launch vehicles with liquid hydrogen fuel and re-ignition oxygen propellant capable of launching objects in excess of 500 kg (Astronautix n.d.) into geostationary orbit engine. It was followed by the *H-II rocket*, completely indigenous, successfully launched in February 1994 (JAXA n.d.).

Currently, the main research directions are:

• development of the *Epsilon* family of solid fuel rockets for the launch of micro-satellites (JAXA n.d.);

• *MTSAT* (Multi-Functional Transport Satellite), meteorological and aviation control satellites (eoPortal n.d.);

• *JAXA Engineering Test Satellite ETS-VIII* (Kiku 8) communications satellites (eoPortal n.d.);

• Military Intelligence Gathering Satellites *IGS Optical* (Spacewatch.global n.d.);

• *Minerva Hayabusa/MUSES-C* robotic asteroid exploration spacecraft with detachable mini-lander (Dooling n.d.);

• Projects on unmanned flights, manned missions to Mars and long-term establishment on the Moon.

In 2020, the Space Operations Squadron was established within the Japan Air Defence Force,

based at Fuchu Air Base, Tokyo (Johnston 2020).

Other space players

Apart from the mentioned powers, there are other space players such as: Great Britain, Germany, European Union, Arab League, South Africa, Brazil, etc. They all develop civilian programs of scientific research of cosmos. However, some of them are also developing military programs, which are mainly aimed at the satellite communications and intelligence gathering sectors.

For example, in the case of Great Britain:

- on April 1, 2021, it established the *UK Space Command* (Royal Air Force n.d.);
- it developed the *Skynet military satellite communications program*, which provides coverage to almost the entire globe (Ministry of Defence 2021);

The *OneWeb satellite constellation* was entered in the *UK Register of Outer Space Objects* following the acquisition (along with an Indian company) in July 2020 of 45% plus a gold share of the shares of the bankrupt *OneWeb company* (BBC 2020). The acquisition was made in order to extract the UK from the EU's *Galileo satellite navigation system*, aiming to further implement the *Independent Global Navigation Satellite System* (UKGNSS). The future constellation of satellites will be incorporated into the *Skynet 6* military communications architecture. The OneWeb project aims to launch about 2,000 satellites into low Earth orbit, to provide Internet services to "everyone, everywhere" (Amos 2017).

British National Space Center (BNSC) was the second largest financial contributor to the European Space Agency's general budget under *Aurora – Earth Observation Program-3, Global Monitoring for Environment and Security* (GMES) *Phase 1* and *Advanced Research in Telecommunications Systems* (ARTES) (BNSC n.d.).

Instead of conclusions: The security impact of the militarization of the outer space

On October 10, 1967, the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, also known as the *Outer Space Treaty*, came into force. It was signed in London, Moscow and Washington DC on January 27, 1967.

The treaty prohibits the stationing of weapons of mass destruction (ANM) in the orbits of Earth or other celestial bodies, prohibits military activities on celestial bodies – from establishing permanent military bases or installations, to testing "any type of weapon" or deploying military exercises on the Moon and other celestial bodies, and details legally binding rules governing the peaceful exploration and use of space (Arms Control Association 2020).

However, the treaty does not prohibit the launch of ballistic missiles from space and, very importantly, does not establish exactly the boundary between atmospheric and extra-atmospheric space, nor does it regulate military activities in outer space – potentially explosive topics in the coming years, when more and more players will develop spatial capabilities.

Cosmic space, also known as extra-atmospheric space represents the area located outside the Earth's atmosphere. As the planet's atmosphere gradually becomes thinner, there is no clear boundary between cosmos and outer space. For this reason, there is no unanimously accepted line between the atmosphere and the cosmos.

However, the *International Aviation Federation* (IAF) has accepted an arbitrary separation of the two spaces, unrecognized in international law, but intended to differentiate aeronautics from astronautics. This boundary is called the *Kármán Line* and is represented by the sky segment that begins 62 miles - 100 kilometers above average sea level. It was established in the 1960s and is the area where orbital dynamic forces[2] become stronger than aerodynamic forces (Drake 2018).

Another perspective on the limits of outer space belongs to the United States Army (US), which lowered the limit of this space as the lowest perigee reached by a spacecraft in orbit, without specifying, however, an altitude (National Security Space Institute). As stated in a document issued by the US National Space Security Institute, "the Earth's atmosphere does not end abruptly at a certain altitude and space begins. In fact, the Earth's atmosphere continues to erupt more than 1,000 miles into space. In practical terms, the lowest altitude for a satellite in a circular orbit is about 93 miles - 150 km, but without propulsion the satellite would quickly lose speed and fall back to Earth" (National Security Space Institute). There are other opinions on the boundary between the terrestrial

[2] The orbit is the trajectory through outer space under the effect of gravity followed by a celestial body around another larger celestial body or a set of celestial bodies.

and the cosmic. Among them there is a study published in 2009 by a group of researchers at the University of Calgary in Canada, who claimed to have built the *Supra-Thermal Ion Imager*, a device able of determining the edge of outer space based on the speed of ions. In his opinion, the Earth's atmosphere ends 118 kilometers away from Earth (Thompson 2009), which is the boundary between Earth's space – where ions move more slowly, and outer space – where ions can reach speeds of over 1000 km/h.

Under these conditions, the question arises, where does the national air territory end and where does the low orbit of the Earth begin? How much sovereignty do states have over the atmospheric columns of their national territories? And if espionage is considered a hostile act, how can one categorize the process of "information gathering" by satellites placed in orbit, above or within the national territory of a state?

On the other hand, as it can be seen from all the case studies presented, space programs, even if they had indisputable civilian scientific objectives, were born of military research, always related to the field of ballistic missiles. Subsequently, the development of satellites automatically involved military applications, and orbital stations also served to military missions. Therefore, the global space program is essentially military. In these circumstances, is it natural to wonder how long a treaty that came into force 54 years ago could still be effective, when the race to conquer space was just at the beginning? Or, in other words, how long will it take for the first permanent military base to be placed on the Moon? Or for the first WMDs to be placed in space – given that military exercises are already taking place in Earth orbit and the Treaty does not prohibit the launch of ballistic missile armed with ANM warheads (Arms Control Association 2020). Of course, the provisions of the Treaty have been reiterated by legal documents such as the *ABM Treaty*, the *SALT I* and *II* agreements, the *START 1 Treaty*. However, all these documents prohibiting the placing of nuclear weapons or any other type of weapons of mass destruction in Earth orbit, including split orbital missiles, have been signed between the US and the USSR, without involving other space powers such as China, India, France, etc.

At the same time, in the absence of international regulations on space capabilities, humanity is facing a new and major security challenge – the spiral of space arming. Which, given the current technological sprint, is automatically linked to the concept of *Massive Attack of Disruption* and the risk of huge losses. And not only that. How will a space crisis caused by an accidental or intentional destruction by a competing power of military or civilian equipment placed in orbit or on another celestial body of some space power be handled? What implications could such an incident have? What types of weapons could be used in the clashes among the space powers involved, given that there is no ban on the use of these weapons on Earth?

Launched in the 1950s, the space race had an intense geopolitical and ideological connotation. Practically, with every success registered by the politico-military blocs of the Cold War, the enslaved propaganda celebrated the victory of one ideology over the other. At present, the terrestrial geopolitical game is faithfully reflected in space, where the new technological blocs express terrestrial alliances. On the one hand there is the Russian-Chinese technology alliance, which has just "cemented" the base of a future permanent lunar station and invited India to join it (Lele 2021). And, on the other side, there are NASA and the *Artemis Agreements: Principles for Cooperation in Civilian Exploration and the Peaceful Use of the Moon, Mars, Comets and Asteroids*, which it launched in 2020 with six other space agencies in Australia, Canada, Italy, Japan, Luxembourg, the United Arab Emirates and the United Kingdom (NASA 2020). The agreements, which reiterate the principles set out in the *Outer Space Treaty*, were subsequently signed by space agencies in Ukraine, South Korea, New Zealand, Brazil, Poland, Mexico and Israel. For this instance, the European Space Agency has only signed a memorandum of understanding with NASA on the agreements, with Europeans also participating in the *US Agency's Artemis Program* (ESA n.d.). It is becoming clear that we are witnessing the emergence of two space blocks that express a very clear reality: the international system is moving towards a new power architecture. An architecture in which Asia, united in the Russian-Chinese mainland bloc, is in competition with an American-British and Japanese maritime bloc, to which a large part of the European states has only partially adhered.

This is a new and extremely dangerous situation and an increasingly obvious return to the paradigm of global domination, with the mention that now the pivotal zone is made up of the huge Russian-Chinese bloc.

In conclusion, we can say that we are witnessing an extensive militarization of Earth orbit, which engages the seven main space powers in a spiral of space arming. This is all the more worrying because there are no international regulations that address extremely sensitive issues such as: sovereignty over the atmosphere, satellite espionage, the extent of the military presence in outer space, how to resolve space crises caused by space accidents or incidents, the right to use space weapons in outer space, etc. A situation that risks getting out of control in the context of the increasingly obvious reconfiguration of the global power architecture, in which space technology blocks describe a return to the Cold War paradigm, with its "assured mutual destruction".

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SPECIFIC PROCEDURES TO INCREASE EFFICIENCY OF THE DECISION-MAKING PROCESS IN THE CONTEXT OF THE VARIABLE GEOMETRY CONFLICT

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The risks and threats specific to the permanent geometry change of an action/operation in the context of the current multidimensional operational environment conflict are extremely diversified and undergo permanent mutations. This situation implicitly requires that the command-and-control systems architecture must allow rapid adaptation to the requirements imposed by the frequent situation changes, in the conflict specific analysis domains, namely PMESII (political, military, economic, social, information and infrastructure). The digitization and algorithmizing of the decision-making process carried out simultaneously with the structural and functional implementation of artificial intelligence is the current way of streamlining the decision-making process by exponentially increasing the capabilities of the command and control systems regarding the volume and speed of data and information processing, the interpretation, of the capabilities of structural and functional organization of both the C2 modules and the operating force, of the capabilities to control and evaluate the execution of the action/operation, etc. Algorithmizing and the digitization of the decision-making process combined with the experience, knowledge based intuition and talent/art (specific to the human factor) inevitably leads to making adequate decision aiming to be quickly integrated into operational plans and orders

Keywords: algorithmizing; digitalization; artificial intelligence; intelligent decision support system; expert system; artificial neural networks.

The new emerging and disruptive technologies based on networks, artificial intelligence, quantum technology, big data, etc. are the ones that considerably influence the architectures of new command and control systems. Integrated and interconnected within the command-and-control systems, these new technologies will considerably influence (make more efficient) the planning, the preparation, the execution and the evaluation of the entire spectrum of military operations at any level (tactical, operational, strategic/global – if in the near or distant future such action capabilities are to be reached).

For this reason, I will discuss the specific procedures to increase the efficiency of the artificial intelligence assisted decision-making process, and I will present a model of forecasting the specific and often changing situations generated by the variable geometry conflict.

In designing the new operational models of command and control (C2) through integrated systemic approach, I considered it necessary to provide an answer to the question: "How should the command-and-control systems architecture be designed to increase the efficiency of the decision-making process and to ensure the successful conduct of conflict-specific actions with variable geometry?"

The current control and command systems have managed these challenges in three ways: reactive (application of a response and reaction plan – through an offensive attitude, which is conditioned by the need for rapid implementation of the plan) (Roman 2017), proactive (the action plan is pre-prepared and timely applied to minimize the effects and consequences) and in a combined manner. I believe that proactivity is main vector in managing the situations and challenges generated by conflict with variable geometry. The challenge lies in anticipation and early forecasting or quick adaptation of plans to changing situations in conflict geometry. I believe that the combined approach is the optimal solution for an efficient management of often changing situations specific to conflict with variable geometry and that this approach becomes effective through AI (artificial intelligence) implementation in the decision-making process, process that takes place at the level of command and control and is built on an entirely digitized architecture.

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The military decision-making process is a *model of analytical planning*, applicable to the entire spectrum of military operations, which establishes the procedures for mission analysis, courses of action development, analysis and comparison, optimal course of action selection, developing and issuing operations plans or orders. The current trend is for this analytical process to have a solid mathematically, algorithmically digitized base and to be supported by artificial intelligence, therefore to become *analytic – mathematically digitized*. The tools and techniques used in the current decision-making process are brainstorming (exchange of ideas), the estimation process, the intelligence preparation of the battle environment, briefings, etc. These tools are constantly diversifying and expanding due to the evolution of technology. In state-of-the-art command and control systems architectures, advanced technology, digitization and artificial intelligence play an extremely important role in the decision-making process. The processing capacity (data and information analysis and synthesis), the ability to analyze and present information in a synthetic form, the ability to provide courses of action based on mathematical - algorithmic analysis, lead to the optimization / efficiency of the decision-making process. The technical and technological expansion at the execution level, allow the high-performance C2 systems to rapidly communicate the decision to the response/execution cells, these cells being technologized and partially or totally robotic.

The predictive scenario regarded as a process of streamlining the decision-making act

Proactive action and combined approach need the predictive scenario to be a result of a process that integrates a large part of the capabilities offered by artificial intelligence, digitization and algorithmization but which is based on expertise (experience, intuition based on scientific knowledge) and the decision of the human factor. The predictive scenario conducted on an algorithmic basis is an optimal way of implementing the decision-making process within the operational planning tailored to the requirements and challenges of the variable geometry conflict.

Completing the steps of the predictive scenario

Achieving a predictive scenario involves the existence/completion of several steps. A first step is *choosing/naming the analyst*, and requires the build-up of the working group consisting of PMESII (political, military, economic, social, information, infrastructure) expert level personnel and AI (artificial intelligence) - a combined, symbiotic and integrated working group. The choice must be at least predefined (depending on the type of situation that may occur) if not even already set according to a certain timeframe existing expectation (near or further away) depending on the operating level of C2 (command - control) (strategic, operational or/and tactical). The expert level provides the human factor with the necessary solid knowledge of the represented field, the experience and the creative intuition necessary in the analysis and synthesis of important data and information on the anticipated type of situation. AI provides fast access to BIG DATA databases and immeasurably larger capabilities compared to the human brain in analyzing, synthesizing, concretizing and/or abstracting accessed data and information, based on logico-mathematical algorithms. At this point in the creation of the predictive scenario, the experience and creative intuition of the human factor is combined with the analysis, synthesis, concretization and/or abstraction of the data and information generated by AI. The result is the variables that will be subject to *modelling and simulation*.

Step number two is represented by the *cause-and-effect relationship* in the analysis of each situation. A decisive role at this level is occupied by all aspects, similar situations from the past or related to current ones. The databases built and furnished for this purpose are quickly navigated through AI, processed, identified the necessary situations and analyzed comparatively in terms of the cause-and-effect variable. The results are automatically generated based on the working algorithms established and implemented at the AI level. The results can be materialized on landmarks such as situations, actors, actions, space, time, etc. The methods of presenting the results can be mathematical, graphic, analytical, etc. depending on the analyzed situation. The purpose of these analyses is to identify the generating sources of situations and actions, their evolution in order to obtain a prediction about possible and probable subsequent changes. Templates can be set up if the actions/situations have a degree of repetitiveness.

This does not present the guarantee of a templated, repetitive future, but it can be a starting point for the next step of the predictive scenario (determining the unknowns). At this point in the scenario, all the elements that can influence the forecast are integrated in order to discover the determinants of the operational environment and to form the complete situational images (PMESII level).

Step number three is the *determination of the unknowns*. AI has an important role, again. Current IT systems (continuously improved) have substantial modeling and simulation capabilities. Experts and AI interpret the results of the simulations and modelling, using the variables determined in the first step and already introduced into the system. Analysts (the panel of experts and AI) are currently estimating data with high uncertainty. The estimate is conducted in a dynamic context, generated by high-stakes situations that need to be anticipated, forecasted. The conditions for an efficient and timely management of these situations must be created at the time of their occurrence. Estimates are made by mathematically and logically algorithmic objective analysis and synthesis, by systemically interconnected artificial intelligence, and by rational and intuitive-logical analysis and synthesis of the human factor (combination of knowledge, experience, creativity, intelligence and innovation).

Step number four is *the determination of variants*. These also take into account previous cases reflected in the binomial possible causes – related effects. The procedure to be used in these situations is the implementation of the system analysis methodology, "the rationalization of record-keeping problems, for an orientation based on the approach and solution of complex information-decisional problems" (Roman 2017, 52). Following the interpretation of the results obtained during the activities specific to the second step, AI and experts will generate possible future situations[1] and scenarios for the given situation based also on the known historical situations. The algorithms used by AI are *logical - mathematical* and those used by experts are *logical-intuitive* based on experience. For each generated variant/scenario, courses of action will be generated in the same working system (logical-mathematical and experimentally logical-intuitive). These courses of action are to be analyzed in the decision-making process, in full swing at the moment, in hybrid system (human experts and AI). I have encountered in the specialized bibliography a series of possibilities of determining and using the variables reflected in the binomial possible causes – related effects. Some of them use methods that are based on principles of operational research (Scipanov 2014), are transposed today into analysis programs, specific to AI, but I have encountered in common practice, and I can confirm from personal experience, also decisions based on the heuristic capabilities of the commander, most often based on previous experiences. In such cases, biases may occur in the analysis of variables. That is why I recommend the use of both AI specialized programs and human expertise.

Step number five consists in *presenting the results*, materialized in approved concepts of operations and plans for the implementation/execution of military/non-military response options. At the strategic level, generic planning situations will result, each one with its own assumptions and strategic scenarios, the main criterion being the identified circumstances probability of occurrence. The results may modify the behavior and the way of action of both decision-makers and force and therefore reduces the uncertainty closer to "0". With sufficient time (forecasting being the activity) and based on AI capabilities, decisions can be made to achieve the related concept of operations and plans for each identified course of action. At this point, the projection of the necessary force to conduct the related missions resulting from the decision-making is also carried out. On the principle of operation of the mosaic warfare concept[2] (Bryan, Patt şi Harrison 2020, 18-13, 56-58) based on the strategy of the decision maker, the machine-activated control system (AI) is directed through a computer interface that: will assign tasks to be executed; will upload estimates on opponents, the size of the force, the desired effect; will identify the forces (human or of a robotic/human nature, classical or autonomous,

[1] For possible future situations, the cycle of achieving another predictive scenario for each situation will be resumed. In this way the work of creating predictive scenarios is continuous. There is a possibility that most of them will not be implemented if they are generated horizontally (as variants of the same situation).

[2] The central idea of the concept, namely to create adaptability and flexibility to forces and complexity or uncertainty for an enemy by quickly composing and recomposing when needed disaggregated forces, using human command and machine control (AI).

technological and weaponry) that could perform the tasks. However, humans maintain control, at a manageable dimension. The commander then decides the forces to perform the tasks. This approach supports the idea that a disaggregated force, partially or totally robotic, which also has in its composition autonomous weapon systems, capable of quickly composing and recomposing, could offer several advantages (Popa 2021, 31) in obtaining operational success. After the projection and the force build-up, preparations will be made for the execution of the missions resulted from the concepts of operations. In this way the forces will be ready for action by the time the forecasted situation is expected to occur.

The predictive scenario can stop there or continue with predictive execution evaluations (previously introduced in the planning process at the time of mission analysis and decision making).

Situations in which predictive scenarios can develop

We have identified three situations/cases in which predictive scenarios for determining the future can be developed.

The first situation is when *the future is sufficiently clearly determined* (the forecast elements are considered real). This level can be achieved under conditions of maximum certainty given by a clear, complex and comprehensive analysis. The predictive scenario is transposed into the plan through the planning process following the preparation of the force and its deployment until the appropriate time for action.

The next case is *to determine several possible situations* to take place in the future (a determined number of alternative situations). At this level, the clarity, the complexity of the analysis carried out and the degree of coverage are also high. The resulting scenarios can be relatively easily capitalized through operational planning / alternative plans and on the mosaic force principle, specific actions can be planned for each predictive scenario in order to avoid surprise. The situation in which multiple possible future situations are generated raises difficulties in determining multiple solutions (it is the situation in which the analyst must substantially reduce the number of possibilities using criteria / variables). At this level the analysis is extremely complex. It is the most common situation in the context of a future conflict, in which the geometry of situations and actions is constantly and rapidly changing. The need for an exponentially expanded capability of data and information processing is acutely felt. I believe that at this level, the presence of AI in the analyst's supporting group is paramount, AI being the only one able to process huge volumes of data and information and to quickly offer predictable alternatives for the scenario construction. The presence of AI in this integrated systemic process is beneficial in all identified situations as long as it is not given full control. The human factor must always have the final decision, that will also be based on intuition (based on experience), on creative thinking, on emotional intelligence, elements that artificial intelligence does not have.

One last situation identified is the one in which practically *a predictive scenario cannot be generated* (the reasons can be multiple and it is necessary to resume the process using other data, variables, criteria, etc.).

Predictive scenarios can be generated for all levels of armed conflict (strategic, operative, tactical). I think that predictive scenarios must be carried out at the strategic level – PMESII and not only on the military field. Complex situations can be predicted (and it is necessary to achieve this) at the political, economic and social level because disagreements in these areas usually lead to armed conflict, involving the military domain. Once these disagreements are predicted, one can intervene in order to avoid an armed conflict as much as possible.

In the Figure 1 I have presented the areas of applicability of predictive scenarios with related options detailing the military response option.

Figure 2 shows a variant of predictive scenario of the command and control of a tactical command center on the maneuver module – future operations.

The operational planning process evolves from the results obtained/generated by the predictive scenario, takes place at all levels (strategic, operational and tactical) and is carried out within the command-and-control structures, with digitized architectures in which artificial intelligence is integrated, modular with high interconnection capabilities at any requested level. Within the operational planning process, its principles will be respected: defining objectives, unity of effort/

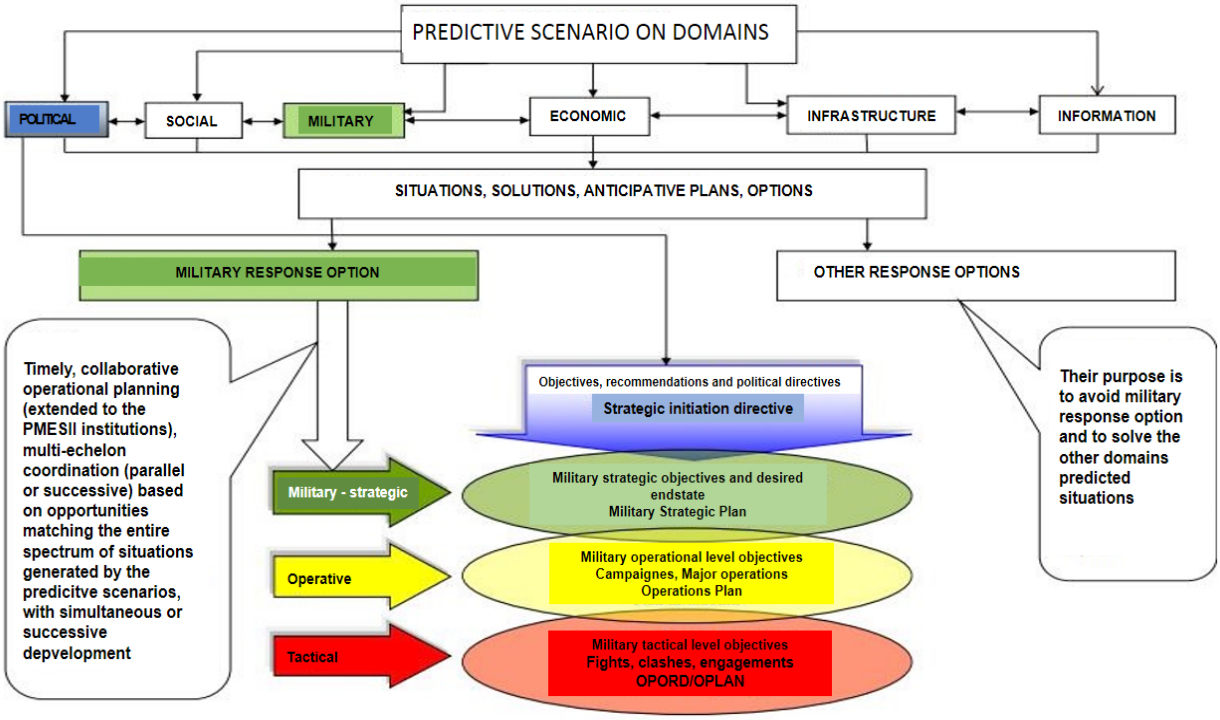

Figure 1 *Areas of applicability of predictive scenarios (own design)*

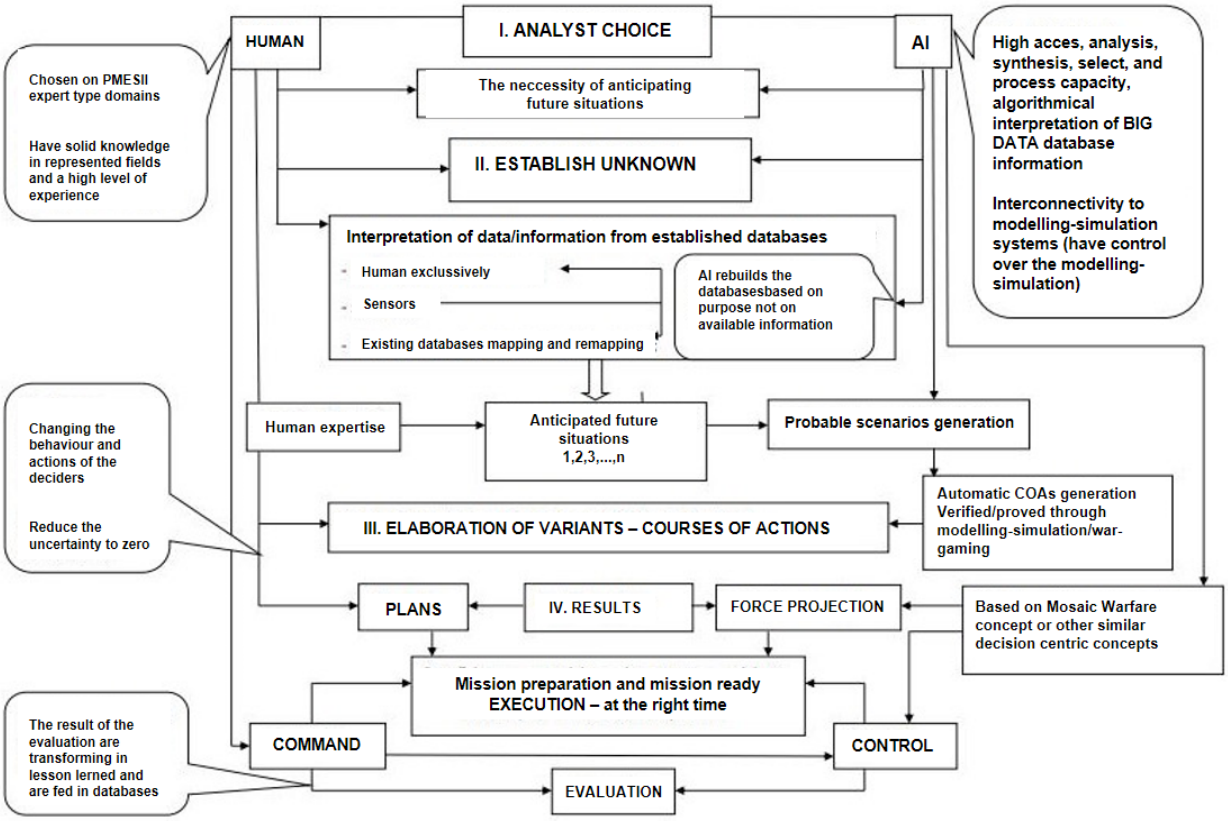

Figure 2 *Predictive scenario (own design)*

purpose, support, concentration of effort, effort saving (saving of forces and equipment involves engaging resources in a manner that allows achievement of the objectives), flexibility, initiative, maintaining morale, surprising the opponent, avoiding the surprise of own forces, simplicity and the multinational environment.

The execution is not a step in the predictive scenario, but it is closely related to it. A ready stand-by force required by building a predictive scenario act according to the mission and the objectives resulting from it. In this situation, artificial intelligence may be given partial control over the robotic force and autonomous weapons, as well as over the sensor integration part, but the final decision of action remains within the realm of the human factor. In the sense of decision-centered concepts, force control must be delegated to the artificial intelligence. In this respect, I consider that it is necessary to establish an overwatch on the AI's control of the weapons systems, so as to eliminate the risk of the opposing forces taking "control" over the AI or the total control of the AI itself over the force that it could use for specified purposes for its benefit.

Algorithmization, digitization and artificial intelligence assistance in the decision-making process

The question we want to answer is: What are the possible mathematical, algorithmic processes implemented at the level of the digitized architectures of the command-and-control systems and processed by the AI, to optimize and make the operational decision-making process more efficient, in the conditions of conflict with variable geometry?

Due to the complexity of the operational environment, the variable geometry of conflicts and military/non-military operations, as well as due to the complexity of the command-and-control systems used in state-of-the-art conflicts, the decision-making process was no longer carried out only intuitively, based on experience and knowledge. On this consideration, decision procedures were developed and their evolution was achieved with the help of specific methods. The existing methods of achieving a decision are built on modeling the real processes, on imitating the behavior of the studied system. Experimenting/ checking a variant of a decision within the real process is not the most appropriate way and is not always achievable. The tools and models for achieving a decision are based on the of *theoretical methods, physics, mathematics and simulation.* In order to achieve a decision, it is also necessary to assess its strength and capabilities. The theoretical method is based on theoretical behavioral models and requires the synthesis and concretization of the existing/accumulated knowledge (held at a certain time) about the existing reality (action-system) without always having the possibility of practically verifying the scientific and practical content. This method is used in conjunction with the physical and mathematical methods. The evaluation of the physical environment is the process that underlies the physical method of achieving a decision. Its applicability in the military field is frequent and is materialized by the study/ analysis of military action with the help of physical means, such as the layout of the terrain (for rehearsals), the different physical means intended for the conduct of the war game, etc. The variables played are variables characteristic of the physical environment. Therefore, this method is not sufficiently effective in achieving a valid decision if not corroborated with other methods for the purpose of completing the number of variables and with those specific to other conflict environments (informational, cognitive, etc.).

Mathematical and analytical methods and procedures

The mathematical method uses instruments that differ in nature from the studied phenomenon/action/system but which can be described by the same mathematical relationships (usually quantitative) as those of the instrument used. Mathematical modeling (Lehaci 2016, 45) is materialized in isomorphism (description in a common form of different phenomena in nature). In the military field, this isomorphism is transposed into the common form description of the different actions variables, operations and/or systems, and their numerical, quantitative expression (e.g. matrix system for comparing the courses of action). However, the realistic quantification of variables remains the biggest challenge of this method/model of achieving a decision. A wrong quantification inevitably leads to a decision-making error, not being based on the reality of the operational environment.

The simulation method (e.g. the war game) involves an interaction between the human factors responsible for the planning process, simultaneously or successively introducing the variables (defining in military operations) in different simulation systems (with capabilities of reproducing real situations in the virtual environment) in order to verify the decision and to establish the military operations synchronization matrix. The simulation method implies the existence of an adequate information system (architecture and software) as well as properly trained personnel, but this method has clear advantages over the other methods, represented by the possibility of accurate programming and introduction into the system of forces with their capabilities and by the fact that it runs independently and produces results that can be analyzed mathematically and statistically and interpreted analytically.

Mathematical modelling is an alternative to the experiment process or method, that most of the time cannot be actually applied in the PMESII fields. Mathematics (the mathematical apparatus) is the instrument of scientifically based decision (mathematical models lead to optimal or almost optimal decisions). Operational research (scientific preparation of decisions) appeared during the World War II and consists in the process of building mathematical models for optimizing the decision-making process. Several sciences have been combined to create decision-making models that significantly contribute to the decision-making process, based on less intuitive or empirical reasoning, thus resulting in the mathematical models. Choosing between several possible variants/ taking the decision is a fundamental axiological option (the result of an information, analysis and deliberation process). The status of decisional process in which the decision-maker knows beforehand the specific result for each decision-making variant and the related risk is called certainty (the decision-maker has full information on the decision-making environment and the consequences of the decision-making variants). At the opposite pole lies uncertainty (that state in which one or more decision-making alternatives have results whose probability of occurrence is unknown or impossible to objectively assess). Uncertainty is often caused by the rapid changes in the particularly complex conflict operational environment. Predictive scenarios are designed to substantially reduce uncertainty.

Game theory is a branch of applied mathematics that addresses the problem of optimal behavior and has also been adopted in the military field and resulted in wargaming (in a framework described by a set of precise rules that establish the possibilities of action for each player, as well as how they are ultimately awarded victory). Game theory is an abstract decision-making model (based on procedures, processes, tactics and strategies) in risk situations, conflict, uncertainty and information impact. Currently, the military approach to game theory extends the interdisciplinary study of human behavior to an integral approach to the behavior of integrated and interoperable systems of systems, involved in the management of a conflicts, crises, etc. Within the game theory, a series of mathematical and algorithmic processes are folded on conflict scenarios. These procedures allow the description and analysis of real or anticipated conflictual phenomena/situations, as well as the establishment of balances, i.e. the status in which no actor wants to change his behavior, regardless of other actors' behavior. As a result, the conflicting state disappears or would disappear on this balance consideration. There are many situations of balance in a game, but the most important are those that are based on correctly modelled credible situations, according to the unfolding or predicted reality. The equilibrium point is mathematically justified. A system of n strategies forms a balance point if no actor has a reasonable motive to change his strategy, assuming that everyone else keeps his strategy[3] accordingly. A game is characterized by the quantity and quality of information available to the actors. Thus, we distinguish games with complete or incomplete information, as well as games with accurate or imprecise information. Games can also be built for 2 or more actors/participants or potential participants in the conflict. Depending on the existing scenario, the mathematical procedures specific to the theory of games are adopted on the criterion from simple

[3] An achievable (possible) action that the player can choose within the game. An optimal strategy is that strategy maximizing a player's win, regardless of the strategies chosen by other players.

to complex. We can exemplify by a process such as playing with n actors in extended form[4], matrix processes, static and dynamic processes in complete information (determination of equilibrium by the algorithm of maximizing relative gains, the algorithm of determining equilibrium in mixed strategies, determining equilibrium through the recursive induction algorithm, etc.). The procedures used in conditions with a degree of uncertainty are the processes called games against nature (Hurwicz's criterion – the criterion of the optimist, the Bayes-Laplace criterion, Savage's criterion – the criterion of regrets, the criterion of Wald). There are situations in which the decisions risks cannot be fully known due to the lack of assumed or not assumed reason by some actors. Such an actor can be considered generically the nature, therefore the name – games against nature[5]. The analysis of such situations is handled by decision theory. These mathematical decision-making processes are closely related to decision-centered military concepts (like Mosaic Warfare).

The information analysis grids (as mathematical and algorithmic processes) managing the uploads of decision supporting necessary information, can be transferred to the control of artificial intelligence using a digitized infrastructure. The advantages will be the increase of processing speed, mathematical accuracy and limited control of AI in the decision-making process. For example, the TAG method (Time Automated Grid) developed by IBM is an automation of a specific part of the system analysis process through which mini-data bases are built for the analyzed system. Expanding to the military field and adapting accordingly, the information analysis grids could manage the necessary information uploads and the set-up of mini-databases for the generated or possibly to be generated situation within the conflict. TAG is not a decision-making method but it can be an algorithm of managing the inputs in the command-and-control system and has the advantage of initiating the information support operationalization, assisted by artificial intelligence through assigned computers. Therefore, by assigning control to AI, through a digitized C2 infrastructure, over the information analysis grids within the decision-making process (regardless of their nature or structure or the method used), a timely management will be achieved (almost instantaneous interpretation of the data and information necessary to initiate and conduct the decision-making process.

Analysis methods based on the design of the information systems represent redesigns of the information flows, of the processes of processing and disseminating all possible sources (closed, open, field sensors, etc.) data. In this way, the installed programs (integrating computer's work) and AI are used both for joining in the data and information analysis and processing and in the adaptation of the system of systems to the latest challenges generated by changing the geometry of the operation / executed actions or changing the geometry of the conflict. Decision-making aspects cannot be reduced to knowing simple rules for the use of AI-assisted computers in order to benefit quickly and efficiently from the possibility of decision-making by circumventing the complexity of the informational decision-making mechanism. In this regard, we can exemplify through the ISDOS system (Information Systems Design and Optimization System) made by the University of Michigan. This system has the possibility to integrate several methods/algorithms for processing the informational requirements and for correlating them in order to design the file of the information system, in order to build the necessary information requirements similar to some trees described with the help of ADC type graphs (methods of analyzing the critical path on which the ordering theory is based). An activity is distinctly determined as part of a project or as a precisely defined sub-process, for which specified time and resources are allocated.

[4] The n-player game is a sequence of random decisions and events, simultaneous or not, that comply with a certain winning structure, given by certain operating rules (the rules of the game). The random event involves a probability distribution over an event field. The rules of the game will indicate how decisions are made by the players and their order. A player is rational if he seeks to maximize satisfaction with his own decisions, but taking into account the decisions of the other players.

[5] The attitude towards the game is different from one actor to another, leading to no universally valid criteria within the theory of decisions. The application of the criteria may lead to different results. The choice of strategy could be given by the result of the application of several criteria, p. 24.

The GANTT diagram[6], used in the military decision-making process (practical application through the Microsoft Office Project) is a tool to streamline the decision-making process that could be aligned on the functionality of the ISDOS system or similar systems. The diagram offers the possibility of planning the human resources and of controlling the activities but can be extended according to the needs of the command-and-control system (comparing the initial planning with an updated one, taking timely and measurable corrective measures to achieve the goals of the operation, evaluation tool, etc.). The process can be digitized and assisted by AI (in the diagram you can enter the data, the tasks, the subtask, the start time of the process and their duration - all the steps of the planning process and their sub-stages, the day and time of receiving the mission and the duration of each step, depending on the time available – until "ready to fight").

The critical path analysis methods as a logical algorithm, involves the division of a project/plan, built on a multitude of complex actions, from several component parts, at a minimum level (activities that follow), allowing the analyst to logically and technologically correlate them, making possible the interaction between the component parts (the minimal units of complex action). The challenge is that all the minimal activities must be determined and here it is necessary for the AI to intervene/ assist the entire process. Decomposition criteria can be established by the human factor, by AI or combined. AI and/or the human brain will identify the activities, starting from the questions: "are there other necessarily activities that follow or precede the activities identified so far?" and "what is the duration of the newly identified activity, when exactly does it begin and when does it end?" (Roman 2017, 55). I believe that this model, in conjunction with the GANTT diagram, can be a starting point in generating an algorithm necessary to make the decision-making process more efficient, digitized and assisted by AI, resulting in a matrix analysis system based on determinants.

[6] The GANTT diagram used in the military decision-making process (a practical application through the Microsoft Office Project) can be another tool to streamline the decision-making process. The diagram offers the possibility of planning human resources and that of controlling the activities. Through it, a comparison of the initial planning with an updated one can be achieved. It also allows timely and measurable corrective measures to be taken to achieve the purposes of the operation and can be used as an evaluation tool.

Human factor in decision making – analysis criteria

The criteria for the analysis of the human factor in the decision-making process are related to personality, preferences, values and information held, all these being closely correlated with the level of training, intelligence, creativity, intuition, etc. Human values prevail in the human behavior / way of action.

The criteria for the analysis of artificial intelligence involved in the decision-making process (if it will be given this possibility) compared to the human factor are based, in principle on (Walsh 2018, 25-26):

- much larger and faster data and information storage / storage capacity, with no risk of losing information (does not forget anything);
- the ability of computers to process data and information with immeasurably superior capabilities than humans and the exponentially greater capability of AI to 'learn';
- connected to an energy source, the AI is not limited in operation (unlike the human factor that needs rest/sleep);
- cannot be influenced by emotions (they do not exist at the level of AI);
- it is not limited in sharing its knowledge, skills, etc. (it can permanently constitute unlimited databases, on different criteria or execute mappings and resizing according to set criteria, etc.);
- there is no intuition in the decisions (algorithms, logical-mathematical);
- the AI has no consciousness (a form of norm consciousness could be built, based on the programmed observance of the norms in all fields, but this will also be of the procedural-algorithmic type). However, the enumeration could continue, what is considered relevant and what may constitute a risk in the implementation of AI in the operational decision-making process is that later this aspect would mean the end of consciousness, of human action and of human values, etc.

The role of artificial intelligence, decision support systems and intelligent decision support systems in the decision-making process

In order to eliminate or reduce the related risks, we consider it opportune that the AI mathematical and algorithmic processes of digitization and assistance of the decision-making process be

validated through a thorough system analysis, with adequate methodology. The testing system must be of closed type, but it needs to be able to simulate/ model the real PMESII domains.

The decision-making process involves responsibility and risk-taking. This risk can be reduced by formalizing the decision-making process by using mathematical methods and models. These have the ability to rigorously condense the essentials, and offer the possibility of being programmed, managed and processed with the help of computers and artificial intelligence.

It is necessary that all these mathematical, algorithmic digitization and assistance processes conducted by the artificial intelligence of the decision-making process, be introduced and managed at the level of some decision support systems (SSD) (Ivanciu 2018, 23). SSD must be flexible, adaptive, interactive, iterative, model-based and graphical interface-based. Currently, command and control systems are based on another type of system, namely *electronic data processing* (EDP). SSDs are designed for communication, shared tasks, accessing and processing of internal/ external data, management and processing of unstructured interfaces (electronic formats), expertise in solving current and future situations, accessing digitized mathematical models, computer science, etc. (optimization, modeling and simulation carried out for the purpose of analysis in the decision-making process. The SSD works effectively both at the modular (intelligent subsystem) level, but also at the system or systems level of interconnected and interoperable systems. By implementing AI at the SSD level, they have transformed (at least at the conceptual level) into SISD – *intelligent decision support systems* based on SE – *expert systems*[7] and AI – artificial intelligence (Ivanciu 2018, 4-17). Human experts and SE contribute substantially to documenting and improving knowledge bases, training new personnel on different functions, disseminating the results and products of the decision-making process and to the rapid and minimal cost transfer of knowledge, data, information, decisions, etc. The competences/capabilities of the two types of experts complement each other and the results are real. Expert systems can act for assistance and consultancy and/or development (from processes to architectures) on three main components such as databases (information, knowledge), inference mechanism and interface with the client. From an actionable point of view, SE focuses on the knowledge acquisition system, workspace, argumentation system (additional explanations) and total knowledge processing (refining) system. These aspects lead to increased efficiency and effectiveness and a reduced decision time, superior product and process quality, flexibility, operation with complex equipment, disposal of expensive monitoring equipment and quick access to databases or organizational knowledge. SE are mainly used in the specific fields of social life, for problems that can be solved by interpretation (surveillance, image analysis, signal interpretation), prediction (weather, traffic, demographic), diagnosis (medical, electronics, mechanics, software), design (circuit layout, building design), planning (project management, financial planning), monitoring (air traffic), troubleshooting (mechanics, software), training (identification of weaknesses), control (life support, artificial environments) etc. and I believe that they can be successful in the process of digitization of command and control systems and their subsequent operation thus covering the military field. In the table, there are comparatively presented some attributes of the two types of experts.

SISD (SSD that performs selected cognitive decision-making functions and which are based on artificial intelligence or technologies with intelligent agents) have developed from the need to remove the cognitive, economic, time and competitive limitations of humans in the processing of knowledge, data, information and in the decision-making process. In order to be perfectly functional and compatible with the human factor, a SISD must develop a behavior similar to that of a human consultant, access and process data relevant to the decision-making process, forecast or identify and subsequently prioritize the problems to be solved, generate different courses of action and correctly and timely evaluate both the courses generated and the action itself after its execution. We believe that using AI/IC (computational intelligence) techniques, SISD will achieve these aspects, emulating human behavior as real as possible through the use (at the AI

[7] SE – a program that processes a set of data, information, knowledge in order to reach results that are difficult to obtain, in the same way as human experts, but with much superior speed and clarity.

Table No. 1

COMPARISON BETWEEN HUMAN WIZARD VS. EXPERT SYSTEM ATTRIBUTES

Expert Type/ Compared Attributes	Human Expert	Expert System
Mortality	yes	no
Learning/processing/ knowledge transfer	difficult, long time	easy, rapidly
Creativity, intuition	high	low/zero
Adaptability	high	low

level) of RNA – *artificial neural networks* (Ivanciu 2015, 5-15). RNA is completely determined by the type of functional units (processing elements called neurons), architecture (location of functional units), algorithm of operation (evolution of input signal to output signal), learning algorithm and self-learning (as acquires new knowledge based on examples). RNA architecture (Ivanciu 2015, 16-34) single layered and multilayer.

Comparatively, the differences between the two types of systems are as follows:

What will clearly revolutionize the construction and implementation of AI in the PMESII domains, in addition to the aspects presented above are the *genetic algorithms* (AG) made on the basis of *evolutionary calculation* (CE). Genetic algorithms are search and optimization techniques, having as a starting point the biological metaphor of genetic inheritance and natural evolution (selection, crossbreeding, mutation). CE principles are materialized in the search of solutions (based on the principle of natural evolution – survival of the best), for finding the final solution we work with a lot of potential solutions that evolve (for humanity the individuals of the new generation are more adapted to the environment than the individuals from which they were created) and the targeting of the search is made through specific transformations on the solutions (similar to natural processes: selection, recombination, mutation). The fields of action of the EC are genetic algorithms, evolutionary programming, evolutionary strategies, genetic programming and optimization.

Table No. 2

SYSTEM DIFFERENCES

System type; comparative variables	SSD/SISD - RNA	EDP
How to use	Active; Reactive; Predictive	Passive
Beneficiary	commander/ command functional mode	Staff personnel
Result	efficiency, efficacy, innovation	mechanical efficiency
Time frame to refer to	past, present, future	past
Physical characteristics	flexibility	consistency

At this moment, I believe that digitization provides the foundation to ensure the resilience of the networks of the command-and-control systems and to achieve the desired results after carrying out the operational planning process. Preparing and training for drastic scenarios in PMESII domains is nothing new for utilities and network operators, but the need to optimize the decision-making process is imperative. The current COVID-19 pandemic has presented us with a completely new reality, unexpected and extremely difficult to manage. Extrapolating the situation in the military field, we find that such a challenge manifested in a conflicting environment would raise issues such as those already existing at the operators involved in the management of the situation at the political, social, economic level, etc. put in a position to manage increasingly complex networks without being prepared in advance for such situations. On one hand, experience has shown that emergency planning has worked and networks have remained stable. On the other hand, the need for the incorporation/implementation of AI and automation in command-and-control systems has been demonstrated, which can undoubtedly help to balance situations at least by speeding up the decision-making process. The current challenge lies in ensuring the resilience of command-and-control networks, in difficult and demanding situations for humanity.

Conclusions

We expect that current systems, which are getting closer and closer to their operational limits, will still be able to respond to an increasing number of new requirements. However, the update and expansion of command-and-control infrastructures have not been able to fully keep up with the current challenges generated by the latest international situations. At the moment, the infrastructure and architectures of command-and-control systems, decision-making processes, and the network operators face difficulties in which they have to balance a dynamic environment of threats with the increasing constraints of daily operational reality. At least, under these circumstances, it is necessary to implement modern architectures, digitized and assisted by artificial intelligence and efficient decision support procedures.

The approach could start with the total digitization and implementation of artificial intelligence within the networks. We believe that digitalization is the way to harmonize these conflicting requirements and to unlock a whole new space of opportunities in the process. However, digitalization is more of a facilitator than an end in itself. Based on artificial intelligence, automation technologies can support and optimize all key tasks assigned to the response force. The data collected is transformed into useful information and the information acquired supports all decisions.

Mathematical, AI-enabled computer algorithms, with an infusion of experience and specialized human knowledge, can fully or partially manage conflict situations (depending on the need). Combinations of automation software can autonomously or not control information or decision-making flows by managing decentralized, modular devices and disintegrated force with rapid integration capability (intelligent systems and subsystems, networks, autonomous weapons, robots, drones, etc.).

We believe that solutions such as intelligent digital systems and subsystems (with extensive capabilities in the virtual and real environment) and programs, response algorithms to any type of requirements (supported by smart platforms) are a real and timely alternative to the challenges faced by current systems. Building the current systems digital twins becomes a practical, multifunctional tool until they are completely replaced. By merging real data from specific closed networks with external data sources (obviously with specific data protection measures), a trial-and-error approach can be avoided in the process of digitizing command and control systems. Predictive scenarios can anticipate and prevent possible incidents (events, conflict situations, etc.) and intelligent digital systems allow for much faster decision-making and rapid implementation of the right corrective action. We consider that the use of predictive scenarios (the realization of which artificial intelligence is implemented to a strictly determined and properly controlled extent) for anticipating future situations and building related scenarios will achieve, on the one hand, a correct and coherent decision and on the other hand, will decrease the degree of uncertainty leading to the avoidance of surprise.

The behavior of the decision-makers is constructively influenced by the products of the predictive scenario/forecasted situations and the

decision is early taken with a high degree of certainty or probability. Predictive scenarios considerably reduce uncertainty, offer the possibility of preparing (in advance) for possible situations, from multiple/ all points of view, remove surprise and negative effects, give confidence in solving situations and meeting anticipated objectives. In this way, the command-and-control systems are ready to act promptly, timely and with maximum effectiveness in the changing situational geometry specific to the conduct of state-of-the-art and future conflicts. A certain force, constituted on the concept "Mosaic Warfare" or similar concepts, centered on decision, offers an impeccable execution of the predicted operations and planned by such a system of command-and-control systems.

Artificial intelligence-based solutions such as those related to digital monitoring, analysis, synthesis and control are an effective way to achieve the desired performance in command-and-control systems, at all levels, where they exist or will exist in the near or more distant future. During crisis, swift decision-making and the right/ optimal course of action are essential. Digitization, automation and deployment of AI at C2 level is the current solution to the challenges posed by modern conflicts, with variable geometry or future ones, regardless of environments and forms.

There are many challenges when it comes to implementing AI at the command-control and force level, automation, robotizations and digitization of networks, and these are related to a different kind of risks and threats.

Finally, I appreciate that the efficient solution to complex problems involved in the variable geometry conflict requires the development of modular, integrated and interoperable command and control systems, assisted by artificial intelligence, which will ensure the conduct of a coherent decision-making process, based on opportunities, oriented towards achieving success and achieving the desired final state.

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THE PRINCIPLE OF "INDIVISIBILITY OF SECURITY" – SOURCES, REASONING, RELEVANCE – AN INCORRECT EXCERPT FROM THE SET OF PRINCIPLES AGREED IN EUROPEAN SECURITY

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The principle of indivisible security in Europe has been resurfaced lately through the intention of the Russian Federation, via the Minister of Foreign Affairs, Sergey Lavrov, to assume a kind of legitimacy for the consecutive invasion of Ukraine, based on the disrespect for its unilateral perceived security threats and the disrespect by the collective West of this principle, in Russian interpretations. It is, for sure, a distraction and not a real debate, but it worth looking into it since it is about a vision on the making, a concept immature and unsubstantiated, never operationalized, but completely linked with the respect of the general principles sitting at the bases of the UN Chart and CSCE/OSCE fundamental document, of the rules based order, as well as the confidence and respect of the peaceful resolution of conflict and abstaining from the use of force or threatening to use it in international relations.

Keywords: collective security; comprehensive security; rules base order; indivisible security.

The erosion of the trust between the West and Russia

The deployment of Russian troops around Ukraine's borders generated emotions and a justified concern over the issue of Peace and War in Europe. Fully denying any such prospect (AFP 2022) (Welle 2021), Russia continued to bring in troops from the Central District and the Far East (Isachenkov 2022) (Defence 2022), approaching the optimum number for launching an attack to occupy all of Ukraine (Blinken 2022) (Slawson, Campbell, Bartholomew 2022). In order to hide these actions, which are not in line with the rules of transparency of the military exercises found in the system of principles and commitments within the OSCE, Russia introduced, through Foreign Minister Sergei Lavrov, a new topic in the conversation, to act as a smokescreen and create a semblance of lawfulness for its future actions. In a letter addressed to an unknown number of states (Anrchynewsky 2022) and without an exact rule, Sergei Lavrov raised the issue of the indivisibility of security as a principle of the CSCE/OSCE (MID 2022) (TASS 2022), the basis of his claims having as a starting point the subjective perception of some security threats, linked, of course, to alleged promises of NATO's non-expansion. This claim is the foundation of the two draft agreements sent to NATO and the US, which were also published on the website of the Russian MFA (MID 2021) (MID, Treaty between The United States of America and the Russian Federation on security guarantees, 2021).

Of course, the tactical move is aimed at covering up some realities, launching a parasitic discussion and possibly highlighting the differences of how states perceive a principle such as the indivisibility of security at the European level and, in fact, transatlantic and Eurasian, as the Astana 2010 document stipulates (OSCE 2010). It is, therefore, a false problem. Nevertheless, it deserves to be tackled and debunked in order to prevent it from making history and constitute a semblance of the legitimacy for Russia's aggressive actions. This is why it must be stated that this principle was a subsidiary one, mainly an aspiration until 2010, but never implemented. The Astana document is also rather aspirational, not substantiated, or detailed.

On the other hand, there is the desire and commitment to agree on such a principle applicable in the context of cooperative security between states that adhere to the foundations of the organization, the basic commitments, and that comply with the Helsinki principles. The first of them – listed, as a matter of fact, in the UN Charter

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– is the equal sovereignty of states (UN Charter, Art. 2, paragraph 1). This encompasses (reinforced in subsequent documents in the Helsinki/CSCE/OSCE system) the freedom to choose the system of ensuring security and defense, including through joining alliances (a principle also enshrined in the Charter of Paris for a New Europe) (Charter of Paris for a New Europe, 1990). It is followed by the commitment to respect the sovereignty, territorial integrity and independence of states, the cornerstone of the Helsinki Agreement, 1975 and the finalization of the agreement for the Final Act (OSCE 1975).

In the background we have the Grand Bargain between the socialist and capitalist states at that time, arising from ten years of negotiations, determined by the Cuban missile crisis and the prospect of the destruction of the world: the inviolability of borders in Europe versus observance of human rights. All of this is paired with arms control (nuclear and conventional) and military transparency – the placement of capabilities in the OSCE area, the redeployment of new troops, and rules for conducting military exercises, as well as the construction of a system of confidence-building measures to be able to prevent conflicts, subsequently to de-escalate any violent conflicts that have arisen, or to resolve existing, frozen, or protracted conflicts (OSCE 1975, p. 2).

However, all these founding principles were violated by Russia through the Russo-Georgian war, the unilateral recognition of the independence of Abkhazia and South Ossetia, and later of Crimea, followed by the annexation of Crimea – the first forceful modification of Europe's borders after 1975, done by the seizing the territories of another state – and the Russian military aggression in eastern Ukraine. The bases of trust collapsed, Russia exited the system, was condemned, isolated, and subjected to international sanctions. Against such a background of lack of trust, the return to the indivisibility of security – possibly in the unilateral interpretation of Russia as a veto right over European security, a veto right within NATO, and the ability to block the sovereign aspirations and decisions of states through military intervention and the use of force (MID, Agreement on measures to ensure the security of The Russian Federation and member States of the North Atlantic Treaty Organization, 2021) – is a subject that requires a whole cycle of returning to the observance of the founding principles of the CSCE and collective security in Europe, then reversing the consequences of Russia's violation of these principles (how could one negotiate a new situation and security guarantees with an actor who did not respect even those in force, what guarantee would one have that the approach is not a useless one, that, after a while, the turbulent actor will not call into question these renegotiated principles, at will).

Thus, we have entered a new post-conflict cycle, whether a new large-scale war will take place in Ukraine, whether hybrid or limited conventional operations will continue, we need to resume rebuilding trust, revalidating the basic principles in documents and actions, return to their enforcement, defend ourselves and reassure most vulnerable states, in order to have the basis from where we start the confidence-building measures, arms control and disarmament measures, and then return to the vision and perspective of collective security and the aspiration of indivisibility of security in Europe. A long road, a new cycle to be restarted, after the status of the previous cycle was changed by Russia itself by blocking the normal road to reassurance, de-escalation, control of nuclear and conventional weapons, and the negotiation of agreements that would control new capabilities based on new technologies – cyber, outer space, etc.

Hierarchies, principles, and aspirational perspectives in European and global security

International law is based on the equal sovereignty of states. The fundamental support comes, after the dissolution of Empires, from the Wilsonian principles (Wilson 2019) that formed the basis of the Versailles system of agreements, respectively the founding documents of the League of Nations (Britannica 1920), the forerunner to the United Nations in the interwar period. The sovereign equality of states means that any state, large or small, strong or weak, has the vocation to be equal to all others in its decisions taken in accordance with the freely expressed will of its citizens, directly or through the legitimately elected bodies that represent them.

Respect for the sovereignty, territorial integrity, and independence of states is a provision included *expresis verbis* in the Helsinki document,

1975, and in all subsequent documents, including the NATO-Russia Founding Act, 1997 (NATO 1997). But the fundamental agreement reached in Helsinki, in 1975, is to balance the principle of the inviolability of borders through military force with the observance of human rights. The first principle was defended mainly by the socialist states of that time, from the Soviet bloc, while human rights were brought up, of course, by the democratic states. It is true, today's Russia, the successor to the treaties of the former USSR, has not complied with either one of the components of the Helsinki fundamental agreement. And this was best exemplified after the Russo-Georgian war of 2008 and the unilateral recognition of Abkhazia and South Ossetia, and all the more so, after the annexation of Crimea in 2014 and the armed aggression in eastern Ukraine.

The provisions of the Helsinki document are the most useful in this case. And, lest there should be any doubt, the first Title, which refers to the issues of security in Europe, begins with the principles that guide relations between states. There we find (I) the sovereign equality of states, (II) the refraining from the use of force, (III) the inviolability of borders, (IV) the territorial integrity of states, (V) the peaceful resolution of disputes, and (VII) observance of human rights. Lest there should be any doubt again, the reference here is to the UN Charter and the Universal Declaration of Human Rights, also mentioned in paragraph 3. At (VIII), which includes the principle of the self-determination of peoples, includes the strict provision, in paragraph 1, that the right to self-determination is used in strict accordance with the Charter of the United Nations and with adherence to the principle of territorial integrity of states. One can also add (IX), the observance in good faith of the international agreements to which each state is a party (OSCE 1975). The conclusion is clear: Russia has violated each of these fundamental provisions that give meaning to European security.

Against this background of observing the fundamental principles of international law, of the Code of Conduct in international relations, of complying in good faith with the international agreements to which each state is a party, it was possible to build the OSCE and subsequent documents to increase trust. This was done, of course, step by step, over time, starting from the strategic agreements on nuclear weapons, continuing with the INF Treaty (INFTreaty 1987), regarding medium-range (intermediate) nuclear missiles, and with the Treaty of Conventional Forces in Europe, revised in 1999 (OSCE 1990) by virtue of the changes that came after the collapse of the Berlin Wall. In this context, the Russian Federation withdrew from the Treaty of Conventional Forces in Europe in 2007 (Reif 2015), violated the INF Treaty by producing and testing medium-range missiles (North Atlantic Council, 2019), later deployed in Europe – something which the US, NATO, and the Western states warned about and proved, on several occasions, before the dissolution of the agreement. Given that the fundamental principles of international law – equal sovereignty of states – have not been observed, the fundamental principles of the CSCE/OSCE have not been observed – sovereignty, territorial integrity, and independence – the confidence-building measures have not been observed – arms control, transparency of troop movements and military exercises, all the more so around the borders of another state – a reference to the aspiration of indivisible security is, at this stage, superfluous, outdated, and inadequate.

Indivisibility of security. Documents and meanings

Returning to the origins, let us discover how this principle is described in the CSCE/OSCE documents and what significance is given it. How it is operationalized today is hard to say once the fundamentals of the organization that would have proposed to implement it have been shattered by the state that today calls for a return to such a principle as a method of blocking the expansion of NATO, of blocking the equal sovereignty of states and the right to freely choose their alliances and security arrangements. All this is based on an alleged perception of the security concerns expressed unilaterally, in a unique format, by only one of the states of the system, the Russian Federation, the one that violates the foundations of international law and the founding principles of CSCE/OSCE.

Thus, the Conference on Security and Cooperation in Europe, Helsinki, 1975, states only in the preamble, among the countless principles and provisions prior to the agreement, "recognizing the indivisibility of security in Europe as well as the common interests of the development of cooperation in Europe and between them [the parties to the

agreement] and the intention to follow these efforts among them [the parties to the agreement]" (OSCE 1975) (...) The aspirational nature is obvious, and so is the intention that emerges from this whole formulation. Moreover, there is no reference to the indivisibility of security anywhere in the text, after this, made explicit in any way, not even a provision in this regard in the body of the agreement – the Helsinki Final Act, 1975.

The Charter of Paris for a New Europe, 1990 (Charter of Paris for a New Europe, 1990), also notes that "by ending the division of Europe, we will fight for a new quality of our security relations while fully respecting everyone's freedom of choice in this matter. The security is indivisible, and the security of each participating State is inseparably linked to that of the other states. We are therefore committed to working together to strengthen trust and security between us and promote arms control and disarmament." The conclusion is very clear, the freedom to choose the desired security formula (i.e., equal sovereignty of states) precedes the idea of the indivisibility of security, which translates into commitments to increase trust and promote arms control and disarmament. But even these actions provided for by the idea of indivisible security are all violated by the Russian Federation, which appeals to this principle, but under the conditions of non-observance of the Helsinki principles, massing troops at the borders of a state and not observing the control of armaments, the transparency of military exercises and shattering confidence – the concrete foundations for the application of this principle in 1990.

The OSCE Summit in Istanbul in 1999 (OSCE 1999) has four documents mentioning the indivisibility of security, under very strict conditions, framed by the observance of the founding principles and in the context of confidence-building measures. Thus, the Istanbul Document, 1999 (OSCE 1999), a true OSCE Charter, notes the commitment to prevent any violent conflict wherever possible, strengthening the OSCE's capacity to resolve conflicts and rebuild societies ravaged by war and destruction. "The Charter will contribute to the formation of a common and indivisible area of security, advancing the creation of an OSCE area, free of dividing lines between areas having different levels of security." Again, it is an aspirational issue, placed in the context of conflict prevention and resolution and post-conflict reconstruction, and especially in the context of the community of states that observe the basic principles.

The part reserved for common foundations, paragraph 10, reaffirms the principle of decisions taken by consensus in the OSCE and the need for flexibility and the ability to respond rapidly to changes in the political environment, which is "at the heart of the OSCE's cooperative and inclusive approach to common and indivisible security" (OSCE 1999). Again, aspirational and in context. Then, in the title on the political-military dimension, paragraph 30, after the references to the OSCE Vienna Document, 1999, as well as to the other documents adopted by the Forum for Security and Cooperation (FSC) related to the political-military aspects of security, the increase of trust and transparency is mentioned again: "the full use and implementation of the OSCE instruments on the ground and the adoption of appropriate responses to the security needs in the OSCE area".

After the extensive references to the Code of Political-Military Conduct, it mentions "the determination to make efforts to address the common security concerns of the participating states and to pursue the OSCE concept of indivisible and comprehensive security". Again, an aspirational approach, in the context of observing OSCE principles, and by juxtaposing indivisible and comprehensive security, i.e., with the three dimensions (baskets), including human rights, peaceful resolution of conflicts, confidence-building measures, in the context of refraining from the use of force to achieve political objectives. In Title 4 of the same document, which lists the common instruments, the subtitle on strengthening dialogue registers in paragraph 34 the commitment to extend the dialogue and the commitment of the Permanent Council and the Collective Security Forum (FSC) to address the security concerns of the states and to continue with the implementation of the concept of comprehensive and indivisible security.

The second document mentioning the idea of indivisible security is the Operational Document – Platform for Cooperative Security, which mentions the cooperation with third-party international organizations or states, based on the set of known principles, among which are "the support of the OSCE concept of indivisible, common and

comprehensive security and of a common security space free of dividing lines". Again, one can see the aspirational element, the support of a concept that is already no longer just about indivisible and comprehensive security, but also common. The mere fact of the inconsistency of the formulations shows the lack of maturity of the concept and its non-decryption at the formal level (OSCE 1999, p. 10, p. 43-45).

The concept can also be found quoted in the Final Declaration of the OSCE Summit in Istanbul (OSCE 1999, p.46-58), paragraph 40, "welcoming the efforts of the OSCE Forum for Security and Cooperation to build dialogue, cooperation, transparency and mutual trust on security as well as the construction of the OSCE concept of comprehensive and indivisible security", in accordance with the Helsinki mandate, 1992. The paragraph also refers to the Vienna Document, 1999, on confidence-building measures, to the Code of Political-Military Conduct, and on all aspects of security. It is the clearest reference to a concept under construction and to the context of observing the principles of the CSCE/ OSCE as the basis for its development.

Finally, the fourth document, the CFE Treaty Adjustment Agreement (OSCE 1999, p.119-137), of the Conventional Forces in Europe, mentions, in the preamble, the "struggle to further develop and consolidate a new security model between the State Parties based on peaceful cooperation, thus contributing to the establishment of a common and indivisible area of security in Europe". Needless to say, it was Russia that also breached the trust, violated the principles, used force and did not abide by the peaceful cooperation invoked, did not withdraw the troops according to the CFE Treaty, and even increased their presence after the withdrawal from the agreement and the annexation of Crimea, thus undermining the construction of that common and indivisible space of security.

The OSCE summit in Astana and the indivisibility of security in Europe

35 years after the Helsinki Final Act, the Astana Commemorative Summit (OSCE 2010) recorded the most extensive references to indivisible security in all OSCE documents. Foreign Minister Sergei Lavrov also refers to this document and the sum of the Istanbul documents, in particular, to substantiate his claims and try to legitimize a forceful action in Ukraine, invoking the disregard for the claims and perceptions of the Russian Federation in terms of security. The document is no less illustrative regarding the context and conditions of building an indivisible, common, and comprehensive European security, which also remains an aspiration, not a concrete commitment or a well-grounded, mature, unanimously accepted concept.

Thus, right from paragraph 1, the Heads of State and Government of the 56 participating states, members of the OSCE, are committed to supporting "the vision of a free, democratic, common and indivisible, Euro-Atlantic and Eurasian security community, from Vancouver to Vladivostok", reaffirming "the relevance and commitment to the principles on which the organization is based" and the need for further action to "implement the fundamental principles and commitments on the dimensions of politico-military, economic and environmental, and a human dimension, in particular in the field of human rights and fundamental freedoms". The references are obvious, the context and the conditions for advancing this vision, defined: the observance of the rules, and also of all the principles, with the special emphasis of those related to the observance of human rights. The conditions in question have not only been ignored, not observed, but major steps backward have been taken by Russia internally since then, and internationally since 2014, since the annexation of Crimea and the Russian military aggression in eastern Ukraine, in particular, although we must not forget the war in Georgia, August 2008.

Paragraph 2 underlines again the references to fundamental documents and commitments in the UN Charter and the OSCE principles, rules, and commitments, before discussing the creation of a "comprehensive, cooperative, equal and indivisible security, which is linked to the maintenance of peace and observance of human rights and fundamental freedoms and is linked to economic and environmental cooperation and peaceful relations between states" (OSCE 2010). It could not have been clearer, and we are already noticing that indivisible security is already integrated into a broader concept that also represents the context principles – maintaining peace and observance of human rights and fundamental freedoms. All these elements were violated by Putin's Russia, the one

that clamors for a concept to be realized in principle, at the end of the chain of a trust construct whose course has been broken, repeatedly, precisely by the actor that today demands the completion of this road of trust and disarmament.

Paragraph 5 refers to "inclusive and comprehensive security at the regional level" only to underline the role of the OSCE and the basis of principles among which "consensus, equal sovereignty of states, promotion of open dialogue, prevention and resolution of conflicts, building mutual understanding and strengthening cooperation" are explicitly emphasized. Finally, it reaffirms the commitment to the implementation of the principles outlined above and to substantial contributions to the common and indivisible security. Paragraph 11 welcomes the initiatives to strengthen European security, on all three dimensions, in order to "achieve the vision of a comprehensive, cooperative and indivisible security community within the OSCE area", which can react to the challenges of the 21st century, based on "our full adherence to OSCE rules, principles, and commitments on all three dimensions. It should unite all participating OSCE states in the Euro-Atlantic and Eurasian regions, without dividing lines, conflicts, spheres of influence and areas with a different level of security." It is stated without any doubt, nuance, or possibility that these provisions can be interpreted in any way, distorted, taken out of context, cut, or individualized beyond the founding principles and norms of international law and the OSCE.

The indivisibility of security – an aspirational principle that does not exist outside of principles, norms, rules, and behaviors in the OSCE

Of course, only one big question remains in the end: what is the real meaning of the indivisibility of security in Europe in OSCE documents?

The first observation is that such a principle does not exist independently. It is an aspirational vision of where states should end up if the level of built trust is high enough. Moreover, the evolution of the debate – until 2010, after which we had no more documents referencing it, not even the final declarations of the OSCE summits – shows that we are talking about comprehensive and indivisible security first, then about "comprehensive, cooperative, equal and indivisible security, which is linked to the maintaining peace and observance of human rights and fundamental freedoms, and is linked to economic and environmental cooperation and peaceful relations between states."

Perhaps the clearest explanation was provided in 2010 by the Secretary-General of the OSCE, Marc Perrin de Brichambaut, in a debate at the Diplomatic Academy in Vienna, during the Partnership for Peace Research Seminar (Secretary General Marc Perrin de Brichambaut, 2010). It abandons the rest of the components and comes down to formulating the indivisibility of the security that would be at the heart of the OSCE project. However, it reveals the genealogy of the concept, that it was conceived as an interconnected formula of three concepts. The Helsinki document was about the fact that the security of a state is linked to the security of every state in the OSCE, cooperation benefits all member states, and that insecurity within or outside of any member state affects all OSCE member states.

The second component is that of "comprehensive security", reflecting the comprehensive approach to security within the CSCE, namely the three dimensions (baskets) – political-military, economic and environmental, and the human dimension – regarded as complementary, interconnected, and interdependent. "All three dimensions must be understood as essential and equal for real and long-term security," said de Brichambaut. Finally, the third component of the triad of understanding indivisible security is the principle of "cooperative security", which stresses the importance of cooperation between member states, between international organizations and institutions. "The three principles worked together and were unanimously accepted together by the Member States over time."

I think that, at this point, beyond revealing the utilitarianism of the reopening of such a subject today by Putin's Russia, we can say that the West, the US, NATO, the EU, and the OSCE as a whole, do not have to hide or look at this principle and aspiration of European states, after the fall of the Berlin Wall, with any reluctance. The rules-based world means fulfilling in good faith all the international commitments and signed agreements. In this context, the perspective of indivisible, comprehensive, and common security at the level of the OSCE also means the absence of

spheres of interest, the sovereign equality of states, respect for the sovereignty, territorial integrity and independence of states, and the right to freely choose their security solutions and alliances, as well as the consolidation of trust, arms control, transparency of troop movements and military exercises. Exactly what Russia is accused of infringing. All these principles are deeply opposed to the claims evoked by Russia in the two draft agreements sent to NATO and the US, which stipulate exactly the opposite of the commitments within the OSCE, including those related to the indivisibility of security.

Regarding Ukraine, realism brings us back down to earth: we are in a new Fulda Gap-type era (Fulda Gap, Lawland Corridor, Germany) where the parties try to eliminate the gray areas and create a reinforced border in Eastern Europe between the Western, Euro-Atlantic World, and the alleged Russian World, based on Thucydides' trap formula (Graham Tillett, Allison Jr. 2017) in which Vladimir Putin placed himself when he employed military resources on Ukraine's borders and attempted to achieve militarily the submission of a sovereign and independent state, which opted for a security solution contrary to Moscow's interests and subordination to the Kremlin. While Belarus is no longer an independent and sovereign state, after being swallowed by Russia into a "common state", based on Lukashenko's inability to deal with his citizens, ignoring their aspirations, Ukraine is preparing for a large-scale confrontation. One without convenient elements and explanations that would allow a de-escalation on the ground using dialogue and diplomacy.

In this context, the debate on "indivisible security" is nothing more than a smokescreen, propagandistically usable, especially if there are meanings and nuances in the Western interpretation of the subject, so that a genuine transition to the debate on this subject would no doubt destroy Russia's claims and ambitions to have an end of the thread to which to bind itself to justify normatively the invasion of Ukraine, that began 24-th of February. One can see this from this step-by-step analysis of the documents and references to this concept, its aspirational, forward-looking nature, its complexity, and its indivisibility towards the context of observing the principles and values of OSCE, from the Helsinki Final Act to the OSCE Summit documents in Istanbul and the Astana Final Declaration. There is no basis that would allow Russia to play the card of the division of the West or to interpret distinctly, *sui generis*, a concept so unsubstantiated, but with clear limits, as seen in the documents analyzed above.

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ASPECTS OF RECONFIGURING THE CONTEMPORARY WORLD ORDER FROM THE PERSPECTIVE OF THE EXISTING CHALLENGES IN THE INTERNATIONAL SECURITY ENVIRONMENT

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The struggle for supremacy dates back to ancient times, and the conquest of new territories or the desire to regain former affiliations is not new. Consequently, the central objective of the paper is to understand and review current geopolitical and geostrategic issues. At the beginning, the general framework of the research is pointed out. Although contemporaneity offers countless possibilities for states to have a prosperous and peaceful inner order, their tendency is different, in fact it is the same as always: territorial expansion and the obtaining of the scepter of international power. This scientific approach captures analytically and comparatively the attitude of two major state powers, from the Euro-Asian space, Russia and China, on the one hand, and the efforts of international actors, USA and NATO, which promote peace and stability and counteracts hostile actions that threaten its values. Following the results of this analysis, the conclusions of the research are drawn, accompanied by personal contributions, issues addressed and identified limitations.

Keywords: supremacy; order; territorial expansion; Rusia; China; USA; NATO; peace; stability.

We are currently witnessing an endangerment of the order of the states of the world, supported by their actions or inactions, which tend to trigger a "tectonic movement" to resettle the current borders.

The dispute over supremacy, be it political, economic, geostrategic, technological or otherwise, stands out globally, so that the international goal of the existence of a deliberate, conscious interstate peace seems more like a utopian desire.

The purpose and research directions of the paper

Although the issue of changes in the international security environment has been and continues to be intensely addressed in national articles and publications and is also found in my area of scientific interest, there are areas of research that remain open due to international geopolitical and geostrategic uncertainty.

Taking into account our own research concerns regarding the transformation of the Romanian Army, a process with many elements tangential to changes in NATO, we identified as the main objective for this paper the review and understanding of the reasons for hostile attitudes of some Eurasian states, Russia and China. compared to the Alliance's countermeasures.

The research directions for the proposed goal include: defining the geopolitical and geostrategic importance of the Eurasian space and the existence of a "balance of power", Russia's current position and requirements, China's actions, contrary to NATO's global order, US role in the Eurasian space. Following the analysis performed, through this paper I try to capture the trends and evolution of the contemporary security environment and possible solutions for restoring international relations.

This scientific path will be supported by up-to-date data, collected and analyzed through the online platforms of SIPRI (Stockholm International Peace Research Institute) and IISS (The International Institute for Strategic Studies), but also by the study of official documents and literature from domain. SIPRI is an independent international institute established in 1966 with the mission of conducting research on conflicts, armaments and arms control and disarmament. IISS, founded in 1958, is a British institute that aims to do research in international affairs. Both institutes provide valid and globally recognized information and databases and are benchmarks for various specialized studies in the field.

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Preliminary considerations on the relationship between Russia, China and the United States

The starting point for the analysis of the three states, Russia, China and the United States, and the focus of the research directions inclusive, is the vision of futurists Toffler: "We all, civilians and military alike, need a deep understanding of the revolutionary new knowledge, wealth and war" (Toffler 1995, 290).

The personal interpretation given to this perspective, with an impact on the scientific approach taken, is the following: through "knowledge" we will achieve the geographical delimitation of the conflict area and the correct capture of current requirements and predict the intentions of states under analysis; the idea of "wealth" will highlight a comparative picture of the financial expenditures in the military field of the three state actors (Russia, China, USA); and in terms of the concept of "war" the military potential will be captured, expressed in this case by contextual comparisons at the level of armed forces. Broadly speaking, the last two aspects analyzed will define "hard power" (Nye 2012, 37-43), tangible resources, such as force and money, which can change territorial boundaries and extrapolate the idea of economic supremacy in the region.

The events of the XXth century also meant attempts to quantify the power of states through various formulas, one of the analysts who stood out during the Cold War, Ray Cline, published the following simplified version:

PERCEIVED POWER = (POPULATION + TERRITORY + ECONOMY + ARMY) x x (STRATEGY + WILL) (Nye 2012, 20)

Applying the formula with the values of the two representatives of the opposing sides of that time, the USA and the Soviet Union, Cline concluded that the latter is twice as strong. Although plausible at first glance, history has shown otherwise. More recent efforts by economists in particular focus on the inclusion in the formula of all of a country's resources and national achievements (external constraints, infrastructure, ideas) and how they would influence military capabilities and combat performance.

The application of these formulas is not the object of study of this paper as they have not proved their usefulness over time, but the close follow-up of established research directions.

"The knowledge"

The general framework for the proposed analysis is metaphorically referred to as "the great chessboard" by political scientist Zbigniew Brzezinski, "Eurasia or the" supercontinent, "bounded on the west by Lisbon and on the east by Vladivostok" (Brzezinski 1997, 34). This territory is in a continuous process of reconfiguration, where hegemonic ambitions, economic disparities, civil unrest and acts of terrorism compete to restore new international influences.

Despite the fact that Eurasia occupies about 75% of the world's population, comprising the most politically, economically and financially active countries, which also have great nuclear power, it does not act as a whole for the common good, and states are individually wasting a vast array of resources in pursuit of their own interests and goals, sometimes to the detriment of neighbouring countries.

The Eurasian space is riddled with multiple conflicts, and misunderstandings are popping up everywhere. Frustration and rebellion of some states, manifested in the form of threats to the territorial integrity of other states or concrete actions in this regard, harming the competitive spirit or eliminating competition and extrapolating the idea of superiority and the concept of "overpower" (Marga 2017, 58- 71), disrupts the main strategic objectives of international organizations with responsibilities in the field of defence and security, to maintain a stable and secure climate.

Renowned American theorist Henry Kissinger considers Westphalian Peace to be the main model of world order, believing that Westphalian principles "are the only generally recognized basis of world order" (Kissinger 2021, 10). The idea is also reiterated by the Romanian political scientist Andrei Marga in a paper based on Kissinger's visions, stating that "the Westphalian system has been practically shared over most of the globe" (Marga 2017, 10).

A World War II theory had the Newtonian pendulum as its counterpart in the scientific world, in the sense that it proposed a "balance of power" (Kaplan 1957, 684-695). If one state stands out significantly from its power, the others will initiate a coalition to fight it and bring it back into its own orbit, thus restoring balance.

In a similar contemporary approach, Bohumil Doboš, a political scientist, talks about a Westphalian

system based on the existence of sovereign states that are independent in decision-making and are responsible for their own survival, as well as for all other domestic or international action. Moreover, he recalls the existence of a certain "balance of power", stating that "the balance of this system lies precisely in balancing power among the states of the world" and has as its "main characteristics sovereignty, territoriality and the state" (Doboš 2020, 20-21).

Therefore, in the light of this narrative, one can analyze the efforts to ensure and maintain peace and stability by NATO and the US specifically, in the new international context of conflict, caused by two influential politico-military and economic powers, Russia and China.

The strategic vision given by the interpretation of this map highlights the emerging dissensions and current challenges of the security environment, which begin, from left to right, with Russia's hostile attitude towards the West. Its expansionist trend became strong with the military intervention in Georgia in 2008, followed by the illegal annexation of the Crimea in 2014. The Kremlin currently maintains a Russian Troop Task Force in the Republic of Moldova, simultaneously with an aggressive accumulation of military forces and equipment on its border with Ukraine. In addition, there are large-scale armed deployments in Belarus in the form of joint exercises.

Amid talks in Brussels on January 12, 2022 between Russian and NATO officials, the Kremlin sees the Alliance's "open gates" policy of expanding to Eastern Europe in particular as a threat to its borders. In addition, it is believed that suppressing Russian influence in the area is in fact NATO's undeclared goal. Under this denunciation, Moscow blames the Alliance for both the aggravation of Europe's security and the emergence of its own sense of insecurity, due to the endowment of resources and military equipment of states in the vicinity of its territory.

Although the Kremlin supports its hegemonic claims, even resorting to force if its requirements are not met (withdrawal of NATO troops from former Warsaw Pact countries, halting the Alliance's expansion in Eastern Europe and preventing Ukraine's accession to NATO), the Alliance does not seem to yield to concessions. A concrete measure in this regard was taken in February this year, by consolidating the Eastern Flank allied with additional military troops in Romania. NATO is still proposing a series of sanctions to counter Russian action if the diplomatic solution is not considered

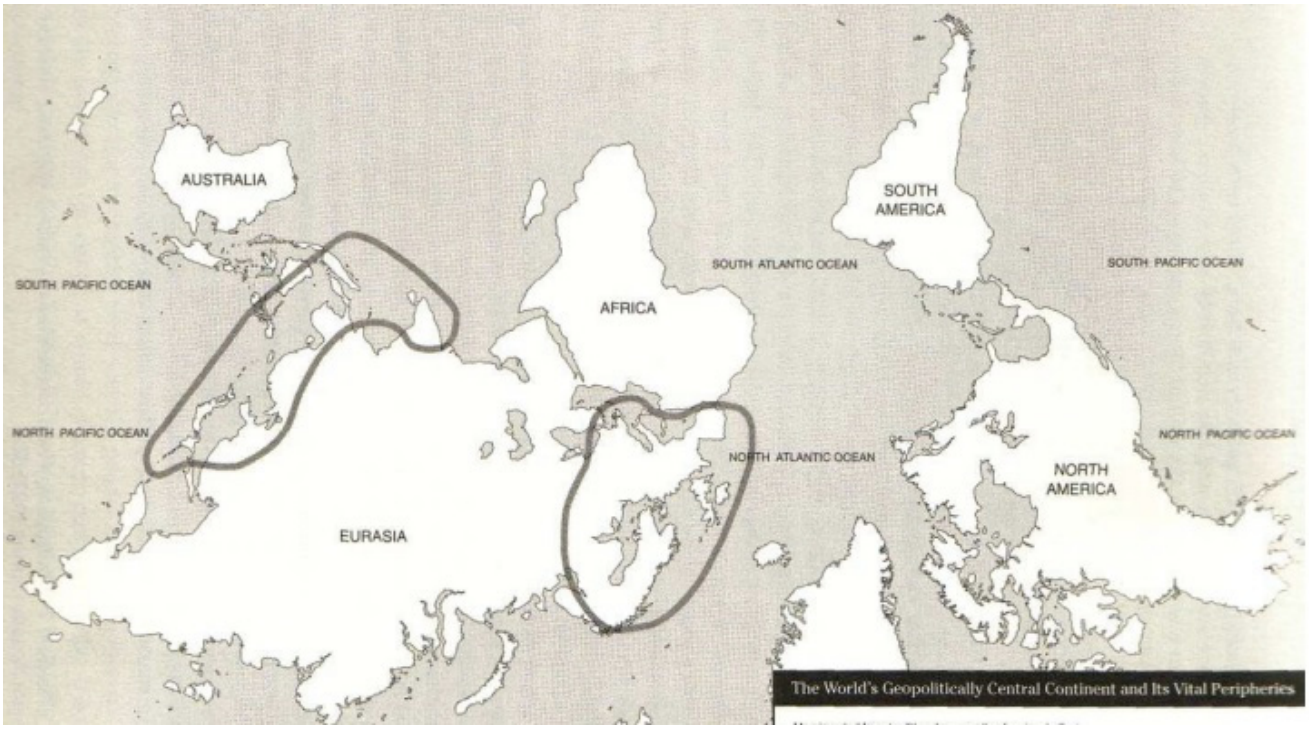

Figure 1 *Inverted map to create a visual effect*
(Brzezinski 1997, 32)

by the Kremlin. The proposed sanctions include Russia's exclusion from SWIFT international payment system, used by all banks in the world to exchange information, and the blocking of the Nord Stream 2 gas pipeline, which is expected to deliver gas directly to Germany, bypassing Ukraine and Poland.

alliance, because that would be their biggest fear. It is this fear of forming a coalition between states such as Mongolia, South Korea, Japan and the Philippines that should be exploited by the United States. Even the threat of such a coalition, through concrete moves in this direction, could temper Beijing's actions. China knows how the U.S. and

Figure 2 *The split of the Soviet Union – 1991*
(Google 2022)

If Russia seeks to "dethrone" the entire allied politico-military power or at least weaken it and recognize its own supremacy, China will compete with the U.S. when it comes to the old paradigm of economic domination and testing their role as guarantors of Allied security. Through incursions into the South China Sea region and attacks on Taiwan, the People's Republic of China aims to "stir up the waters" in eastern Eurasia.

Former director of the Center for Chinese Strategy at the Hudson Institute in Washington, DC, Michael Pillsbury believes that "there is a reason behind Communist China's claims to the South China Sea, namely the desire to have unlimited access to resources", natural disasters in the region and intimidating neighbours into not forming an

its Allies have suppressed the Soviet Union, and it is aware that the same can happen to it" (Pillsbury 2016, 221).

It is noteworthy that the US renewed its Quad Leaders' Joint Statement (Quad Leaders' Joint Statement: The Spirit of the Quad 2022) strategic alliance with Japan, India and Australia in February 2021, and will carry out major naval maneuvers in the fall of the same year in Bay of Bengal. This collaboration is intended to be a counterweight to China's increasingly strong and ambitious policies in the region.

Given the simultaneous pressure from Russia and China, respectively, the US's ability to regroup its assets in the face of possible concurrent armed aggression is questionable. The order in the Eurasian

space, its borders, is therefore in a destabilized and unpredictable point and could be restored only by the mastery of the negotiations carried out by the main international organizations promoting global peace and stability.

From a negative but most likely realistic point of view, the American diplomat Richard Haass remarks fatefully that, given all these changes, a return to the old world order is impossible. It will also be insufficient if we think about the new challenges. The United States and its partners will need to establish arms storage and arms control agreements; will need to strengthen weak states that cannot control terrorism, cartels and criminal groups; and they will have to counterbalance the authoritarian powers that infiltrate democratic processes. Arguments that attempts to integrate China and Russia into the existing world order have failed should not become a pretext for rejecting future efforts to include them in creating and maintaining the future world order, as it will reflect these processes throughout the 21st century. Such efforts will be a mixture of compromise, incentives and brakes. Relationships will be a mixture of competition and cooperation, with the twin objectives that the former should not conflict or take precedence over the latter" (Haass 2021, 372-373).

"The wealth"

For the comparative analysis of the financial implications in the field of defence, we considered relevant for the axis of the research directions the last summary report of 2021 of SIPRI on armaments, disarmament and international security.

The United States ranks first in the world when it comes to defence spending. In 2020, they were in their third consecutive year of growth, reaching $ 778 billion. Compared to 2019, they increased by 4.4% but decreased by 10% compared to 2011 (SIPRI Fact Sheet April 2021 2022). Elements that contributed to this increase include in particular the focus on research and development, the modernization of the US nuclear arsenal and the acquisition of armament.

China has distinguished itself worldwide by continued financial growth for 26 consecutive years. Compared to the USA, there is a certain stereotype, slightly variable, in terms of contribution in the period analyzed below, its ratio being on average 1/3 (30.86%) of the amount invested in defence by them.

Compared to the other two major powers, Russia is among the countries that saw a decline in defence spending in 2020, caused by the economic consequences of the COVID-19 pandemic. Taking into account the same route, 2014-2021, Russia seems to follow China, a constant, slightly variable model, but it spends about 9.98% of the total US investment during the period for defence.

"The war"

Although it has the supremacy in terms of financial contribution to the defence, the credibility of US power has started being tested recently both within NATO and globally. The causes are many. From the failed attempt to rebuild Afghanistan using "unorthodox" methods by invading Iran and pursuing a regime change in Libya, to the reluctance to respond to issues that needed more attention, such as the case of Syria, then when the Syrian regime used chemical weapons against anti-regime groups.

The presidential administration itself raised doubts about the confidence in the US by withdrawing from certain international pacts (Global Climate Agreement-2017, Treaty with Russia on Intermediate-Range Nuclear Forces-2019), placing it under the spectrum of conditioning commitments of the Alliance considered sacred and intangible by its members, the removal of several partners from the Middle East, as well as the mismatch between rhetoric and action in the contemporary context of the situation in North Korea and Iran.

Regarding the conditions imposed by the US administration, it warned in 2017 that before coming to the aid of European allies in the event of a threat to them, for example from Russia, it will first check whether they have met their financial contribution of 2% of their GDP in the NATO defence budget.

This US approach has influenced public opinion, fuelling tensions across states. Russia's intervention in Syria and Ukraine and the Saudi-led military incursion into Yemen, defiance from China, are nothing more than expressions of a reality out of the control of the "balance of power" and peace of the United States and its allies. from Europe and Asia, plus conventional military forces and nuclear weapons.

The icon below (Figure 9) shows the numerical values of the armed forces of Russia, the USA and China. While the United States is a financial

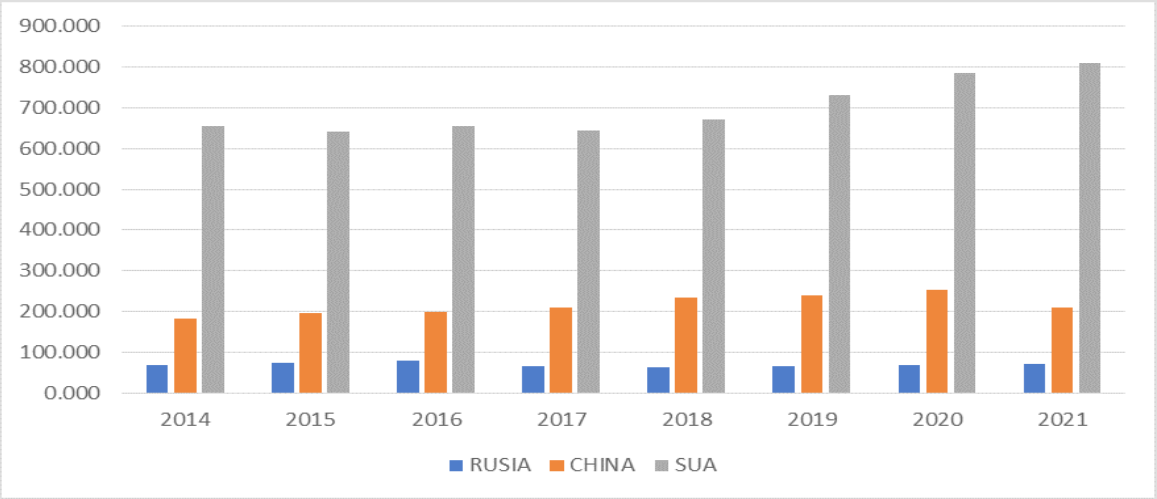

Figure 3 *Financial expenses in the field of defence*
(Trading economics 2022)

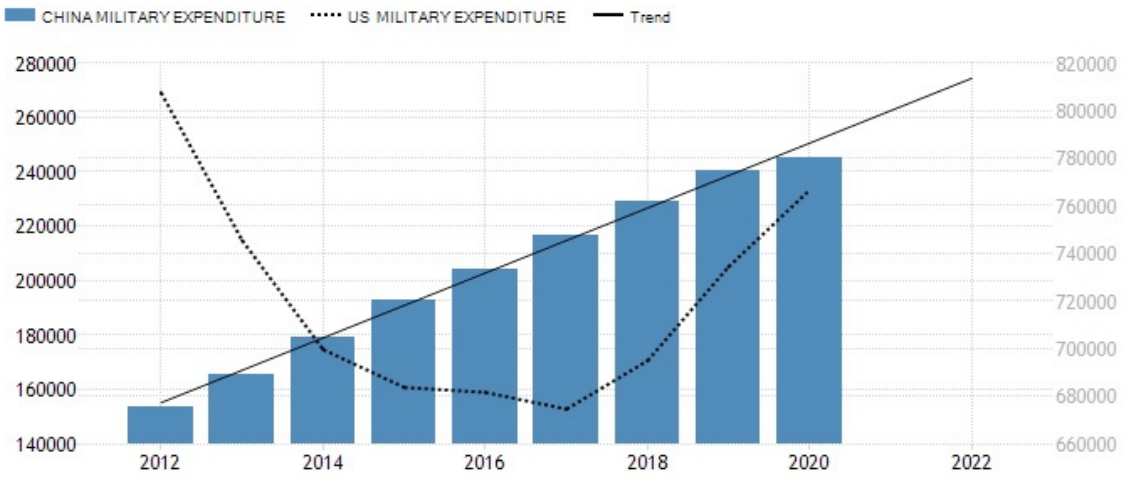

Figure 4 *Development of financial expenditure in the field of defence (China-SUA)*
(Trading economics 2022)

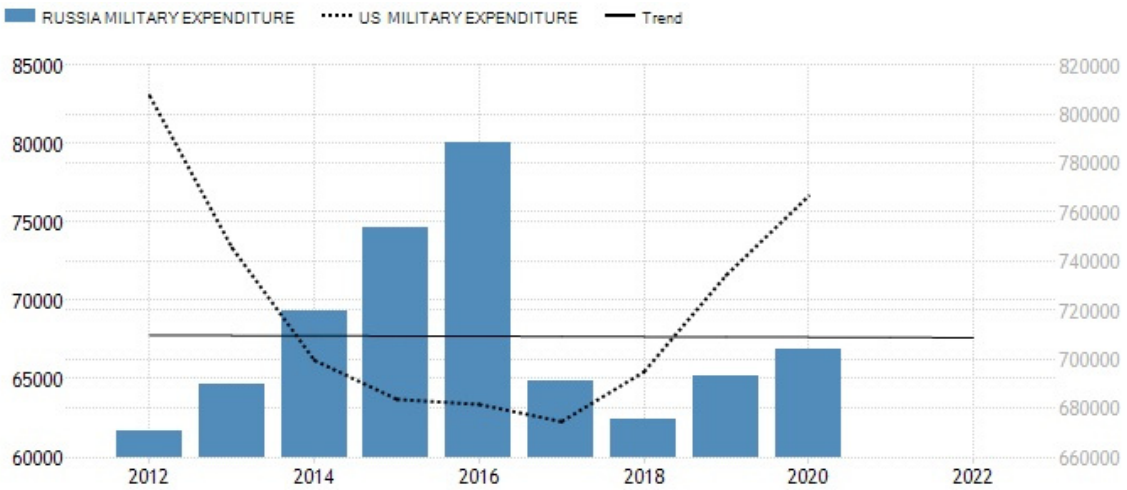

Figure 5 *Evolution of financial expenditure in the field of defence (Russia-USA)*
(Trading economics 2022)

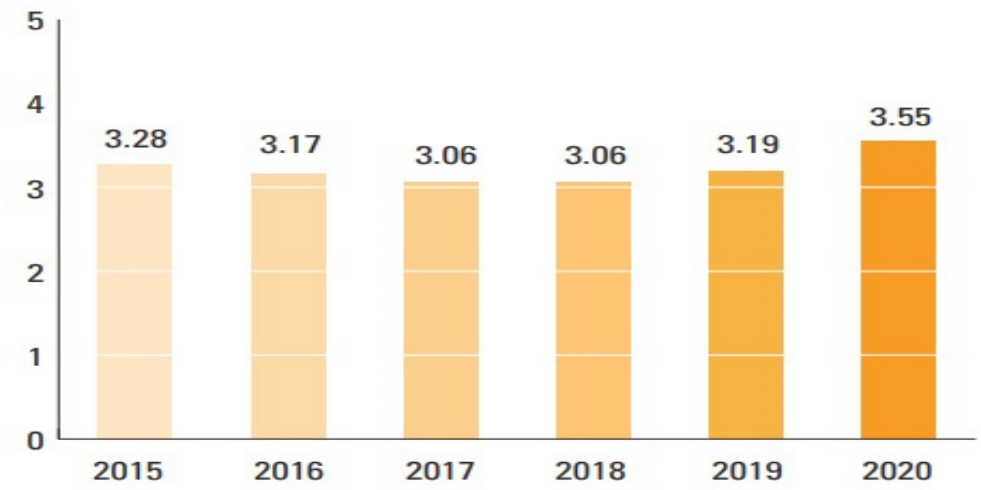

Figure 6 *Financial Expenditure on Defence – US (% share of GDP)*
(The military balance 2021, The International Institute for Strategic Studies 2021)

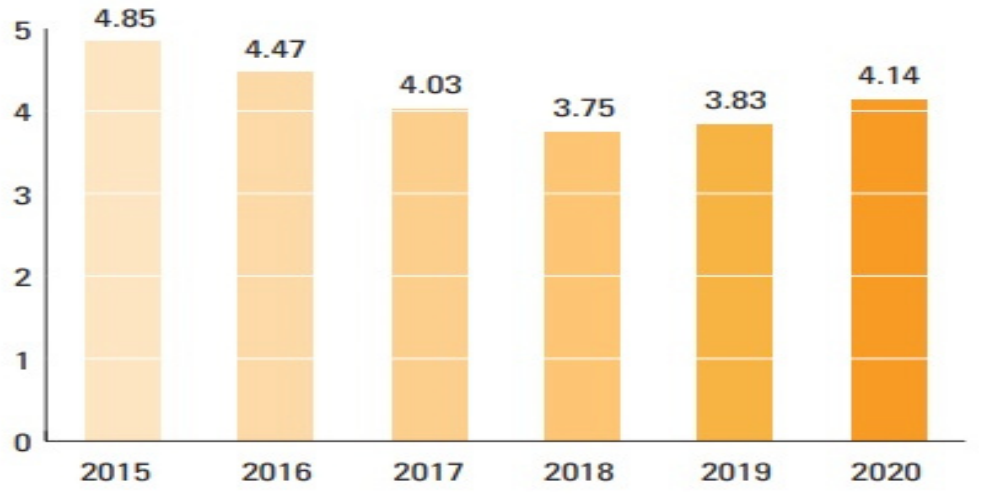

Figure 7 *Financial Expenditure on Defence – Russia (% share of GDP)*
(The military balance 2021, The International Institute for Strategic Studies 2021, 174)

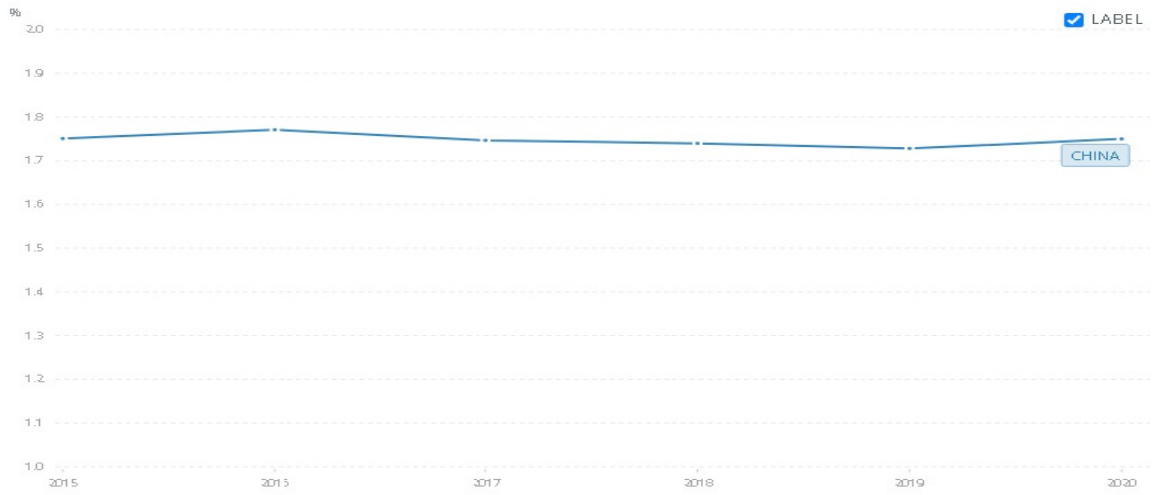

Figure 8 *Financial Expenditure on Defence – China (% share of GDP)*
(World Bank 2022)

leader in defence spending, China stands out as the world's largest active-duty military personnel with about 2 million active troops.

The military personnel reported are the following military branches: US Army, US Navy, US Air Force, US Marine Corps and US Coast Guard. The largest branch of the United States Armed Forces is the United States Army, which also decreased between 1995 and 2015, although it began to increase slightly in 2015. In 2019, there were 327,878 active members of the US Air Force, compared to 396,382 in 1995 (Statista 2022).

Summarizing the above comparative analysis through the prism of the three distinctly approached ideas, it follows that the strength of a country's armed forces is determined not only by the number

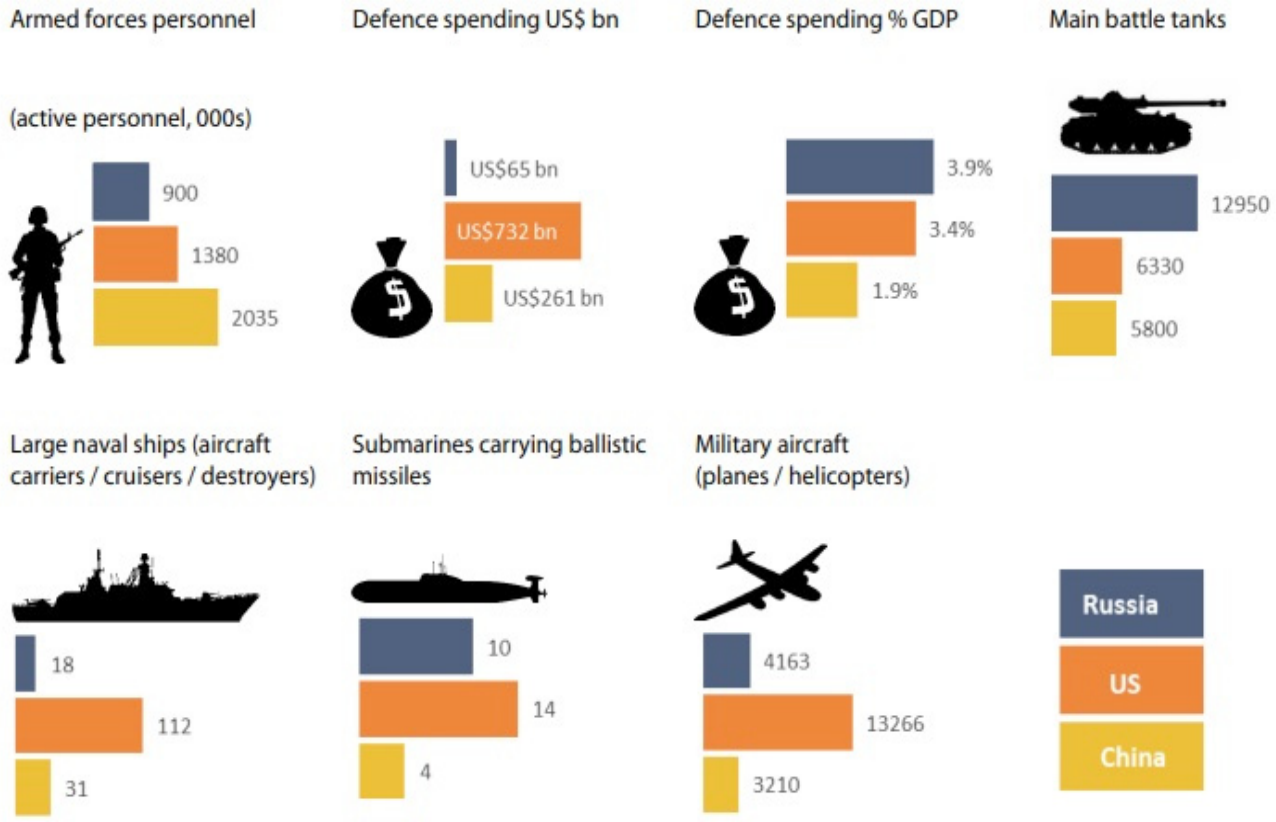

Figure 9 *Numerical comparison of the Russian, American and Chinese armed forces*
(European Parliament 2022)

is responsible for ground military operations. The number of active-duty U.S. Army personnel decreased from 2010 to 2019, from 561,979 US Army active-duty members to 479,785 in 2019. The number of active-duty US Navy personnel has declined slowly over the past 20 years. In 2019, there were 332,528 active members in the US Navy. United States Navy personnel are enlisted sailors, commissioned officers and intermediaries. Sailors must take part in the Staff Qualification Standards to demonstrate that they have mastered the required skills. The United States Air Force is a branch of the United States Air Warfare Service. The number of active duty Air Force personnel of personnel they maintain, but also by the number and quality of their military equipment.

For example, the comparative analysis of personnel does not take into account the overwhelming number of nuclear warheads held by Russia and the United States as compared to other countries. One way to answer this question is to look at the total amount of money each country spends on the military, as spending includes both personnel and technology. As for the countries with the highest military spending, the United States is at the forefront of the world with an annual budget almost three times larger than China, which ranks second, followed by Russia.

Conclusions

As the current world order seems to be a total collapse, we considered it necessary to review and analyze the main contemporary issues, by studying some official and specialized documents in the field.

As a summary, the personal contribution is distinguished by the analytical and comparative vision established by the research directions and the interpretation of the Russia-China-USA triad through the prism of the three concepts: "knowledge", "wealth" and "war".

The results of the scientific approach are shown in the form of points of view and proposals, but also open issues and limits of research.

First of all, the idea of cooperation is paramount in any type of relationship, be it political, economic, military or otherwise. Promoting cooperation between states in the South China Sea region could ease existing conflicts. A flexible and informal political platform, at the presidential level, similar to the Three Seas Initiative, aimed at increasing convergence and cohesion, while reducing the economic development gap, by increasing interconnectedness in the region, in the fields of energy, transport and digitalization. This would include the essential requirements for combating expansionist China.

Moreover, China's attitude could be tempered by encouraging cooperation with the Association of Southeast Asian Nations. This would mean conducting joint military exercises aimed at increasing transparency and mutual trust, thus helping to promote stability and reduce tensions in the area.

Secondly, when it comes to the issue of Russia's insistent demands, things get complicated. From the perspective of the latest major events, also analyzed in the paper, there is a concern about the claim of the former territories of the Soviet Union and their isolation from the protection that could be offered by joining NATO and the EU.

In order to meet its requirements declared before the United States and the Alliance, the tendency of Russian expansion, even in the form of conventional or unconventional actions, is not excluded. A deployment of forces in the full force of the word, a "blitzkrieg" similar to the invasion of Georgia or a hybrid attack similar to the one in Ukraine are becoming more and more likely. By ignoring NATO warnings and sanctions, a capitulation to the Kremlin's demands seems more distant than ever.

Russia's ferocity could be disarmed by the strength of NATO's response, which should be radical and politically, economically and militarily sustained. Isolation of Moscow economically first, by preventing the commissioning of the Nord Stream 2 gas pipeline and harsh economic sanctions, and then by resorting to the delivery of defensive military forces and equipment to the Alliance's Eastern Flank.

This audacity of states, such as Russia and China, to reconfigure the order of the contemporary world translates into a reduction in the credibility of NATO's defence in the event of an armed confrontation, a degraded image due to political, social and ideological divisions. Therefore, the best solution to stop the politico-military and economic aggression that threatens NATO's mission is for it to do everything in its power to ensure the freedom and security of all its members and partners.

The uncertainty of the actions in the battlefield and the unpredictability of the decisions of state actors, especially Russia and China, leave open some problems, which are also limits of scientific research. In what form the next conflicts will take place and in what direction the trends of the two states will evolve remain only dilemmas at the moment, but the possible scenarios should not be ignored.

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REFORM OF THE COMMAND STRUCTURES OF THE MILITARY ENGINEERING BRANCH IN THE PERIOD 1989-2021

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Following the events of 1989 a radical change of the Romanian political regime took place, a change that had as main effect the democratization of the Romanian society, with special implications of a political, economic, social and implicit military nature. From a military point of view, the Romanian Army underwent extensive transformations that took place in several successive stages. These consisted of starting the process of modernizing the military body on all levels: doctrinal and organizational changes in command and force structures, the concepts of training and their use in operations, and starting the process of replacing certain categories of equipment and some categories of weapons systems with newer and more efficient ones. All these transformations also affected the military engineering branch, in terms of the organization and attributions of the engineer command structures, as well as the structure of engineer forces, on the line of organization, endowment, training. In the following lines we will make a brief review of the transformations to which the Romanian Army was subjected, and implicitly, the military engineering command structures, in the period after 1989.

Keywords: command-control; command structures; force structure; military engineering branch.

At the end of 1989 several events took place with special implications for Romanian society. The first and most important was the replacement of the communist political regime with a democratic one, which generated ample political, economic, social, and military changes.

The reform of the military system meant "the elaboration of a concrete program, staged in time, which would modify the Romanian military body in its main components (structure, education, instruction, endowment, mode of action, mentalities). The general objective was to achieve a military force of optimal size, able to effectively serve the interests of national security and to participate in efforts to ensure cooperative security" (Defence Staff 2022).

From a military point of view, the Romanian Army went through special transformations that took place in several successive stages. These consisted primarily of doctrinal changes that established the place and role of the military in Romanian society and its responsibilities in situations of peace, crisis, and war. Secondly, the leadership structures and the force structures were reorganized.

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During this period after 1989, a series of important events took place for the Romanian Army. The first of these was in 1994 when Romania signed the "Partnership for Peace" program. A second important event took place in 2002 when our country received the invitation to join the North Atlantic Alliance, along with six other Eastern European states, on the occasion of the NATO summit in Prague. Not too late, in 2004, Romania was integrated into the North Atlantic Alliance and was subsequently admitted to the European Union (2007).

Following the accession to the North Atlantic Alliance, the Romanian Army began an extensive process of doctrinal alignment in accordance with the Alliance's regulations, followed by the transformation of command-control and force structures to ensure their adaptation to capability requirements commitments made. Following the process of transformation of the command-control structures in the Romanian Army, the transformation of the military engineering command structures took place, which is the object of our study.

Transformation of the military after 1989

The consequences of the change of political regime in Romania were also felt in the Romanian Army, thus the new strategy of defending the country was established and the role, place, and missions of

each component of the National Defence System were redefined. In this new context, the Romanian Army will successively go through several stages of restructuring, reorganization, and modernization (Gargaz, Sclipcea, Cheța, Burtan 2009, 129-136).

Thus, the first important stage was in the period 1990-1993, a stage of transition from the communist era to a democratic regime, with important consequences on the Romanian society, as well as on the military body. At this stage, measures were taken to depoliticize the military body and to reorganize some structures.

Also, the creation of the legislative and normative framework necessary for the reform of the military institution began, and an important aspect worth mentioning for this stage is the fact that measures were taken to stop the employment of military structures in carrying out various tasks in the national economy.

A second stage would be between 1993-1997, when the initial reform of the military body began. Thus, based on the *General Order of the Minister of National Defence no. 24 of August 30, 1993*, the *Command of the Land Troops* was transformed into the *Staff of the Land Troops*, having subordinated armies of assembled branches, educational institutions, and formations of various branches directly subordinated (Defence Staff 2022). At this stage, the Romanian 3rd Army was disbanded and Armies 1 and 2 were reorganized into army corps. On this occasion, the General Inspectorate of Military Engineering was abolished.

In 1994, Romania signed the "Partnership for Peace" program, as the first stage of the NATO integration process (Securitate prin parteneriat) (NATO 2019).

The third stage, period 1997-2000 (Gargaz, Sclipcea, Cheța, Burtan 2009, 129), is characterized by raising the degree of operationalization of operational and tactical level commands.

At this stage, several priority objectives were assumed regarding the interoperability with the NATO system and their progressive implementation took place. Units (including an engineer battalion) (Neagoe 2010, 57-59) were set up and operationalized to participate in NATO-led Partnership for Peace (PfP) missions.

Measures were also taken to reduce the number of army troops by disbanding commands, large units and units, as well as by transforming or resizing them (Portal legislativ 2022).

During this period, the military engineering structures within the General Staff and the staff of the force categories were reorganized.

The fourth stage, the period 2000-2003, is the stage when the definitive reorganization and restructuring of the Romanian Army took place.

At this stage, in accordance with the *Romanian Military Strategy*, it was established "first of all, the realization of adequate structures, smaller in size, more compact, supple and flexible, able to be deployed quickly and able to have adequate resources to support the military effort and, secondly, to increase the quality of equipment both by modernizing part of the existing equipment and by purchasing new equipment" (Legislative portal 2021).

Following the implementation of the provisions of the new strategy, Armies 1st and 4th were transformed into Territorial Army Corps, organized into brigades.

Starting with April 11, 2000, based on the Decision of the Supreme Council of National Defence no. S-8, referring to the "Framework Plan on the process of restructuring and modernization of the Romanian Army", the Staff of the Land Troops changes its name to the Staff of the Land Forces (Staff of the Land Forces 2022).

As for the military career, a new system of leadership training, professionalization of personnel, modernization, and standardization of training was established. We also proceeded to the elaboration of new normative acts specific to each branch (doctrines, manuals, instructions, etc.).

The next stage is the one in which the process of restructuring and modernization of the Romanian Army takes place after Romania accedes to NATO (2004-2014) and is characterized by a series of measures. Among them, we mention the adaptation of the new organizational structures of the army forces, after Romania accedes to NATO, the continuation of the reduction of troops, and the creation of a new force structure, able to ensure the country's defence and contribute to collective defence. The transformation of the 2nd Joint Operational Command and the 1st and 4th Territorial Army Corps into Infantry Divisions and their territorial reorganization takes place. Measures are being taken to improve the regulatory framework for the professionalization of the military and also to modernize the endowment based on short,

medium, and long-term procurement programs. (Gargaz, Sclipcea, Cheța, Burtan 2009, 129).

The 2015-2021 stage was characterized by the strengthening of the defence capacity at the national level, in an allied and international context.

The national military objectives for this period were: "the development of the necessary defence capabilities; participation in the implementation of the national integrated crisis management system; strengthening Romania's military profile within international organizations and regional initiatives; increasing the allied presence on the national territory; strengthening military cooperation in strategic partnerships; development of cooperation initiatives and partnerships with the armies of neighboring states" (Legislative portal 2021).

It should be mentioned that in this last stage, several commands of large multinational units were set up in Romania, namely the Command of the South-East Multinational Corps, the Command of the South-East Multinational Division, and the Command of the South-East Multinational Brigade.

Reform of military engineering command structures

At the end of 1989, the military engineering branch was led by the Military Engineering Troops Command, which had a complex structure capable of handling all branch issues. The Command was headed by a Commander, Major General Gheorghe Popescu, who was subordinated to the *Staff* (organized by sections), the *Political Council*, the *Combat Training and Education Section*, the *Technical Service* (organized by sections and offices), the *Financial Service Officer*, *Personnel Office*, *Service and Accommodation Officer*, *Chief Medical Officer*, *Secretarial Office*, *Command Train Statute*, *Section for the management and coordination of works on the Bucharest-Danube waterway and road and railway works* (organized by offices), *Section for leading and coordinating the works on the Danube-Black Sea and White Gate-Midia-Năvodari canal* (organized in offices) and the *Scientific Research and Technical Design Engineering Workshop* (Commandment of the Military Engineering Troops 1993).

Based on the provisions of some *Annual framework plans for the reorganization of the army*, since 1990 major changes have taken place regarding the entire Romanian Army, implicitly the leadership structures of the military engineering branch, as well as the units and large units of engineers (Land Forces Staff 2022).

The first important measure taken after the beginning of 1990 was the abolition of all elements belonging to the political party apparatus, within all leadership structures at all hierarchical levels, as well as within the troops.

In the next period, command structures and some large units that were engaged in works performed within the national economy began to be dismantled. Thus, between February and March 1990, the *Directorate for Works in the National Economy* and the *Directorate for the Construction of Irrigation Works* were abolished (Gargaz, Sclipcea, Cheța, Burtan 2009, 129).

Starting with August 1, 1990, based on the *Order of the Minister of National Defence M.102 of July 30, 1990*, the *Military Engineering Troops Command* was transformed into the *Military Engineering Inspectorate* and became directly subordinated to the Land Troops Command (Land Forces Staff 2022).

Based on the approval of the Minister of National Defence on the *Report of the Commander of the Land Troops no. S. 4856 of November 10, 1990*, the Military Engineering Inspectorate starting with December, 1990 changed its name to the *Military Engineering General Inspectorate*. It was sized according to the needs of the branch and had the following organization: *Chief-Inspector General* MajGen Gheorghe Popescu, seconded by a *Chief of Staff (who was also the first deputy inspector)*, under whose subordination were sections and offices. Subordinate to the Inspector General was also the *Deputy for combat training and education*, which in turn was subordinated to sections and offices. Also under the subordination of the Inspector General were the *Technical Service*, which organized sections and offices, the *Roads, Bridges and Railways Works Department*, the *Chief Physician*, the *Personnel Office*, the *Financial Accounting Office*, and the *Secret Documents Department* (Commandment of the Military Engineering Troops 1993).

Based on the *General Order of the Minister of National Defence no. 24 of August 30, 1993* of the Minister of National Defence, the *Military Engineering General Inspectorate* ceased its activity starting with November 30, 1993 at 24.00.

Starting with December 1, 1993, the civilian staff and employees of the Military Engineering General Inspectorate were included in the structures of the Great Staff and the Staff of the Land Troops (Commandment of the Military Engineering Troops 1993). Thus, the military engineering command structures were reorganized and the *Inspector of Military Engineering* was appointed to the Great Staff (in 1994 the name was changed to General Staff), with 10 men under his command, under the command of Brigadier General Constantin Stănciugelu and *Chief of Military Engineering* to the Staff of the Land Troops, subordinating 10 people, under the leadership of Colonel Mircea Sclipcea (Gargaz, Sclipcea, Chețа, Burtan 2009, 130).

As a result of the mentioned transformations, at the end of 1995, at the level of the Romanian Army, the military engineering branch had the following organization: at the General Staff, there was the *Inspector of Military Engineering*, at the Staff of the Land Troops there was a military engineering command structure led by a Chief of Military Engineering with the rank of colonel, at the level of 1st, 2nd and 4th Armies there was also a military engineering command structure led by a chief of military engineering with the rank of colonel.

Starting with Aprilie 1, 1998, the structures of the *Inspector of Military Engineering*/General Staff and *Chief of Military Engineering*/Staff of the Land Troops were abolished, in their place being constituted within the same commands, the *Military Engineering Section*/Doctrine and Instruction Directorate under the leadership of Colonel Constantin Teodorescu, respectively the *Military Engineering Office*/Combat Training Directorate under the leadership of Colonel Alexandru Rusu (after the dissolution of the Military Engineering Section/General Staff in 2001, this structure took over the coordination of the issue regarding the structural organization of principle, the training of staff and the training of engineering units in the land forces) (Gargaz, Sclipcea, Chețа, Burtan 2009, 130).

On March 10, 2003, at the level of the Land Forces Staff (based on the CSAT Decision no. S-8 of 11 April, 2000, the name of the Ground Troops Staff was changed to Land Forces Staff) (Land Forces Staff 2022), the institution of the Military Engineering Inspector was reorganized, whose prerogatives, for the military engineering branch, were assigned to the commander of the Râmnicu Vâlcea the Application School of Engineering and Railway, and mainly aimed at design and application of the doctrine and development policies of the military engineering branch; elaboration of normative acts specific to the organization, development, and control of military training and education; applied scientific research at the level of the branch.

Later, in 2006, the *Instructions on the institution of the Land Forces Inspector* (Land Forces Staff 2006), were drafted and approved at the level of the land forces, which regulated the main duties of the inspector in the line of branch. These were the following: "he elaborates the project of development/modernization of the branch; manages the training system of the branch training center personnel; leads the process of accepting NATO standards and is responsible for their implementation in specific normative acts and branch manuals; coordinates the process of collecting data, conclusions, and proposals resulting from the activities carried out on the branch line; promotes the results of the engineer branch in the media; coordinates the various scientific research works on the line of branch; identifies the need for new types of branch-specific equipment, weapons, equipment, and materials; organizes and carries out control activities in large units and units where there are branch structures."

In 2008, military education was reorganized and the branch-specific educational institution was renamed the CBRN, Engineering, EOD, and Defence Training Center. On this occasion, the position of branch inspector was abolished (Marin 2013, 4).

At the end of 2012, the Chief of Staff of the Land Forces issued the SMFT Order 21 of 4 October, 2012 on the institution of the Land Forces Inspector in order to revitalize this institution (Marin 2013, 4).

According to this order, the duties of the inspector were as follows: "development and modernization of the branch; the elaboration of specific normative acts and military manuals; instruction and education; endowment with new types of weapons, equipment, and specific materials; applied research in branch; promoting the image of the land forces; arms-specific international relations".

Also by this order, the Chief of Staff of the Land Forces there was established as an inspector for the military engineering branch, the commander of the Training Center for Engineering, EOD and CBRN Defence "Panait Donici", who coordinated and contributed, in collaboration with the Chief of the Engineering Office from the Land Forces Staff, with specialist officers from the infantry divisions and from the 10th Engineer Brigade, to develop the *Branch Development Concept* and the *Medium and Long Term Branch Development/Modernization Program*. The center also housed the Armed Forces Research, Development, and Regulations Department, which was the main execution structure available to the branch inspector.

During this period, the engineering branch inspector, personally or through subordinates, collaborated in a specialized line with the NATO Centers of Excellence for Engineering and EOD, with various military educational institutions in the country and abroad and participated in several multinational exercises organized where military engineering structures were involved, thus ensuring the development of branch-specific international relations.

As for the military engineering command structures, they were reorganized and contributed to the leadership and coordination of all activities carried out on the line of the military engineering branch. Thus, at the General Staff, which later became the General Staff of the Defence, the EOD Office was set up in March 2003. From March 2008 to April 2010 it functioned as the Support and Protection Office, and from April 2011 it was reorganized as the EOD (Explosive Ordnance Disposal) and C-IED (Counter Improvised Explosive Devices) Office, which a year later, in 2015, became the Engineering, EOD, and C-IED Office. Also, at the level of the Staff of Land Forces and the Staff of Air Force there were the Engineering and EOD Offices, and at the Staff of Naval Forces an EOD Office.

During this period, the personnel who assigned the military engineering command structures were actively involved in organizing, leading, and coordinating the activities organized on the line of branch, the multinational exercises Resolute Castle and IEL MILU, contributed to the planning of actions of engineer structures, leadership and their coordination for Saber Guardian and Dacia 21 field strength exercises, inspection of units and large units of military engineering, verification of the EOD combat service, elaboration of doctrines, instructions and manuals on the branch line, elaboration and validation of EOD technical procedures, collaboration with the Centers of Excellence for Engineering in Germany, EOD in Slovakia and C-IED in Spain. Personnel from these command structures also participated in missions in theaters of operations and held positions in NATO commands.

At this time, in the organization of the Romanian Army commands, at the strategic, operational, and tactical levels (division commands), there are military engineering command structures, offices, and compartments, and at the level of the mechanized brigade staff, within the operations sections, there is a position of engineer officer.

The general attributions of the military engineering command structures in the organization of the Romanian Army at this date are the following: elaboration of policies, concepts, and doctrines on the line of engineering, EOD, and C-IED; providing advice and expertise for commanders, on a specialized line; contributions to the development of various plans and orders; database management with specific information; cooperation with NATO Centers of Excellence in Engineering, EOD and C-IED; coordinating engineering support in areas of responsibility and operations; participation in control teams in engineering units; contributions to the planning, organization, leadership, and coordination of national and multinational exercises, etc.

Conclusions

The year 1989 marked – for the military engineering branch, as well as for the entire Army – an extensive process of transformation and reorganization. The reform of the military system was achieved through the implementation of a staged plan, which consisted of doctrinal, organizational, and structural changes, endowment, education, training. At the same time, the reorganization of the military command structures, as well as the large units and units of military engineering, was carried out.

Following the accession to the North Atlantic Alliance, the Romanian Army began the doctrinal alignment in accordance with the regulations of the Alliance, followed by the transformation of

command-control and force structures, to ensure their adaptation to capability requirements, in accordance with commitments. Following the process of transformation of the command-control structures in the Romanian Army, the transformation of the military engineering command structures took place. However, this was not done in accordance with NATO's doctrinal provisions, as a different organizational system was adopted. At this time, there are military engineering command structures, but they are undersized and manage to handle all areas of engineering support, as well as peacetime counseling/expertise, during the operational planning process, and even more so for other more important situations. On the other hand, the role of these command structures is not limited to advising commanders but consists in estimating the needs of engineering support, resource planning, and their judicious allocation to supported units, which requires a large and specialized staff.

At the moment, in accordance with the provisions of the new strategies, the process of transformation of the Romanian Army is underway, simultaneously with the one carried out within NATO, on which occasion the military engineering command structures can be reorganized and resized to be able to manage corresponding to the complex issues of the branch, on all lines: planning and operational leadership, intelligence, infrastructure, EOD and contributions to the protection of forces, environmental protection, C-IED.

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THE ROLE OF INTELLIGENCE IN MAINTAINING COMBAT POWER DURING CONTEMPORARY MILITARY OPERATIONS

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The contemporary security environment is undergoing periodical radical changes in which more and more diversified threats are emerging, determining that the age in which we live is marked by crises of a different nature. That is why the use of intelligence has become a concern of military and political decision makers, especially in terms of its integration into combat functions to ensure and maintain a high combat capability and thus the combat power necessary to achieve objectives/mission. The peculiarities and specific features of modern/contemporary military conflicts, as well as the influence of technological evolution or, as specialists call it, the revolution in military affairs has led to changes including in the field of military intelligence, which is essential to keep up with the present and anticipate the future. These changes have led to changes in the place and role of military intelligence in the military phenomenon, changes in doctrines, techniques, tactics and procedures, and the readjustment of requirements to the changes applied. Military intelligence structures must be conceptually integrated and not only with the other collection capabilities of the National Defence System, Public Order and National Security.

Keywords: security environment; intelligence; interagency; combat functions; threats; cooperation.

"The measure of intelligence is the ability to change" (goodreads n.d.), said the well-known scientist Albert Einstein. I think it is a good motto to start our topic, due to the essence of the phenomenon caught in these few words. We live in a world of continuous development and technological evolution, and the most important thing is that the contemporary security environment is undergoing periodical radical changes in which more and more diversified threats appear.

The current security environment is characterized "by a high degree of dynamism and unpredictability, as well as by the accentuated globalization of threats and risks, with varied manifestations and with unlimited potential of geographical propagation" (presidency.ro 2020, 19).

The age we live in is one marked by crises of a different nature, which produces societal imbalances. Moreover, we cannot ignore the results of the analysis of specialists in the field according to which "the unpredictability of the current security environment, the atypical nature of the new challenges, the almost uncontrollable diversification of risks and threats and the reduction of time limits in which they can occur create the risk that decision makers at all levels might be taken by surprise by such potential risk generators situations" (Ionescu 2015).

War and, by implication, contemporary military operations are no longer what they used to be, but we are constantly forced to analyze the reality of the security environment, to identify new types of threats other than those we were accustomed to until recently, and in order to ensure a safe and stable climate, adequate responses to these threats are needed.

That is why I started the article with this statement of the great scientist, to emphasize the importance of the flexibility we need to show, the need to constantly adapt and readjust our way of thinking, how to analyze and synthesize, actions/reactions/counter-reactions to threats in the operational environment, and all this is very clear that they should also be based on the most complete and high quality intelligence products.

The role of intelligence, as a function of combat, in maintaining combat power is essential, I could say, because obtaining and maintaining the highest possible level of intelligence advantage is critical. Only by being at least one step ahead of the adversary/enemy can we have a more complete picture of the operational environment, base our

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decisions on quality intelligence products, and make our reactions to modern threats effective.

Defining features of contemporary military operations

We are contemporaries with a dynamic period, in continuous evolution and profound transformation, which requires flexibility in analysis and synthesis, so that predictability offers possible reactions as applicable as possible to reality at a given time. The contemporary security environment has deep risks and threats, of a complex nature, and the response to them, in my opinion, must be an integrated one because only by cooperating and collaborating inter-institutionally can we act synergistically.

As stated in the National Defence Strategy, "the strategic trends of recent years illustrate the accumulation of a substantial potential to reconfigure relations between actors with global interests, with direct effects on the stability and predictability of the international system, and the revitalization of global strategic competition confirms the transition to a new security paradigm. This will accentuate the tendency towards a more sustained activity of the states bilaterally, with momentary, conjunctural, interests and alliances, which will further affect the predictability of the international security environment" (presidency.ro 2020, 17).

These continuous transformations happening in the contemporary security environment "generate a number of challenges to the institutional capacity to formulate appropriate responses and enable effective measures to be put in place" (presidency.ro 2020, 38).

More than that, "the characteristics and dynamics of the current strategic and security environment require an inter-institutional and comprehensive approach, allowing the materialization of the concept of extended national security, by integrating public policies and state action in the field of national defence and security" (General Secretariat of the Government 2021, 8).

In the face of these realities that make/could make a significant mark, we cannot remain ignorant. There are events, phenomena that take place and can have effects in terms of national and regional security.

That is why the use of intelligence has become a concern of military and political decision makers, especially in terms of its integration into combat functions so as to ensure and maintain a high combat capability and thus the combat power necessary to achieve objectives/mission. "Combat capability provides a commander with the strength needed to perform an operation, and combat functions are functional categories of abilities used to generate specific effects during the execution of land operations" (*F.T. – 1, Doctrina operațiilor forțelor terestre* 2017, III-13). Also, „the fighting ability expressed by the fighting functions generates the fighting power and the potential of the action in question. In order to fulfill their mission, commanders, through estimates and the planning process, use this potential to establish tasks that lead to the performance of functions of combat power" (*F.T. – 1, Doctrina operațiilor forțelor terestre* 2017, III-12)

We cannot discuss about the revolution in military affairs of the last decades due to the technological progress that has had and has an exponential pace. As stated by military specialists, "increasingly consistent discoveries in the field of intelligence technology that ensure the gathering of intelligence by satellite or unmanned aerial platforms, the guidance of high-precision weapons of warfare have changed the face of military conflicts" (Stanciu 2016, 13).

These advances have given rise to what we now call artificial intelligence, which, although it has appeared in the literature for a long time, has had significant results in the last decade, due to the impressive technological progress, the evolution in the field "machine learning (subset of artificial intelligence / AI, focused on building systems that can learn – or improve their performance – based on the data they process)" (ORACLE. n.d.) at the same time increasing the accessibility of data/information and computing power.

As a result of the emergence of artificial intelligence, many activities previously performed by humans can now be performed in a very short time, much more efficiently and in a much larger volume. It is very clear that artificial intelligence will play an important role in planning and conducting military operations in the future. It offers many advantages, limiting human and material losses, ensuring precision and accuracy. We cannot ignore this phenomenon and even more so even if we did, then it would become possible for our

adversaries/enemies to use it which would create a real technological and obviously informational imbalance.

Intelligence, an important resource of power and at the same time a function of the struggle, is constantly subject to analysis from all points of view, in all forms and aspects, noting a constant concern of decision makers to modernize specialized capabilities of gathering, analyzing and processing intelligence, to maintain them at a high level and appropriate to the realities of the moment with an essential contribution in supporting and substantiating an effective decision-making process. In addition, it is imperative that the other components of intelligence systems, not just specialized structures, keep up with technology.

Also, intelligence is "the product resulting from the collection, processing, integration, evaluation, analysis and interpretation of available intelligence on hostile/potentially hostile forces or elements, as well as areas where operations are currently taking place or are potential areas of operations. The meaning of the term is dual because it also applies to the activity that aims to materialize this product, as well as to the organizations that are involved in such an activity. All this gear supports the General Staff and commanders in the process of planning operations, in establishing the course of action/COA, identifying tactics and techniques, the effective use of forces and means and ensuring force protection measures to achieve the objectives and achieve the desired final state" (APD ARMY PUBLISHING DIRECTORATE. n.d.).

Intelligence – combat function

The process of planning operations, in all its phases, is directly influenced by the provision of intelligence support. From this point of view, we consider that the integration of the intelligence activity is an essential requirement, which can be successfully fulfilled by the efficient use of the intelligence system available to the military structures at any level, especially considering that "obtaining accurate and timely intelligence is a real challenge for both the intelligence experts and the decision maker, both of whom are equally responsible for the active management of data and information on potential crisis situations, but also for the development of new ways of anticipatory thinking and strategic planning meant to confuse both future expectations and opportunities" (Ionescu 2015).

Military intelligence is the basis for conducting military actions and protecting forces during their deployment, while ensuring that the situation is obtained and maintained. According to the defence intelligence doctrine, "the military intelligence activity is a set of actions and measures aimed at achieving strategic, operational and tactical warning and providing political, politico-military and military leadership with actionable intelligence on risk factors and external, military and non-military threats, which may affect national security in the military, as well as the prevention, countering and deterrence of risks and threats, through independent or integrated missions" (*I.A. – 1.1., Doctrina informațiilor pentru apărare* 2017, 9).

During the planning and conduct of an operation, the commander has at his disposal various tools, capabilities that he can use, at the most appropriate times according to his decision, in order to achieve the objectives/accomplish the mission.

Thus, "combat functions are the main tools available to the commander, which he integrates and coordinates in the operation, to synchronize their effects in time, space and purpose" (*FT-1, Doctrina operaţiilor forţelor terestre* 2017, III-13). We find among the seven functions of combat intelligence providing support for military operations, i.e. a more real picture of the combat battlefield/ operational environment, as well as the capabilities and possible actions of the enemy. Achieving the highest possible level of intelligence advantage is a concern of commanders at any level to be able to plan effective responses to actions we say likely of the enemy, but we want to anticipate as accurately as possible and, moreover, to confirm the predicted ones.

The intelligence combat function has the following objectives: supporting the generation of force, providing support for the assessment of the situation, carrying out ISR operations/intelligence, surveillance, reconnaissance, identification of targets and obtaining informational superiority.

"The collection, processing, dissemination and use of data and information on the battlefield, before the start of the operation and during its operation, are vital activities to ensure success. Achieving a unique and clear image of the battle space requires the centralized management of the intelligence

acquisition process, its simultaneous development at all levels and the timely dissemination of data through the intelligence system" (*F.T. – 1, Doctrina operațiilor forțelor terestre* 2017, III-16).

The military structures that carry out tactical operations have their own collection and processing capabilities, but at the same time, depending on the priorities and the allocation of resources, they also benefit from intelligence products from the upper echelons. It is necessary that they have as much intelligence and quality intelligence products as possible and in the shortest possible time to anticipate the possible action of the enemy in the confrontational/operational environment. And intelligence, as a function of combat, provides commanders and staffs with a complete picture of assessing the impact of operations and other military actions on elements of the operational environment by generating the desired effects and their implications on the evolution of operational systems.

As mentioned, we intend to obtain and maintain the highest possible level of informational advantage (informational superiority, informational dominance and informational supremacy). Obviously, it would be ideal to reach the maximum level, but this is a difficult goal to achieve, which is why the most widely circulated and perhaps the most realistic concept at the moment is that of informational superiority, which can be defined as "the ability to run all the processes of the intelligence cycle in a shorter time than the opponent with a higher degree of security" (Armistead 2004, 16). The other two levels of informational advantage, I consider as I mentioned, are much harder to obtain and maintain, but that does not mean that we do not want them and do not use the resources available to achieve this goal.

The intelligence cycle is the logical and continuous process through which we carry out military intelligence activities starting from the identification of the need for collection, taking into account the capabilities of the available structures, efficiently allocating collection tasks to them, processing data, information and even intelligence products, but also those already available and, finally, disseminating the intelligence results to the beneficiaries. This is a process that takes place throughout the planning process and continues throughout the operations so that the intelligence structures permanently generate intelligence products useful to commanders and staffs.

The intelligence cycle takes place in four stages which "although distinct, they sometimes overlap and overlap, so that they often take place simultaneously, not sequentially. The stages of the intelligence cycle are:

- direction;
- collection;
- processing;
- dissemination.

Monitoring the efficiency of the intelligence cycle and coordinating the four main stages is done through Intelligence Requirements Management/ IRM and Collection Management/CM" (*I.A. – 1.1., Doctrina informațiilor pentru apărare*, 2017, 24).

I consider that it is essential for the intelligence function to contribute substantially during the planning process, but also during the conduct of modern military operations of any kind so that combat capability is maintained at the highest possible level. Anticipating, having a real picture of what our enemy is going to do in the operational environment helps us to plan effective responses that eliminate or limit human and material losses and contribute to the achievement of the objectives/ mission received.

Integrating intelligence into contemporary military operations

The new image of the contemporary security environment, as stated in the National Strategy for the Defence of the Country for the period 2020-2024, requires appropriate and combined responses from the bodies responsible for ensuring national and regional security. "Unified action is the syncronization, coordination and/or integration of governmental and nongovernmental entities with military operations to achieve unity of effort" (Department of the Army 2019, 1-5). That is why inter-institutional cooperation is the basis for the functioning of these response activities in order to prevent, limit, counteract or eliminate the possible negative effects of the manifestation of modern threats that make their presence felt in the area of our country.

At the same time, "intelligence is inherently joint, interagency, intergovernmental and multinational... this intelligence effort is syncronized, networked, and includes collaboration with unified action partners" (Department of the Army 2019, 1-5).

Among the dimensions of achieving national security, we identify as a direction of action within the dimension of public order "the use at national level of modern concepts for the management of public order institutions, based on their equal performance according to standard operational procedures (police equal performance) and intelligence-led policing, which contribute to the efficient use of resources, simultaneously with the increase of the institutional performance level" (presidency.ro 2020) and, at the same time, the directions of action in the field of intelligence, counter-intelligence and security, of which I would like to highlight "prevention and counteracting of hybrid threats, embodied in hostile conjugate actions, carried out by state or non-state actors, in the political-administrative, economic, military, social, informational, cybernetic or organized crime plan" (presidency.ro 2020, 35) which obviously requires efficient and transparent interagency cooperation and collaboration.

I consider that only a combined and integrated inter-agency effort can be an effective response to the increasingly diverse and complex threats that are manifested in adjacent areas, but with effects on national and regional security.

An example, in this sense, can be the interinstitutional exercise Concordia 19, held between October 7 and 13, 2019 in several locations in Covasna and Harghita counties, as well as in Bucharest. This exercise was attended by structures from the Ministry of National Defence, the Ministry of Internal Affairs, the Romanian Intelligence Service, the Protection and Guard Service and the Special Telecommunications Service, structures with responsibilities in the field. The exercise had "as main objective the development of the cooperation relations, as well as the exercise of the techniques, tactics and procedures of joint action of the forces comprised in the National System of Defence, Public Order and National Security" (Army General Staff 2019).

Increasing the efficiency of national institutions for crisis prevention and management, internal and external, military or civilian, interagency cooperation entities/authorities/mechanisms and capabilities to combat asymmetric and hybrid threats, able to ensure state resilience in crisis situations and even conflict and to allow the continued functioning of essential institutions and services is thus one of the national security objectives.

The comprehensive approach, a modern concept used in NATO, proposes the involvement in crisis resolution of all structures/institutions/actors that can bring more experience, coherence, efficiency and effectiveness.

A hybrid threat that acts to achieve clear long-term goals may not be identified in the initial phase, thus delaying immediate effective reactions. Subsequently, only by constantly monitoring the sectors of society, collecting data and information using different and multiple sources, analyzing/processing and filtering them in order to assess their relevance and priorities can appropriate responses be planned from institutions with responsibilities in the field. But in order to identify it and find the most appropriate answer, we need an efficient and transparent intelligence support from all the entities involved.

We know very well that it is easier to prevent, to remove, and if not, to limit or reduce the effects and consequences of events that pose security threats. This can be achieved by improving early warning, alerting and warning systems, systems that must use modern and up-to-date technology, provide vital, geographically targeted intelligence in a timely and complete manner. And for this, the transparency of intelligence should be achieved permanently.

We cannot ignore, as we have described in this paper, the particularities and what modern/contemporary military conflicts mean, as well as the influence of technological evolution or, as specialists call it, the revolution in military affairs which led to changes in military intelligence, an area that is essential to keeping up with the present and anticipating the future. These changes have led to changes in the place and role of military intelligence in the military phenomenon, changes in doctrines, techniques, tactics and procedures, and the readjustment of requirements to the changes applied. Intelligence structures must be organized as efficiently as possible to enable them to carry out their specific tasks as efficiently as possible and, in addition, to make the most of the technology specific to contemporary intelligence systems.

Moreover, as analysed, intelligence is one of the combat functions, which is easy to understand that gaining and maintaining an informational advantage contributes substantially to the level of combat power. Being able to run a fuller and faster

intelligence cycle than the enemy or even limiting it to its own intelligence cycle prevents and limits the losses and risks of an operation, which will lead to a high combat power.

The informational advantage obtained from the operation of the intelligence combat function offers us the possibility of an overview as close as possible to reality and thus of more efficient planning. This presupposes that the activities planned for one's own forces and means be carried out in accordance with the probable actions of the enemy, and in this way the objectives and missions will be achieved/ accomplished without substantially affecting the combat power. We need to rely on efficient informational systems so that human and material losses are minimized.

I believe that the exploitation of the intelligence function at the highest level is the key to success in contemporary military operations in order to maintain the highest possible combat power and ensure the successful fulfilment of the entrusted objectives / missions.

Conclusions

We estimated the current operational environment as an increasingly dynamic and complex one, due to the power of intelligence, the technological revolution and the changes that have taken place in the security architecture globally. We concluded that a number of specific characteristics lead to the need to integrate intelligence from the hybrid environment into a cognitive environment that provides a complex perspective on reality.

As the analysis shows, the contemporary security environment is a dynamic one that undergoes frequent changes, the emergence and evolution of new and increasingly diverse threats so as to predict/anticipate actions taken by various state and non-state actors that may cause imbalances in this environment is becoming more and more difficult to achieve. In other words, being a necessity, in order to achieve it, there is a need for permanent adaptation of the way of integrating one's own capabilities, including intelligence structures/ capabilities and most importantly their education and training so as to cooperate and collaborate interinstitutionally for achieving national security objectives. I consider that military intelligence structures must be conceptually integrated (and not only) with the other collection capabilities of the National Defence, Public Order and National Security System in order to provide an integrated and adequate response to the type and level of threats.

Also, significant changes in the dynamics of contemporary military operations, through the introduction of intelligent weapons systems and platforms, advanced sensors, command systems, control, communications, computers, interoperability, intelligence, surveillance and reconnaisance/C4I2SR and the digitization of the modern battlefield/operational environment, are elements that have profoundly changed the physiognomy of the contemporary military conflict. The implementation of modern technologies in military structures has allowed a "compression" of space and time in the tactical field, which has led to the imposition of a faster pace of execution of military actions in areas of operations, as well as faster and more effective response to threats which have made/are making their presence felt in the contemporary security environment.

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THE CONCEPT OF HUMAN RESOURCES AND THEIR ROLE IN THE DEVELOPMENT OF MODERN SOCIETY

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Over time, human resources have become strategic resources in society, although automation and digitization have a major impact on the workforce. Human resources have managed to reinvent themselves all the time, to find new solutions and to continuously adapt to the processes of modernization and refurbishment. The major advantage of human resources is the fact that they have a great capacity of transformation, keeping updated with the modernization trends and they permanently support the process of development and modernization of modern society. Human resources strategies have an important role in the process of developing and transforming human resources.

Keywords: human resources; creativity; innovativeness; modernazation.

Over time, human resources have acquired a strategic role in the development process of modern society, overtaking other categories of resources involved in this process. Today, human resources play a particularly important role in the information revolution and are also involved in the transition process to a knowledge-based economy. The development of human resources is directly influenced by economic, political, social, educational, technical and cultural developments.

At all times, human resources fulfill a dual role: the role of the main generator of evolution and the role of the adaptor in the face of change, multiplying the effects of change according to each person's typology (Mintzberg, Henry 1989, 82). Regardless of how each organisation streamlines its activity, whether through technology, digitalisation or robotisation, people remain an essential resource within organisations, a resource that ensures their survival, development and competitive success, regardless of the field in which they operate.

In order to achieve their objectives, organisations actually need people to put into practice all the procedures implemented in each organisation. People need managers and leaders to coordinate them so that chaos does not ensue and so that activities to be carried out in an organised way. We can say that the effort of human resources directly influences organisational success. Many people become attached to the organisation in which they work and tend to perceive the organisation as their own and personal, and its successes as their own successes, while the organisation's failures are seen as personal failures.

Among an organisation's strategic resources, human resources come first and investing in them has proven to be one of the most valuable investments an organisation can make in terms of long-term results. Competitiveness and organisational success depend very much on how the organization invests in people. "Among strategic resources, human capital has overtaken financial capital in terms of strategic importance. " (Radu 1999, 25-47)

Human resources specialists have felt these changes intensely in view of the fact that in recent years it has been necessary to improve the recruitment process, reduce retention, apply new techniques of motivation and career management, all contributing to the transformation process that has been subject to human resources. Human resources have an extraordinary capacity for development, they always find solutions to overcome their own limitations, solutions to continuously adapt to the challenges that arise in the organisational environment. Managers have come to the conclusion that investing in people is very important in the organisational development process, as the recruitment process is becoming increasingly complicated and costly. It has been proven to be more profitable to redirect the money invested in the recruitment process into the employee reward system.

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People are involved in all the processes within an organization, but they also need specialized software programs to carry out the activities as qualitatively as possible; they need regular trainings to update knowledge, to improve work processes. Decisions established by HR professionals interlink individual and situational factors of the organisation, but those are different from country to country, and also within individual organisations because decisions and activities made at the level of the HR function depend on so many factors.

Based on research carried out in the field of human resources by a number of specialists, we have made a selection of the most representative views on human resources:

- "Human resources are the organization; people are a common resource, but at the same time a key resource, a vital resource for organizations, contributing to their development and competitive success. " (Manolescu 1998, 11)
- "Human resources have special characteristics that directly influence the percentage of productive use and exploitation among the other categories of resources. " (Rotaru; Prodan 1998, 2)
- "Human resources are the entire staff of an organisation and the progress of the organisation depends on how they carry out their work with a focus on quality." (Burciu 1998, 136)
- "The right human resources in an organisation are those people who contribute to the achievement of organisational objectives. " (Certo Samuel C. 2001, 337)
- "Human resources must meet certain criteria in order to contribute to competitiveness, as they are a category of valuable resources for the organisation that are quite difficult to replace." (Manolescu 2003, 20)

Referring to the previous definitions, we emphasize the importance of human resources in organizations, and all the attributes that are associated with them correspond to their current positioning in management theory. In the opinion of some authors they are "important", "unique", and Aurel Manolescu mentioned in a simple statement all their merits: "human resources represent the organization". (Manolescu 2003, 19)

At the same time, authors such as Boudreau and Milkovich state that "technical facilities, technological equipment and financial capital are important, but human resources are more important." (Milkovich and Boudreau 1991, 12)

Given the views of these specialists, we understand even better why, over the years, human resources have gained a strategic role in organizations and why staff have gradually become a resource whose use must be constantly optimized.

Social sciences aim to improve the quality of life, but this process influences humanity and has a particularly strong impact on how people accept this transformation. Through social indicators and studies regarding the quality of life, aspects related to improving living conditions are analyzed, public services are evaluated in terms of quality and accessibility. In order to contribute to the improvement of the quality of life, the aim is to develop a new science, namely the science of humanity, which will have as a starting point the results of research carried out in the field of social sciences. At this moment, we are going through a very difficult period generated by the COVID-19 pandemic, the quality of life being on a downward slope. If we do not learn to adapt easily to change, to find solutions to integrate technology and modernization as easily as possible into our lives, we will face certain problems of mal-adaptability in relation to the people around us. It is important to adapt to change, but at the same time to maintain a balanced view of our own beliefs and feelings. It is for these reasons that modern society needs people to evolve and to integrate all these transformations into everyday life, constantly thinking that our decisions will positively affect future generations.

Once people understand a phenomenon, they have the ability to integrate it and it is much easier for them to adapt to change. The human resource is constantly subject to change, modernization, adaptation, being influenced by both technical and economic or sociological factors.

For example, technical factors, namely the evolution of production techniques, the development of production mechanization have influenced the increase of labor productivity and at the same time have led to the need to develop human resources. The staff function has undergone a spectacular evolution, moving from the classic activities, administration and payroll, to the development of a human resources management system very much involved in the area of training and personal development of employees.

Human resources need to constantly participate in trainings through which to acquire new qualifications, to specialize according to the technological developments that occur frequently in order for adaptation to be faster and easier.

Moreover, coaching is a very useful personal development tool because it contributes to increasing the efficiency of human resources and it is recommended to be used especially in tensed times, during changes, but also when human resources show a decrease in interest compared to professional activities. It has been observed over time that the use of internal coaching gives a much higher return on human resources, whether we are talking about individual coaching or group coaching. Team coaching can be used in group coaching. (Lefter, Deaconu, Marinaș, Puia 2008, 161) Team-coaching is used in teams that start working with a new technology or a new product, its purpose being to increase the team's performance through learning and change.

Human resources play a key role in the development of modern society and from this point of view, human resources strategies must be constantly linked and improved according to changes in the market, economy, competition. (Lefter, Deaconu, Marinaș, Puia 2008, 44)

Creativity and innovation have become key concepts that human resources must develop in order to contribute to the development of modern society. The main methods of stimulating creativity are the brainstorming method, the Philips 66 method and the discovery matrix. (Nicolescu 2004, 42)

The brainstorming method consists in stimulating group creativity, focusing on finding solutions to certain complex problems and is based on Zen Buddhism. Zen Buddhism is based on the formation of a "creative chain reaction" because it makes a connection between the culture of India, the pragmatic spirit of China and the emotional-sentimental sensitivity of Japan. This method aims to achieve a "creative chain reaction". This method involves a small number of participants and the existence of a leader, a moderator to pursue the ultimate goal (Nicolescu 2004, 43). This method emphasizes creativity and it is important for participants to know the topic of the debate before the meeting. It is recommended that the meeting be held at a time when the participants are rested, to ensure a pleasant atmosphere, and that during the meeting, participants be encouraged to come up with new ideas.

The Philips 66 method is similar to the brainstorming method, except that it addresses a larger number of participants, which must be grouped into a maximum of 5 groups and each group should not exceed 6 participants. Each group must join the discussions within a maximum of 6 minutes (Nicolescu 2004, 44). It is different from the brainstorming method in terms of the fact that at the level of each group a leader is established and a general leader of the creativity meeting is also established and he performs the final evaluation, the time is longer.

The matrix of discoveries is another way to stimulate the creativity of human resources and consists in obtaining new ideas for new products, new technologies. It is based on the use of a matrix, a double-entry table through which to make different combinations of different variables, so as to obtain new solutions. (Nicolescu 2004, 44)

In general, change is initiated by people and it is also people who put those changes into practice, thus contributing to the development of society. The development of modern society is achieved through the development of efficient management in companies and in public institutions. Human resources are responsible for stimulating innovation in organizations and implementing creativity.

Digitization is the latest industrial revolution and it involves people and technology. Automation consists in the use of robots and artificial intelligence, which means that a reconversion is needed, a transformation of human resources, favored by the flexibility and dynamics of human resources.

Conclusions

Mankind is experiencing many changes every day, our lives are greatly influenced by these changes. Challenges appear on all levels and it is important to know how to deal with them, how to adapt as soon as possible. Society tends to modernize, using a lot of digitalization, artificial intelligence. Human resources play a particularly important role in these processes and in order to adapt as easily as possible to modernization, it is important that they be supported through human resources strategies. Through strategies, human resources are guided in the process of modernization and at the same

time, there is a much better organization of things. Trainings, coaching and the application of different policies and procedures specific to human resources have an important role in the development process of modern society.

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BUREBISTA, THE DEFENDER AND UNIFIER OF THE DACIANS

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Burebista was the founder of a genuine empire of the Dacians north of the Danube, not only the first unifier of the Dacians who coagulated them in a state, with a centre of power, with laws and a common religion, but more than that, Burebista was the first of all Thracians to succeed in founding a true regional power in the vast world of European antiquity. The brilliant statesman is a model of European leader, being even equal to Caesar, because he defeated the Celts/Gauls like the great Roman general and politician. Burebista defended the borders of all Dacians by stopping the great Celtic/Gallic migration, transforming the Dacian territories into a Dacian Island, strong and unitary, the Celtic/Gallic wave flowing far south of the Danube, far from the border of Burebista's Dacia. The Dacian state of Burebista was created by the military and reforming capacity of the creator, who bequeathed the ideal of unity to this Carpathian-Danubian-Pontic space, proving by his deeds and his imperial creation that power and defence always stand in unity.

Keywords: Northern Dacians; military leaders; conflict; monarchy; empire; unification of tribes; reforms; militarized state.

This study aims to bring back to the attention of historiography the remarkable personality of Burebista, the first unifier of the Thracian tribes, the creator of the first Dacian unitary state. Unjustly ignored by researchers at present, Burebista was a visionary and a true framer of the country, even of the nation, proving that the state is superior, precisely by uniting its nation, to any tribal unions, no matter how numerous they might be. In the context of classical antiquity, Burebista successfully fits into the gallery of the great leaders of Europe, a strategist as talented as Pericles (especially since his Dacia was much more important territorially and militarily, compared to the thalassocracy of the first of the strategists of Athens), a politician as ambitious as Caesar (the conqueror of all Gaul, but especially the visionary of an international Rome), he was also a pioneer who had never existed before his times (like Alexander the Great, the conqueror of the world), and as a reformer and founder of nation he was like Darius I, (the greatest of ancient leaders), especially since they both offered their nation a monotheistic religion, thus unifying the spirits of their subjects too.

Therefore, taking into account all the above-mentioned considerations, the subject concerning Burebista is very generous for scientific research, relying on a generous bibliography, even if, to an overwhelming extent, it dates from the last century and is exclusively Romanian. Just as Caesar is given what is Caesar's, so too, because of the similarities of the deeds of the two political and military leaders, it is necessary to give Burebista the attention he deserves, as he is unmatched in his deeds by any Dacian, or by a descendant of the Dacians.

We dedicate this study *to the memory* of the special warrior PAVEL CORUȚ, a great admirer of the Dacians, a gifted writer, a true patriot, and a model for his readers, who is now writing the adventures of his heroes, the angels. We express our deep regret for his passing away, as he has gone to the world of the stars.

The name of the unifier and its significance

Nomen est omen, (*The name is predestination* – our transl.) is an old Latin saying that fully applies to the great leader of all Thracians, Burebista, the only one of all the Thracians who managed to unify some Thracian tribes (the Dacians) in one state.

According to most Romanian historians, especially the specialist in Burebista, Ion Horațiu Crișan, Burebista was "a great personality" (Crișan 1975: 58), the name of the Dacian leader announced his great deeds. Thus, according to Strabo, who mentions in his *Geographia* the name of the illustrious political and military leader:

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"Boerebistas, a Getic man, taking the leadership of his people, raised these wicked men in endless wars and directed them by abstinence and sobriety and obedience to commands (laws), so that in a few years he founded a great kingdom and subjugated most of the neighbouring populations to the Getae..." (Crișan 1975: 61)

The historian quoted above, and not only him, carries out detailed and relevant research on the name, giving the following interpretations to the meaning of the name of Burebista:

a. "the brilliant one"; b. "the noble one"; c. "the strong one", achieving comparative linguistics studies, also using Sanskrit, where there is the word *bhuri-h = abundant, strong, much* and *bho-s-k* (like *bostes* of the Dacians - our emphasis) which meant *brilliant, noble, well known* (Crișan 1975: 62). All the historians who dealt with Burebista reached the same conclusion as Ion Horațiu Crișan with regard to the name (Berciu 1979: 7-10) (Vulpe 1968: 33-55) (Petolescu 2010: 43-58), which seemed to mean: "the strong and brilliant one", also demonstrated by the deeds of Burebista who was the greatest and most brilliant of all Thracians, not only of all Dacians.

We consider that the fourth significance added to the three meanings is correct and obvious, that is why it might have been ignored, because it was the simplest translation of the name, d. "the leader of the Boers" or "the most brilliant of all Boers", especially since the Boers were one of the Dacian tribes. The argument for this significance is the Indo-European warrior tradition of names. It is well known that the Aryans had the name *bharata* for tribal chiefs, always with military duties. This is demonstrated by the longest epic of mankind, *Mahabharata*, also translated as the *great war*.

So, the military qualities were a *sine qua non* condition for the ancient leaders, which was also demonstrated by the Celts with whom Burebista had numerous campaigns. Thus, almost every Celtic tribal leader was also called *rix*, which is more a military commander, less a *king*, given that the Celts never had a unitary kingdom. The Dacians had the rank of *tarabostes* (similar to the *bharati* of the Aryans), i.e. the nobles of the Dacians, who, like the *rix* of the Celts, had the status of military commanders, noble warriors and political leaders.

Burebista was, to paraphrase a famous series, the first by his name, even the first of all Thracians who imposed his name in eternity by his energy and ambitions, offering through himself the meaning of the *most brilliant* of all Thracians and Dacians together.

Burebista, the Get or the Dacian?

There are many controversies about the core of Burebista's power, namely where the kingdom of Dacia began, if Burebista was a Get, that is, beyond the Carpathian arch, or a Dacian, inside the Carpathian arch. The conclusion is not clear. We consider that Burebista was from outside the Carpathian arch, namely a Get from Muntenia, but from Northern Muntenia, from the Curvature Carpathians, not from the Muntenia Plain.

Hadrian Daicoviciu and other prominent historians do not reach a clear conclusion regarding the branch to which Burebista belonged, whether he was a Get or a Dacian.

However, it seems that the base of his power was somewhere in the plain of Southeastern Muntenia (Daicoviciu 1968: 112), but there was also an important power in Transylvania at that time, the cradle of Decebal's Dacia. (Daicoviciu 1968: 114-115)

These two hypotheses about whether Burebista was a Get or a Dacian (Vulpe 1968, 33-55) (Berciu 1979, 7-10) (Petolescu 2019, 43-58) (Crișan 1979, 103-119) (Cicoare 1977-1979, 503-506) (Crișan 1975) (Valea și Nistor 1995-1996, 253-256) were discussed by most of those who studied the Burebista phenomenon, but none states a certainty due to the lack of written sources from that time.

As mentioned above, we argue in favour of the Getic origin of the great Burebista, but from the branch of the Getae in Northern Muntenia, more precisely the Curvature Carpathians, possibly the Buzău Mountains for the following reasons:

- The geographical position of the Curvature Carpathians allowed Burebista to rapidly enter Transylvania, but also get access to the Danube and the Black Sea where he cooperated with the Greek colonies (hence the Decree of Acornion) (Crișan 1975) (Daicoviciu 1968); at the same time, he had an open path to the region of today's Moldova, both to the region of Romanian Moldova and to that of the Republic of Moldova, to the Dniester;
- In the Curvature Carpathians there are many Thracian traces, so prior to the Dacian state founded by Burebista, which demonstrates that the founding

of a state had mandatorily a tradition of organizing political and military power;

• In the Buzău Mountains there are many Thracian and Dacian religious constructions, which explains the religious reform that Burebista imposed along with his state. The worship of Zamolxis began with Burebista, so we can assume that the Sacred Mountain or *Kogaionon* also began to be worshiped during this period by the Dacians. The cult of Zamolxis presupposed the existence of some caves, or nests in the mountains, a requirement of the cult, which exists in the Buzău Mountains, some caves not being fully explored even today.

Along the same line, the naming of a Sacred Mountain for the Dacians meant some impressive phenomena for the common people, which would give it the epithet of sacred. These phenomena still exist today in the Buzău Mountains and in the Curvature Carpathians and we will mention a few: the Berca Muddy Volcanoes, the Living Fire of Lopătari, the Salt Hill, the Bozioru landscape, the amber of Colți, the seismic region of Vrancea and others. From the current Buzău region you can go both to Transylvania through Gura Teghii and to Vrancea and Moldova through Bisoca. Moreover, the salt deposits of the Salt Hill located in the communes of Mânzălești, Lopătari, but also along the villages of Sări, Sărulești, Meledic offered the Dacians an extremely important economic resource, with which they most certainly traded with the Greeks from the Black Sea and not only. Economically, the area was very generous because a state needed economic resources to support itself. The trade with the Greek colonies was much more favourable for the Dacians from this side of the Carpathians than for the Dacians beyond the Carpathians;

• In the whole region of the Curvature Carpathians there are still vines today, which Strabo mentions: "the Getae ... were persuaded to destroy their vineyards and live their lives without wine."(Crișan 1975: 151) The destruction of the vineyards was necessary in order to destroy the habit of the Thracians, implicitly of the Dacians, to drink wine, a habit called by the Romans *mos Tracicum*, which involved that wine was drunk in large quantities, without any water or honey, according to the Roman habit. This Thracian habit was everywhere in the Balkans, even Alexander the Great borrowed it, so the Greeks also embraced it. Moreover, the wine god Dionysos himself, although from the Greek pantheon, was of Thracian origin, as was Orpheus.

So, the destruction of the vineyards began on the territory of Burebista, after which it spread wherever his power spread. The soil of the Curvature Carpathians is still very suitable for the cultivation of vines, we can mention the viticultural area of Vrancea, but also that of Pietroasele, Merei, Istrița in Buzău County, etc.

• The proximity of Buzău to the Prahova area, especially to the Bucegi Mountains where many Thracian and Dacian artifacts were discovered;

• The plot for the assassination of the most brilliant Dacian was possible because of the tarabostes from Transylvania, who profited the most after the death of Burebista, considered an outsider, because he might have been a Get, because the nucleus of the next Dacian state would appear in Transylvania, which would not coagulate the free Dacians located in the region of the Curvature Carpathians and Moldova and beyond. *Cui profuit?* (To whom was Burebista's death a benefit?) The centre of Transylvania (the center of the Orăștiei Mountains) (Daicoviciu 1968, 110) is the only political centre of the Dacians out of the four or five that broke away from Burebista's empire after the assassination of the extraordinary leader, which became a kingdom.

So for all these reasons it is not wrong to consider Burebista a Get, from the branch of the Dacians outside the Carpathians, that is why he had such a great vision of his power, which was not closed in the Carpathian arch, on the contrary his power encompassed the entire Carpathian arch, bordering the Sea, the Tisza, the Dniester, the Danube as a whole, because he controlled its sources (river that had a sacred role in the Dacian mentality) and the mountains beyond it. Burebista was the one who saw the borders of Dacia beyond the estates of the Dacian tarabostes, who unfortunately did not share his great vision.

The empire of Burebista

Reforms for the foundations of the state of all Dacians

Burebista achieved the first union of the Geto-Dacians, very quickly, reaching the creation of the first and "greatest barbarian power in Europe."

(Crișan 1975, 62) For the creation of a power which had never existed before in the world of all Thracians, not only Dacians, but an institutional model was also needed. Therefore, Burebista's model was, according to Hadrian Daicoviciu, "the model of the states that arose on the ruins of the Empire of Alexander the Great." (Daicoviciu 1968, 97) So Burebista's state was a military monarchy, with a strong military imprint, just like the Hellenistic kingdoms, ruled by *diadochi*, former generals in the phalanxes of Alexander the Great.

Every state need institutions and reforms (laws) to mark its existence. That is why Burebista carried out four great reforms, like Darius I the Great, the titan of the Persians who organized the most efficient empire, which was surpassed as a political organization only by the Roman Empire.

The most important of Burebista's reforms, as in the case of Darius I, was the *religious reform*, because he needed to be followed by the Dacians he wanted to unite, both leaders imposed a monotheistic religion in essence: Darius the Zoroastrianism, and Burebista the cult of Zamolxis. Strabo describes that Deceneu was with Burebista and "made predictions" (Crișan 1975, 149). This was the closest collaborator of the Dacian unifier, he was "the high priest, with the duties of a true viceroy." (Daicoviciu 1968, 98) So, the architect of the religious reform was certainly Deceneu, the high priest, and also a true prime minister, who offered advice to the king. He embodied the Dacian intellectual, just as the Druids were to the Celts, there was a striking resemblance in terms of the role of Deceneu to the role and duties of the Druids. In all Indo-European civilizations there was a chief of the religious cult (*Zoroaster*, magician = priest for the Persians, *Druids* for the Celts, *Ephorians* for the Spartans, *Pontifex Maximus* for the Romans, a quality that the emperor himself would exercise, etc.) who had a decision-making role in the politics of the states of these Indo-European civilizations. Strabo calls him a *sorcerer*, but Deceneu certainly was like the Great Druid of the Celts, as described by Caesar, who was a physician, astronomer, astrologer, counsellor to the king and educator of the people, interpreter of the will of the gods and source of wisdom. Darius I the Great reformed Mazdaism through Zoroaster, thus imposing Zoroastrianism, a monotheistic religion, but also a standard of Persian education. Similarly, Burebista, with the wisdom of Deceneu, imposed the cult of Zamolxis to the Dacians, so that they would follow him, and he would offer a common point to all Dacian tribes. At this point the main Dacian totems were established, especially the institutional totem - the wolf. The spirits had to be united first, and religion was the most effective means. We support this through the social symbolism of the wolf, which alone is not a feared predator, but in the pack it is a leading predator in the food chain. Burebista was the alpha wolf, due to the religious reform, so he was followed by the Dacians everywhere, being invincible, until the pack revolted.

The laws that Strabo tells us about are most likely the creation of Deceneu, the reformer and one of the institutional founders of Dacia. He is the one who convinced the Dacians "to destroy their vineyards and live their lives without wine" (Crișan 1975, 151), because a nation needs organization to make a state, and an army needs discipline, hierarchy, and solidarity, just like a pack of wolves (Strechie 2017b, 369-375). Certainly, the unification of the Dacians was done not only voluntarily, but also by force since a plot to assassinate Burebista was successful. However, we consider the religious reform to be the key reform, without which the other reforms would not have been successful. This religious reform is the one that lasted, even after the disappearance of Burebista. At the time of Decebal, there was the cult of Zamolxis, even Deceneu, which proves that the High Priest of the Dacians was not a name, but a function, as we demonstrated above.

Another very important reform was the *economic reform*. All the great Romanian historians who dealt with the research of the Dacians consider that the accomplishment of Burebista's state was due first of all to the economic unification and at the same time to the unprecedented economic development (Crișan 1975, 7-10) (Daicoviciu 1968, 33-55) (Pârvan 1982) (Valea, Nistor 1995-1996, 253-256) (Berciu 1979, 7-10) (Petolescu 2010, 43-58) (Vulpe 1968). The Dacians had innumerable resources and very good trade relations, especially with the Greeks, but through the Greeks with other nations. A very important resource was salt, but also precious metals. Precious metals were the main resource of the Dacians in the Carpathian arch, so it seems that they were the ones who organized the plot to assassinate the brilliant king, because

Auri sacra fames, (*Hunger for gold is cursed* – our transl.) as Vergilius said, and they did not want to share this resource with all Dacians, and especially this resource to be available to Burebista, an outsider. Although this reform was very important for the achievement of the great power of all Dacians, it was a short-term one, because after the assassination of Burebista, but also long after that, there was no economic unity of all Dacians, during the reign of Decebal, the free Dacians had economic ties with Dacia, but one cannot speak of an economic unity. It was one of the reforms that gave way very quickly after the death of the unifier of the Dacians, being most likely one of the causes of his assassination.

The political reform was another basic reform that involved two components: a. *the reform of foreign policy* and b. *the reform of internal policy*. This reform, even when Burebista was alive, was incomplete and showed weakness, because there were no institutions and administration, at least no written or archaeological sources have been preserved. If we compare the empire of Burebista with the Persian Empire of Darius I the Great, in the case of the Persian titan, the administrative reform was the best implemented reform, it had the same vigour as the religious and the economic reforms. Moreover, in the implementation of the political reform, in its administrative and institutional components, Darius I associated his army, militarizing the administration and the institutions, which ensured the full success of his military reform. In the case of Burebista, the political reform (as well as the economic and military ones) was the weakest, due to the multitude of privileges of the Dacian tarabostes, regardless of their geographical position, privileges which were only partially renounced, a renunciation for a common interest rather than out of conviction.

The only successful component of Burebista's political reform was *foreign policy*. His power relations with the Greeks, who were a kind of allies of his, offered him opportunities for the international trade. He also had diplomatic agreements with the Greeks if we consider Acornion (Crișan 1975). Also, through the Greek allies, Burebista had diplomatic relations with Rome during the triumvirate, even negotiating with Pompeius, nicknamed the Great, promising him Dacian help in the civil war in which he confronted Caesar (Daicoviciu 1968: 108).

The success of foreign policy is due exclusively to the charisma and intelligence of the most brilliant of the Dacians, Burebista, because he knew how to make a great policy at regional level and not only, being on an equal footing with the greatest of the ancient world at that time, the Romans, those who mattered especially in the European world. After Rome, Burebista's Dacia was the most important power structure in Europe because it was a state.

The relationship with Rome was one of mutual surveillance, however, the fact that he was one of the negotiators who chose Pompeius' camp (Daicoviciu 1968) demonstrates Burebista's qualities as the strongest regional leader, who also had the military force to intervene in the conflict between the two former triumvirs, Pompeius and Caesar. We think that Burebista did not make the wrong choice between Caesar and Pompeius, by choosing the latter, because in Rome all power was concentrated in the hands of Pompeius, so Pompeius would have had every chance of winning. No one infered or expected General Caesar to show his genius and charisma on the occasion of this civil war. He had the vision of open borders like Burebista. And, like Burebista, he was an outsider, and if at Pharsalus Pompeius had resorted to Burebista's help, Caesar would probably have been defeated, for he won by a brilliant artifice. So, from a diplomatic, military and political point of view Burebista chose the camp well, the alliance with Rome was not available to everyone, usually it was Rome that allied with someone, the reciprocal being an exception, as Burebista was an exception.

How was the negotiation with Rome possible? Even a negotiation at the highest level, we would say, because Pompeius represented the Roman state, he was not a natural person in conflict with someone. The answer would be that due to the military force, the Dacians often robbed Moesia long before the two leaders, a direct witness being the unfortunate Ovid, who in his work refers to the multiple expeditions of the Dacians across the Danube and beyond (Strechie 2017a, 199-216), thus proving that in the Balkan region the Dacians were the ones who mattered.

The military reform did not have a longer life, than the one of the founder of the Dacians' united power. It functioned during the Celtic campaigns more as a consequence of religious reform, and less as a result of comradeship in arms or fighting

unity. We will describe the Celtic campaigns below, they were a common point of alliance and not of fusion between Burebista's troops and the troops of the Dacian tarabostes. Burebista's army, which was the spearhead of the Celtic campaigns and not only, was the "personal army" made up of "national elements" and "Thracian mercenaries", therefore the leader of such an army could decide a lot in the region where he exercised power (Crişan 1975, 163-171).

Strabo appreciated that Burebista's army amounted to 200,000 soldiers, which some historians consider exaggerated (Daicoviciu 1968, 107), but Vasile Pârvan considered it an adequate number, especially since the renowned scientist believed that Burebista's Dacia had about a million people (Crişan 1975, 168). We consider that the number of 200,000 people for Burebista's troops, in their entirety, including those of the Dacian tarabostes from all over the territory, is not at all exaggerated, because it was a time and society of warriors, and the military occupation was the main occupation, especially in the case of Indo-European civilizations. In addition, troops were needed both for campaigns and for the security of the borders of the Dacian empire and for the royal court.

The royal authority of Burebista was not complete due to the military factor, which most likely was not a unitary one, ie all armed troops be subordinate to the king, the tarabostes had their own troops, which was the biggest mistake of Burebista's management. For the unity and for the royal authority, the unique command of the troops was necessary, it needed to be exercised by the king and the tarabostes should have been subject to him. We consider that the failure of Burebista's empire was caused by the lack of control of the army of all Dacians. Burebista should have forbidden the tarabostes from holding personal troops, because power lies in unity, as demonstrated by the Romans, who clashed three times for the sole command of the army. Again, it is highlighted that the Transylvanian group of the Dacians, which had most of the precious metal resources, could afford to buy mercenaries and privileges, which led to the betrayal of Burebista's royalty, possibly organizing the plot to assassinate the visionary Dacian king.

Campaigns to found the power of all Dacians

During Burebista's reign, the international situation in European Antiquity was troubled by numerous conflicts, migrations, and tribal clashes. It was a turbulent political century for everyone, a confrontation for taking power, for revolutionizing it or for preserving it. The Carpathian-Danubian-Pontic region was at a crossroads in the context of the great migration of the Celts/Gauls, who were a sure threat to all Dacians, especially since they were not united. Burebista emerged as king in this context, he was truly the unifier and defender of the Dacians, before the Celtic danger, which in their migration and with their military technology (the Celts/Gauls are the founders of the Iron Civilization, being the best craftsmen of innovative weapons for those times, made of iron, very resistant) could have occupied all the territories of the Dacians. The Celtic threat was real (Daicoviciu 1968, 103).

Since the best defence is the attack, Burebista started the campaign against the Celts who were migrating from their homeland, which was fighting against Caesar, to the Balkan Peninsula, so the territory of the Dacians was very advantageous for the settlement of the Celts. But the Dacian wolves acted like a pack and the Celts were crushed by Burebista in 60 BC (Marin 2010, 23-32). Bohemia was set free from the Celts, Burebista reaching as far as Moravia of today (Daicoviciu 1968, 103). In this context, the Dacians came to be neighbours to the Germanic tribes which Burebista neither confronted nor allied with, because he did not need these tribes to consolidate his power. Thus, the power of Burebista extended in the north to the Forest Carpathians and to the sources of the Danube (Daicoviciu 19968, 104-107), the territory of the Dacians, as confirmed by archaeological discoveries. The North was thus secured, the defeat of the Celts by Burebista was the greatest success in the south-eastern European region, being as important as Caesar's campaign, of course *mutatis mutandis*

After the North, the West was secured, being bordered by the Danube and the Tisza, the South was guarded by the Haemus Mountains and the Danube, the East was controlled by the Greek colonies.

Five years after the Celtic campaign, Burebista began his campaign to conquer the Greek colonies of the Black Sea, colonies also wanted by Rome. Thus, from 55 BC to 48 BC, Burebista conquered the Greek colonies of the Black Sea, reaching Illirya, leaving only Dionyssopolis unconquered, with which he had an old diplomatic and commercial alliance. Thus Olbia, Tyras, Histria, Tomis, Callatis,

Odessos, Messembria, Apollonia and Olbia fell one by one and Burebista was recognized as their master, which led him to rule to the Dniester in the East and to have the Black Sea as neighbour in the South East. (Daicoviciu 1968, 106-107) (Daicoviciu 1971, 89-95)

By subjugating the Greek colonies, Burebista ensured the exit of Dacia to the sea and at the same time a natural frontier of his empire. Also, the economic factor was very important, the sea trade was now directly under the control of the Dacians, and the Dacian territory was diversified including all forms of lanscape: mountains, forests, plains, flowing waters and the sea, just like any empire.

The success of Burebista's campaigns is also due to information. The fact that he knew the situation in Rome, namely the confrontation between the two triumvirs, indicates that he had infiltrated people to keep him informed of what was happening in Rome, which makes him a true regional leader and not only, because his Dacia was not below Pompeius' Rome. It was different from the Rome dreamed of by Caesar, but it was about the same as the old, Italic Rome represented by Pompeius.

The campaigns were for the consolidation of his Dacia, his plan of power was carried out, unfortunately the traitors with narrow vision, subject to greed and personal interests, ended his life and thus the dream of the united Dacians. The assassination of the great Burebista was the work of his own tarabostes, most certainly not of his Getae from ouside the Carpathians, but those beyond them. Most likely, the Transylvanian faction, which had the most to benefit from the death of the most brilliant of the Dacians, committed the heinous crime. History has harshly paid back for this betrayal because Decebal's Dacia (the betrayal being repeated to some extent) was only part of Burebista's power, which never included all Dacians and because of the lack of unity of the Dacian pack of wolves, it was only a matter of time and tactics to be conquered by the Romans. Dacia, which once negotiated with Rome, became just a province a century later due to its betrayal and the cursed hunger for gold, thus a shadow of the great Dacian empire. The rift that was thus formed by the betrayal of the tarabostes, between the Dacians from Transylvania and the free Dacians, was of gigantic proportions, and the elimination of the one who, uniting all Dacians, thus defended them, (first from their assimilation by the Celts, Burebista also intuiting the Roman danger, therefore he positioned himself as an ally of Pompeius' ancient, Italic Rome, because allies do not attack each other) was the beginning of the end for independent Dacia. The lack of a unionist faction among the tarabostes, all Getae and Dacians, completed the monstrous crime of eliminating the union of the tribes of all Dacians, in an empire. The most daring and successful dream of all Dacians, the union, died with Burebista.

This criminal betrayal was paid for by Decebal's Dacia, more than 100 years later, when the free Dacians did not intervene in the Dacian conflict with the Romans in Transylvania, because the binder, the alpha wolf of the Dacian wolves, Burebista, had disappeared. Genius attracts more envy than followers, this was also the case with Burebista.

History does not tell what it would have been like if Decebal's Dacia in the wars with the Romans had been the same as Burebista's Dacia. But an answer is certain in the case of this speculation: Burebista's Dacia would have resisted Rome, at least for a longer time, and if there had been no betrayals for the same gold and for the petty interests of narrow-minded leaders, Imperial Dacia would have been an ally of Rome of the type *socius et amicus* (*ally as equal and friend* – our transl.) and not a client state or province.

Conclusions

Burebista was the man of his time, he was not only contemporary with Caesar, Pompeius and others, he was their equal. By his energy and will, he created an empire, as important as Italic republican Rome. He was the unifier and defender of the Dacians, the first of all Thracians to show that the most important, after the Persians, of the Indo-European nations were a force that had to be taken into account in the European region. Unjustly minimized by the current Romanian historiography, Burebista was, is and will remain *the most brilliant, strongest,* and *most important* of all Thracians and Dacians together, like his name, a model of political and military leader regardless of time. His legacy left to the Dacians, and descendants is unity, an ideal put into practice by himself through his deeds and his vision.

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FUNDAMENTAL COORDINATES OF AN AUDIT GUIDE OF REGULARITY/COMPLIANCE, APPLICABLE WITHIN THE MINISTRY OF NATIONAL DEFENCE

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In this article we would like to present the way in which we tried to set up an internal audit guide of regularity/compliance for the entities of the Ministry of National Defence, starting from the already existing model in the Internal Audit Department for such type of audit, but seeking to add new elements from the following sources of documentation: the national legislation in force in this field; the study conducted among internal auditors and representatives of military entities, based on the Balanced Scorecard Model; the challenges that the new socio-sanitary phenomenon has generated at global and national level – Coronavirus pandemic; new research and achievements obtained in recent years by theorists and practitioners in the field of public internal audit.

Keywords: internal audit procedure; service order; permanent file; form of identification and analysis of the problem (FIAP); form for finding and reporting irregularities (FFRI); public internal audit report of regularity/compliance.

Setting up an internal audit guide of regularity/compliance adapted to the specifics of military activity is the purpose of the research we want to highlight in this article. For this scientific approach, we proceeded to examine some reference documents and normative acts in this field. First of all, we reviewed the content of the normative acts that refer to the internal public audit in order to deepen the requirements resulting from them for the regularity/compliance missions, such as: Law no. 672/2002 (Monitorul Oficial al României. 24.12.2002, P.I.), GD no. 1086/2013 (Monitorul Oficial al României. 10.01.2014, P.I.), OMPF no. 757/2014 (Minister of Finance 2014), OMND no. M.67/17.06.2014 (Monitorul Oficial al României 25.06.2014, P.I.), OMND no. M.127/09.12.2014 (Ministry of National Defence 2014).

We then carefully read the contents of the internal audit guide of regularity/compliance made by the specialists of the Internal Audit Department for the missions related to public procurement (Ministry of National Defence1998), in order to be able to identify which current elements were not inserted in it. We also consulted various regulations of the Internal Audit Department materialized in the form of provisions of the heads of this structure Disposition DAI-1 (Ministry of National Defence 2020), Disposition DAI-2 (Ministry of National Defence 2020); Disposition DAI-3 (Ministry of National Defence 2020) to identify specific and recent requirements in the area of various internal audit missions in the military.

Another documentation made refers to the study we conducted based on the Balanced Scorecard Model following questionnaires applied among auditors and audited from the army for the last 5 years, to the experiences and challenges of professional internal auditors in Romania, but also in other countries during the Coronavirus pandemic and the news that we considered feasible, from the new research conducted in recent years by theorists and practitioners in the field of public internal audit.

We further present the Audit Guide of Regularity/Compliance for the structures of the Ministry of National Defence, with the amendments that we propose to be included, as novelty elements, starting from the form already approved by the Head of the Internal Audit Department in 2020.

Current structure and our proposals for the configuration of the internal audit guide of regularity/compliance with the part of the methodology related to the preparation of the mission

The planning and implementation of regularity/compliance audit missions (Monitorul Oficial al României. 10.01.2014) aims to examine the

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actions on financial effects on public funds or public assets, in terms of compliance with all principles, procedural and methodological rules that are applied.

The general methodology for carrying out a regularity mission involves completing *the four main stages,* respectively*: A) Preparing the mission; B) On-site intervention; C) Reporting the public internal audit activity; D) Follow the recommendations.*

The purpose of preparing the public internal audit mission is to carry out the following operations: elaboration of the documents for initiating the regularity mission; knowledge of the audited entity/ audited field; establishing the relevant aspects that will be the subject of the regularity audit; developing a program for establishing the responsibilities and deadlines within the audit mission.

In order to carry out these operations, the Internal Audit Guide of regularity/compliance for the entities of the Ministry of National Defence configured by the profile department of the army includes several audit procedures.

The *internal audit procedure* establishes the planning and conduct of internal audits, which verifies the compliance of the management control system with the requirements of standards in the field, as resulting from OSGG 400/2015 (Monitorul Oficial al României 2015, P.I.) and the applicable legislation in the field as well as establishing and monitoring the effective implementation of the resulting corrective actions.

Regarding the part related to the preparation of a regularity/compliance audit mission, the following procedures are inserted: *P-01 – Elaboration of the service order; P-02 – Preparation of the Declaration of Independence; P-03 – Elaboration of the Notification regarding the initiation of public internal audit mission of regularity; P-04 – Opening meeting; P-05 – Establishing/ updating the Permanent File; P-06 – Information processing and documentation; P-07 – Risk assessment; P-08 – Initial assessment of internal control and setting of audit objectives; P-09 – Elaboration of the Program of public internal audit mission of regularity.*

Procedure P-01 – Elaboration of the service order aims to establish the coordinates of the mandate given to the audit team in carrying out the regularity mission.

Compared to the current form of the *Service Order,* we propose the following: the use of this document and the electronic version, resulting from the IT System for the Management of the Internal Public Audit Activity (SIMAPI); the inclusion in its structure of a statement stating that one or more auditors, depending on the situation, may be replaced during the engagement by the head of the audit department, if a number of objective issues arise (incompatibility, temporary incapacity for work, etc.).

Procedure P-02 – Preparation of the Declaration of Independence aims for each auditor in the team to declare in writing their independence and to mention any impediments to objectivity in carrying out the audit engagement they received.

Compared to the current printed form of the Declaration of Independence, we propose the following: to use the electronic version to be sent online by the head of the audit department to the internal auditors for completion; to complete the declarations of incompatibility, similar to the declarations of independence, by the commanders of the audited units (respectively the heads of offices and compartments/similar, within the audited entities). Models of these statements proposed by us may be submitted online together with the *Notice of Initiation of the Mission* (which shall be sent to the audited unit at least 15 days before the start of the on-site intervention and which will also contain the composition of the audit team, because the procedure does not provide for this at this time).

The purpose of *Procedure P-03 – Elaboration of the Notification regarding the initiation of public internal audit mission of regularity* is to inform the audited structure about the initiation of the internal public audit mission and has the following content: the position and name of the head of the structure to be audited; the name of the mission, the audit plan in which it was provided and its purpose; the general objectives of the mission; informing the audited entity about the opening meeting; the documents that the audited entity will have to prepare in order to carry out the mission.

We propose, compared to the current version, the following: to use the electronic version; the notification of all military units planned in a reference year for the execution of such audit missions at the beginning of the year or immediately after the approval of the Annual Audit Plan by the

Minister of National Defence and not as currently regulated (at least 15 days before the start of the on-site intervention); recording in the notification, including the audit team and a model situation that can provide at the opening meeting of the audit mission, an overview of the way in which the activities have been carried out since the date of the last audit mission to the start of the new one.

According to *Procedure P-04 – Opening meeting*, the following main aspects are communicated: the internal auditors and the supervisor; the theme and general objectives of the mission; the deadlines for carrying out the mission; the responsible persons from the audited structure in order to carry out the mission; Charter of Internal Audit; scheduling of discussion meetings during the mission with the management of the audited structure; ensuring the working conditions necessary for the mission (room, access to printing, etc.).

With regard to the current content of the minutes of the opening meeting, we make the following proposals: the opening meeting to be held online, with the participation of the representatives of the two parties involved and then the documents of the meeting to be signed, scanned and sent to the two interested parties; the expression "list of persons from the audited entity participating in the opening meeting of the internal audit mission" to be completed in the part highlighted and underlined with the expression… "or from other echelons above the unit, or control structures", which would it adds transparency to the discussions held during the opening meeting and would also create the possibility of joint actions auditors-audited, auditors – representatives of the upper echelons.

The purpose of *Procedure P-05 – Establishing/ updating the Permanent File* is to provide a database for knowing the specifics of the audited entity and the evolution over time of the main characteristic elements.

The information included in the *permanent file* must be systematized by categories and presented over a 5-year time horizon, in order to allow the analysis of trends over time, such as, for example: The organization of the entity; Incidental normative framework; The audited activity; Human resources activity; Financial-accounting activity; Legal activity; External audits and controls; Internal controls etc.

A very important document is the *acquaintance questionnaire*. It includes questions related to: knowledge of the socio-economic context (at the level of the entity and the audited structure); knowledge of the organizational context; knowledge of the functioning of the audited entity/structure.

In connection with the acquaintance questionnaire, we propose: to be completed and transmitted electronically to the persons involved in the elaboration and management of such a document; those who are appointed by the commander of the audited unit to answer the questions asked by the auditors, to assume in writing by signature the answers given and the arguments formulated in support of the answers.

The purpose of *Procedure P-06 – Information processing and documentation* is to know the audited entity/audited field in order to establish auditable activities and as a subsequent basis for identifying risks and consists in analyzing the following documents and similar acts: organization documents; incidental regulatory framework; planning documents; activity reports; findings of previous audits and controls; external information on the audited structure.

The processing and documentation of the information is completed by the elaboration of the *Preliminary Study* document, which refers to the following aspects: the general characterization of the audited entity; the entity's strategy, policies and objectives in the audited field; analysis of the activity in the audited field; analysis of the structure and training of staff in the audited field; the level of insurance and the availability of the financial resources necessary to achieve the objectives of the audited field; conclusions.

We consider that in the *preliminary study stage* the audit team must also consult the annual balance sheets, the minutes, the (similar) findings of the various control structures authorized in law (operational, financial, logistics, etc.), the reports of the Court of Accounts, and the annual reports drawn up by the bodies that make up the Internal/ Managerial Control System in each military entity.

The purpose of *Procedure P-07 – Risk assessment* is to identify the risks in the audited entity and then to assess the likelihood and impact of each risk, by using the criteria of appreciation of each.

The following criteria are considered for the risk assessment:

• the history of the manifestation of the risk;
• the stability of the incident normative framework;
• the complexity of the activity;
• staff availability and experience.

The risk impact assessment is performed based on the following criteria:

• loss of assets;
• affecting the image of the entity;
• increasing the costs of the audited activity;
• affecting the quality of services;
• interruption of activity.

The probability assessment is expressed on a value scale, on three levels, as follows:

• low probability;
• moderate probability;
• high probability.

The impact assessment is measured on a value scale, on three levels, as follows:

• low impact;
• moderate impact;
• high impact.

After assessing the probability and impact of the risks, the audit team determines the total risk score by entering the result of the product between probability and impact, for each risk (PT_{risk}=PxI).

Based on the score obtained, each risk is ranked as follows:

• High risk (High), if the total risk score is between 6 and 9;
• Medium risk (Medium), if the total risk score is 3 or 4;
• Low risk (Low) if the total risk score is 1 or 2.

Examining carefully the criteria on which the risks of an audited entity are assessed, we find that they need to be measured /determined more accurately, both in terms of their probabilities of occurrence and in terms of their impact.

In the part of probabilities of occurrence of risks, one of the criteria of these probabilities refers to the *analyzed risk*, in the sense that it can be divided into three variants:

• it has not previously manifested in the audited entity/audited field (and then the probability of occurrence is low);
• it has rarely occurred in the past in the audited entity/audited field (and then the probability of occurrence is medium);
• it has often occurred in the past in the audited entity/audited field (and then the probability of occurrence is high). We believe that this risk should be supplemented here by specifying frequency intervals from the previous audit mission to the one to be carried out (for example if the frequency was between 1-2 within 3 years of the previous audit is considered low risk, if the frequency was between 3-5 within 3 years of the previous audit to be considered medium risk and if the frequency of manifestation of this risk was higher than 5 within 3 years of the previous audit to be considered consider high risk.

On the impact side, loss of assets and impairment of operating costs are provided as criteria. There are also 3 levels of impact:

• low impact (no loss of assets; operating costs are not affected);
• medium impact (asset losses are low; operating costs are moderate);
• high impact (significant loss of assets; high operating costs).

Some amendments should be made to this part of the impact assessment, in accordance with the above criteria we have referred to.

For *asset losses*, a *significance threshold*[1] *for their value* must be set, so that we can classify them in one of the impact classes.

To establish the significance threshold, a certain percentage can be used (usually 1-2% of the value of the total assets of the unit according to the annual financial statements submitted in the years from the last internal audit to the next one).

If there is no damage to assets (found in annual inventories, inspections and controls performed or as a result of extraordinary events and reflected in the annual financial statements) then the impact is low.

If there is damage to assets below or at the level of significance threshold (found from the sources mentioned above) then the impact is medium.

If there is damage to assets above the significance level (found from the sources mentioned above) then the impact is high.

[1] *The Significance Threshold* is defined in the "General Framework for the Preparation and Presentation of Financial Statements" issued by the International Accounting Standards Committee in the following terms: "Information is significant if its omission or misstatement could influence users' financial decisions based on their financial statements. The significance threshold depends on the size of the item or error, judged in the specific circumstances of the omission or misstatement. Thus, the threshold of significance offers a limit rather than a primary qualitative feature that information must have in order to be useful."

For *operating costs* two aspects should be taken into account: *planned costs through budgets and actual costs of the audited activities/audited fields,* to see the relationship between them, correlated with the impact or not of the quality of the activity carried out by the audited entity. The cost values of the activities must be taken from official documents validated and reported by the management to the audited entities to the higher hierarchical structures (such as the quarterly and annual financial statements, the projected budgets and their execution).

The *risk analysis* is prepared by the audit team and is verified from the point of view of the correctness and adequacy of the information by the head of the Internal Audit Department/Section, who signs it and does it on each auditable activity within each objective of the audit mission of regularity/compliance.

Compared to the current form of risk analysis, we advance the following proposals:

- reviewing the ways of determining the risks and their impact in the internal audit activity of regularity/compliance, capitalizing for this purpose the valences of the COSO risk management model (in particular – COSO Guide-Risk Assessment in practice (Deloitte & Touche LLP 2012) and the other suggestions made above;
- the analysis system thus developed, can be considered a diagnostic system that can provide all the necessary data for this process;
- purchasing at the level of the communications department better computer programs for internal auditors than those currently used, which can process faster and more accurately the considerably much and complex information involved in the risk analysis and assessment process.

The purpose of *Procedure P-08 – Initial assessment of internal control and setting of audit objectives* is to analyze the degree of confidence that the internal audit team can have in the internal control system associated with the activity being audited and it involves the following steps: establishing the expected (minimum) internal controls for each auditable activity or identified risk, as appropriate; identification of the existing internal controls for each auditable activity or identified risk, as the case may be; the initial assessment of the conformity of the internal control by comparing the expected internal controls with the existing ones.

If the existence of internal controls for the management of risks assessed by the audit team as high is not identified, the auditors ask questions in the internal control questionnaire to clarify the existence or non-existence of controls.

The internal control questionnaire contains questions related to: the evaluation of the planning of the audited activity in relation to the normative requirements and the real needs of the entity; verifying the observance of the legal and procedural provisions regarding the organization of the procedures that must exist in the field being audited; verification of compliance with legal provisions related to the effective conduct of activities in the field being audited.

The initial evaluation of the internal control is performed by using a 3-level scale, as follows: compliant; partially compliant; non-compliant.

Following the initial assessment of internal control, the audit team establishes the objectives, auditable activities and associated risks involved in the audit process.

The following activities must be selected for audit: all high-risk activities (regardless of the initial assessment of internal control); activities with medium risks for which the initial assessment of internal control has been established as "partially compliant" or "non-compliant"; low-risk activities for which the initial assessment of internal control has been established as "non-compliant".

Related to this internal control questionnaire, my proposal is to "merge" the two questionnaires (the acquaintance questionnaire; the initial internal control assessment questionnaire) into one, called the "Preliminary knowledge questionnaire of the audited entity and of the internal control mechanisms", which would help to reduce the number of documents that do not differ much from each other both in terms of content and results provided, but which consume huge time and human resources.

The purpose of *Procedure P-09 – Elaboration of the Program of public internal audit mission of regularity* is to assign the tasks of the mission to each internal auditor and has the following content:

- the objectives within the mission program, which are the following: mission preparation; on-site intervention; mission reporting; following the recommendations;

• for each of these objectives the types of activities/actions (risks), the type of testing, the description of the testing, the number of tests, the duration in hours of the tests, the internal auditors performing these activities and the place of these activities.

Related to the Program of public internal audit mission of regularity/compliance, we propose the introduction in the structure of the Program (as well as in the model of the Service Order) of a statement stating that in the event that one or more auditors are replaced during mission, or if a number of issues arise that could alter the data originally entered in the Program, a new up-to-date Program will be developed that accurately reflects over time the activities planned and performed by each member of the audit team.

Current structure and our proposals for the configuration of the internal audit guide of regularity/compliance with the part of the methodology regarding the on-site intervention

This part of the internal audit mission of regularity/compliance involves:

• collection and analysis of audit evidence;

• reviewing documents and compiling the audit file;

• closing meeting.

Regarding the part related to the on-site intervention in a regularity/compliance audit mission, the following procedures are inserted: P-10 – Carrying out the tests and formulating the findings; P-11 – Problem analysis and formulation of recommendations; P-12 – Analysis and reporting of irregularities; P-13 – Reviewing documents and compiling the audit file; P-14 – Closing meeting.

The purpose of *Procedure P-10 – Carrying out the tests and formulating the findings* is to collect audit evidence necessary to meet the mission objectives, for which purpose the tests mentioned in the approved audit mission program are performed.

The *test* is prepared by the auditor and verified by the supervisor and the documents supporting the test findings (worksheets, checklists, questionnaires, interviews, as appropriate) are attached to it.

The test has the following content: the objective of the test; sampling method; test description; the results obtained after testing; conclusions.

In this part of the guide on conducting tests and formulating findings, we put forward two proposals:

• the choice by the auditors of a sample established on the basis of the risk analysis, which can lead him, as soon as possible, to formulate a conclusion/conclusions or the identification of a malfunction in a particular segment of activity audited;

• the development at the level of the General Directorate of Finance-Accounting, together with the IT specialists, of an IT / software program that can allow the export of data from the accounting system, the salary system, from the INTEND and MENTEC systems (programs in the logistics area) of units, in a dedicated platform of the Internal Audit Department/subordinate structures, data that can be analyzed and processed by the auditors, since the period of preparation the mission.

The purpose of *Procedure P-11 – Problem Analysis and formulation of recommendations* is to present, in an elaborate form, the dysfunctions identified after testing. In this sense, the *Form of identification and analysis of the problem (FIAP)* is elaborated by the internal auditors, in order to record the dysfunctions in order to elaborate the recommendations, it is analyzed by the head of the audit team, and it is supervised by the supervisor. Then, the FIAPs are discussed during the on-site intervention with the representatives of the audited entity, who will sign them, for information.

If the representatives of the audited entity refuse to sign the FIAP's acknowledgments, the internal auditors record these documents in the Classified Documents Department of the audit structure and forward them to the audited structures.

The Form of identification and analysis of the problem (FIAP) has the following content:

• the problem that is the object of the file;

• the auditor's findings following the examination of the issue;

• causes for which certain provisions related to the object document of FIAP, were not observed;

• the consequences of non-compliance with certain provisions related to the subject matter of FIAP;

• recommendations made by the internal auditor to eliminate the shortcomings found and recorded in the FIAP.

Regarding this *Form of identification and analysis of the problem (FIAP)* the following proposals are made:

- the transmission / making available to the decision-makers of the unit of these online forms, to be studied, by the auditors;
- deleting the date from the field intended to be read by the representative of the audited unit, as it may create some differences of opinion and different legal interpretations regarding, for example, the date/time when the representative of the unit was notified and must order execution of the administrative investigation.

The purpose of *P-12 – Analysis and reporting of irregularities* is to document and transmit, according to the legal provisions, the irregularities found during the audit mission. *Irregularity* is a serious dysfunction that requires immediate corrective or investigative action, without waiting for the audit mission to be completed.

The establishment of a dysfunction as an irregularity is made by the internal auditor, strictly based on professional reasoning, depending on the duration or other limitations of the mission, the severity of the consequences, the urgency of ordering measures to correct/recover the damage.

If an irregularity is identified, the auditor prepares the *Form for finding and reporting irregularities (FFRI),* which is supervised and then forwarded to the Head of the Internal Audit Department for information to the Minister of National Defence.

The Form for finding and reporting irregularities (FFRI) has the following content:

- the issue that is the subject of the file;
- the auditor's findings on the irregularities found;
- normative acts violated as a result of the irregularities produced in solving the problem by those audited;
- the legal and other consequences as a result of the irregularities produced in solving the problem by those audited;
- recommendations made by the internal auditor to eliminate the shortcomings found in the correct and legal resolution of the issue for which the file was prepared.

In connection with this form, we propose:

- the development by IT specialists at the departmental level (to support the Internal Audit Department) of software that would allow the maximum use of the possibilities of automation and digitization of the internal audit activity, in the area of regularity/compliance missions, taking from the experience of the most advanced specialists in the field, including through the use of advanced technologies such as RPA – Robotic Process Automation that can become operational for the military;
- the transmission of the form for finding and reporting irregularities (FFRI) to be done in electronic format in compliance with the legal norms regarding the protection of classified information;
- the modification of the current regulation from the Methodological Norms regarding the exercise of the internal public audit in the Ministry of National Defence, approved with the Order of the Minister of National Defence no. M. 67/2014, in the sense that this should be done in 3 working days and not in 3 calendar days;
- removing from the content of the FFRI the rubric of recommendations, because the irregularity is reported hierarchically to the minister who has the legal authority to order measures accordingly.

The purpose of *Procedure P-13 – Reviewing documents and compiling the audit file* is to verify, once again, the adequacy of the evidence supporting the identified deficiencies. To this end, the internal auditors shall draw up a *Centralizing note to the working documents* that must be verified by the mission supervisor.

The Centralizing note of the working documents has the following content: the finding; supporting documents/audit evidence; whether they exist or not; the auditors who prepared the working documents. As a proposal, we consider that the *Centralization note of the working documents* should also be made and transmitted in electronic format to the persons involved in the elaboration and management of such a document.

Procedure *P-14 – Closing meeting* is to present to the management of the audited structure the findings, conclusions and preliminary recommendations of the internal auditors, resulting from the performance of the tests. *The closing meeting* also takes the form of a document that has in its first part data on the list of participants (from the Internal Audit Department and those audited, with name and surname; position; structure that is

part of), and in the final part there is the transcript of the meeting and the signatures of the participants in this activity.

Our proposals for this closing session address two issues:

• the closing meeting should take place in the future also in online format, with the participation of the representatives of the audited entities and of the auditors;

• the conciliation meeting, if any, may take place during the closing session.

Current structure and our proposals for the configuration of the internal audit guide of regularity/compliance with the parts of the methodology regarding the reporting of the results of the mission and the follow-up of the recommendations

This part of the internal audit mission of regularity/compliance implies in the section of reporting the results of the mission, the following: elaboration of the Project of the public internal audit report; elaboration of the Report of the public internal audit. The final stage of such an internal audit mission is to follow up on the implementation of the recommendations.

Regarding the reporting of the results of the mission and the follow-up of the recommendations, the following procedures are inserted in an audit mission of regularity/compliance: P-15 – Elaboration of the Project of the public internal audit report; P-16 – Transmission of the Project of the public internal audit report; P-17 – Conciliation meeting; P-18 – Public internal audit report; P-19 – Dissemination of the Public Internal Audit Report; P-20 – Supervision; P-21 – Follow the recommendations.

The purpose of *Procedure P-15 – Elaboration of the Project of the public internal audit report* is to present, in a structured manner, the findings resulting from the audit mission. In order to prepare the project of the internal public audit report, each auditor participating in the assignment must submit to the auditor who prepares a document with the findings, dysfunctions and recommendations related to the objectives set for him.

We make the following recommendations regarding the elaboration of the project of the public internal audit report:

• to present, analyze and evaluate the objectives whose degree of risk, resulting from the analysis performed by the audit teams, is medium and high, in order not to load the report with data that do not add value to the management of the unit or help it;

• the value judgments inserted in the report must be oriented towards the aspects that aim at the main activity of the unit, towards its mission and specific activities;

• the objectives of the audit should be oriented and adapted to the model, to the concrete specifics of the unit, and the conclusions or assessments resulting from these reports should be understood by both the auditor and the audited;

• opinions and conclusions should be focused on elements of quality and not quantity (how voluminous the audit report is).

In connection with *Procedure P-16 – Transmission of the Project of the public internal audit report*, our proposal is to use the electronic version in the form of RDE, or through INTRAMAN for the transmission of this report.

The purpose of the *Procedure P-17 – Conciliation meeting* is to discuss the views of the audited structure on the project of the internal public audit report elaborated, and the *minutes of the conciliation meeting* is drawn up for this purpose. The internal auditors have the obligation to organize a conciliation meeting within 10 calendar days of receiving the views and requesting the audited structure.

In connection with *the reconciliation meeting*, we make two proposals: to hold the conciliation meeting with or during the Closing Meeting and, of course, to adapt the legal regulatory framework in this regard; the modification of the procedure regarding the decision of the final form of the findings, conclusions and recommendations (to be the attribute of the Head of the Internal Audit Department, when the conciliation meeting takes place between a territorial audit structure, and the final decision to be the attribute of the Minister of National Defence, when the conciliation is run between Internal Audit Department and a structure in its area of competence/responsibility).

Procedure P-18 – Public internal audit report is intended to present, in a structured manner, the findings of the audit mission, which included the changes agreed following the conciliation meeting. It must be accompanied by a summary of the

main findings and recommendations. Following the conciliation, the project of the audit report is amended as agreed in the minutes of the conciliation meeting, becoming the final public internal audit report.

As a proposal, we suggest the submission for reading and analysis of the audit report of regularity to the representatives of the audited entities, to be done in a first stage in electronic format, and after their confirmation of the content and final conclusions, the transmission by the auditors of the final form; it can thus be confirmed by the management of the audited entity, in a very short time (not necessarily 15 days, as is regulated on this date) that the audited entity is not to request a conciliation meeting.

By *Procedure P-19 – Dissemination of the Public Internal Audit Report*, it will be finalized form, following the mission performed in the audited unit, it will include the changes established in the conciliation meeting and will be disseminated for supervision, before being sent to the audited entity, in final form, including in electronic form.

The purpose of the *Procedure P-20 – Supervision* is to ensure that the objectives of the internal public audit mission have been met in a quality manner. In the event of any ambiguity between the supervisor and the internal auditors, they shall prepare the *Document Supervision Note*.

In the process of supervising the Final Public Internal Audit Report, we propose to use the electronic version, through which the supervisor might communicate with the internal auditors who performed the audit mission.

Procedure P-21 – Follow the recommendations includes as a key document *the Form of following the implementation of recommendations (FFIR),* which contains the following headings:

- presentation of each finding or dysfunction;
- the auditor's recommendation;
- the public internal audit mission;
- planned date/extension date/implementation date;
- how to implement the recommendation;
- the added value brought by the implementation of these recommendations.

As proposals and recommendations, we consider that the following would be welcome: FFIR to be made and transmitted in electronic format to the persons involved in the elaboration and management of such a document; to clarify the moment when a recommendation is considered to be implemented, because this aspect is not yet well defined; therefore, we consider that a recommendation made by the auditors is implemented by the audited unit when the purpose for which that recommendation was made has been achieved.

We are convinced that these proposals, but also others, possible and necessary, can be considered by the Internal Audit Department, for the configuration of a new internal audit guide of regularity/compliance, better anchored to the new realities and requirements of the Romanian Army.

Conclusions

The research sources that we used in writing this article were relevant and useful to our approach and consisted in:

- the basic regulations currently existing at national level in the field of internal public audit regarding the missions of regularity/ compliance;
- various models of guides already used by the Internal Audit Department of the Ministry of National Defence and first of all the regular audit guide for public procurement;
- the conclusions drawn by us following the application of questionnaires among a significant number of auditors and audited from the army based on the Balanced Scorecard Model;
- the challenges of the new socio-sanitary phenomenon generated at global and national level by the Coronavirus Pandemic;
- new research and achievements obtained in recent years by theorists and practitioners in the field of public internal audit.

We managed to make consistent proposals for the audit guide of regularity/compliance usable in the entities from the Ministry of National Defence, as compared to the version configured by the Internal Audit Department, for the following parts of the document: risk analysis; the initial evaluation of the internal control; the format of the form of identification and analysis of the problem (FIAP); the format of the form for finding and reporting irregularities (FFRI); suggestions on the key issues that the report of the internal public audit of regularity/compliance should contain.

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ASPECTS REGARDING MULTINATIONAL LOGISTIC SUPPORT IN NATO OPERATIONS. LIMITATIONS AND CONSTRAINTS

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Within the North Atlantic Treaty Organization/NATO we have in most cases operations and activities supported in a multinational environment, diverse and especially different in terms of technology and levels of training. The logistics of military actions is one of the pillars and basic factors taken into account right from the moment of their preparation, which initiates a widespread need to understand the phenomenon of multinational logistical support, both tactically and operationally, as well as issues related to legality, funding, responsibilities, limitations and constraints. We also believe that multinational logistical support must primarily reflect the interests of the state and, secondarily, the obligations of the state that generates the logistical support in accordance with the treaties, conventions and alliances to which it is a party. At the same time, we believe that the harmonization of national strategic cultures and logistics cultures is a major challenge that will find a rather difficult answer. Also, noting the current technological advancement but also the growing threats of Russia, we believe that defining on the territory of one of the NATO member states on the eastern border a large and rapid reaction logistical support capacity would be one of the solutions for ensuring the least material support of NATO's eastern countries in the event of military aggression that would invoke Article 5. Major logistical support provided by the alliance could support frontline countries to military support from other members, thus decongesting the material burden, being able to focus on the conduct of combat actions.

Keywords: multinational logistics support; NATO; guidance; economics; logistics operations; financing.

Introductory landmarks in multinational logistic support

In a world in perpetual development, in which the level of interoperability knows values and levels unprecedented to this day, the challenges that arise are just as great. The challenges that NATO faces, especially on the eastern border of the alliance, determine ample military actions that take place in a multinational military environment (NATO 2019), actions through which the logistical support brings its contribution to a great extent.

Before identifying the main logistical challenges in NATO military operations, it is useful to approach the field of logistics in a general understanding. "Within the military organization, logistics is the field that materializes ensuring all the conditions for large units and units to fulfill their missions in the best possible conditions, involves the harmonization of the activities of specialized departments, so that, overall, logistics is carried out in conditions of efficiency and economy, and the combat troops should benefit from maximum logistical support at the right time and place" (Milandru 2015, 41). Logistics deals with the management, planning and implementation of the movement of resources and the support of the armed forces from the point of origin to the theater of operations and once the operation is completed, back to the point of origin. This includes transportation, maintenance, subsistence supply, ammunition, clothing, field services such as waste disposal, construction and operation of camps, guarding and security, infrastructure support, medical support and other services such as providing and maintenance of communication networks.

Timely and effective delivery of services is a crucial element of logistics. An operation will be difficult or blocked from the beginning to fulfill its mission, if the troops and equipment are not in time in the area of operation, if the force cannot be moved once deployed, or if supplies such as food and drinking water are not delivered on time. In addition, sustainability is an important issue and the flow of goods and services must be guaranteed. Logistics involves a chain of services whose disruption has immediate consequences

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on the overall efficiency and effectiveness of an operation.

The main challenges in the field of logistics are often summarized in the so-called 4D formula: distance, duration, destination and demand (Pap, Venekei 2018), these being simplified in Figure 1. This figure determines the most common challenges in planning and executing any logistical support action, be it tactical or strategic, local, national or multinational.

as Logistic Leading Nation / LLN, Logistic Role Specialist Nation / LRSN, Multinational Integrated Logistic Unit / MILU, Multinational Logistic Unit /MLU but also the use of economic operators through Contractor Support to Operation / CSO are intrinsically necessary for military operations to be both successfully met but also with a low logistics mark coupled with reduced operational costs.

These modes of multinational logistical support are used within the North Atlantic Treaty

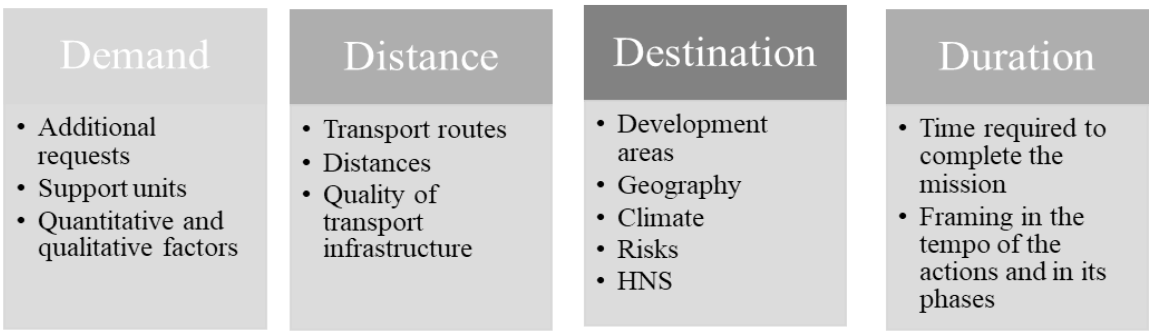

Figure 1 *Simplified 4D analysis*

These issues need to be taken into account when planning the logistics of an operation and anticipating challenges. The logistics parameters differ for each management context of the operation and must be adjusted to the realities of the operating area and the limitations of the support chain. Limitations are likely to occur, especially given the variety of actors operating locally, nationally and multinationals, various government actors, contracting companies, non-governmental organizations, North Atlantic Treaty Organization / NATO, non-NATO, European Union / EU institutions and engaged international partner organizations. (Wade 2018).

With the shift to forward-looking stocks and operations, NATO's position on logistics and the way it operates has changed, and in an attempt to limit the costs of operations, multinational logistics support solutions have been encouraged to lead the action, to be dissipated and to increase both the efficiency and to significantly increase the ability to advance, the displacement, the flexibility but also the use of the specific national expertise in support of the combat forces. Thus, in the following lines we will describe the ways of operating this type of logistical support, as well as their relevance, usefulness and key features. Operating modes such

Organization/NATO, both for the spectrum of military operations and for exercises, including those conducted with other non-NATO state actors.

We also have several types of multinational logistical support (NATO 2021) (NATO 2018):

• pre-planned reciprocal logistical support, including Host Nation/HNS Support, CSOs, mutual support agreements - Mutual Support / ASM Agreements and cooperation between National Support Elements/NSEs, which are concluded bi- or multilaterally by NATO and/or nations;

• a country formally supporting the operation as an LLN or LRSN formally initiates the provision of logistical support or a range of services to all or part of the multinational coalition, in which case the command authority is the commander of the NATO / JFC joint force, but national control is what is manifested in the services and support provided. Order. To fulfill the role of LLN or LRSN, nations can use their NSEs;

• one or more nations formally undertake to provide support to all or part of the multinational force, under the operational/OPCON control of JFC NATO; this type of support also applies to MILU participation;

• one or more nations formally undertake to provide support to all or part of the multinational force through the formation of MLUs, in which case the NATO JFC is the commanding authority, but the support or services provided remain under strict national command. (European Defence Agency. 2022)

All these types of materialization of multinational logistical support have a different logistic mark both from an operational and financial point of view but especially, at certain moments or conjunctures, they contradict the national interests in many respects.

• finances;
• engineer support;
• confessional support;
• funeral services;
• support of contractors in operations;
• civil-military interaction;
• the support of the military police.

Benefits, limitations and constraints

The responsibility assumed when signing and assuming multinational support must be well understood both in terms of the benefits created later by acquiring certain privileges or capabilities

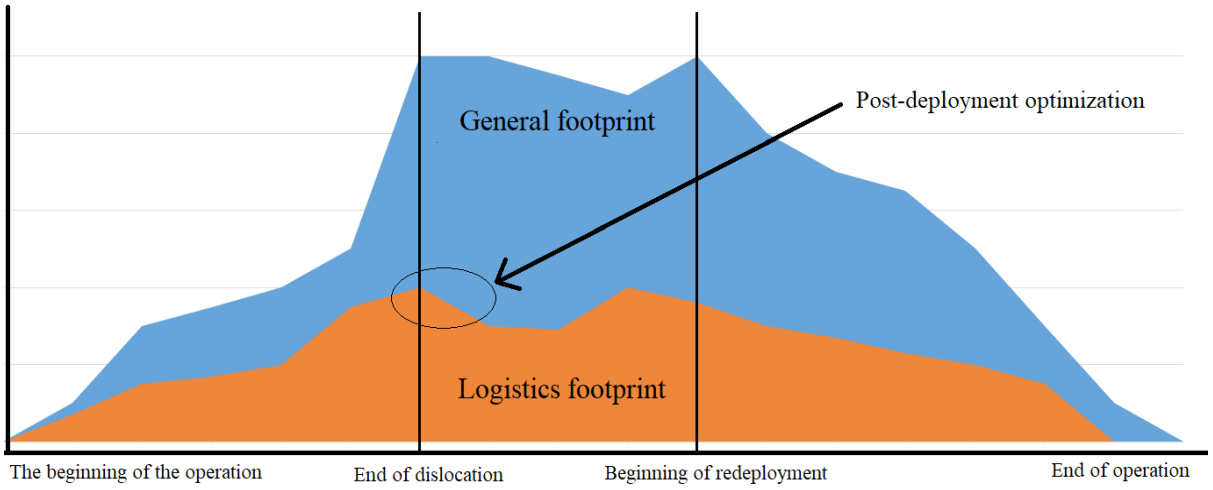

Figure 2 *Logistics mark within a general mark of a joint force*
(Doctrina logisticii întrunite a Armatei României 2020)

According to STANAG 2182, edition B, version 1 of 2018 which refers to the Allied Doctrine of the Joint Level for Logistics (AJP-4), identifies the functional areas of logistics in the following way (NATO 2018):

• supply;
• life-cycle support for materials and equipment;
• equipment maintenance;
• movement and transport;
• campaign services;
• medical support.

At the same time, the functional areas are seconded by other related areas that increase the support and response capacity of the logistical support as follows:

• budget;

but especially in terms of the need for financial resources and staff, so this support should not be burdensome to own forces, thus creating a destabilization of national structures. Multinational logistical support must not run counter to national interests, overburden any structure and, above all, involve unnecessary forces and resources in these support missions.

The use of multinational logistical support significantly reduces the need for resources, equipment and personnel used in the process or phases of deployment of forces and means, and at the same time the nation that benefits from this means also has the capabilities and expertise provided by the guarantor nation (Major and Strickmann 2011). These combined aspects also lead to increased interoperability, a precondition

for viable multinational logistical support, which requires standardized practices, procedures and techniques, and a common language, all of which are established in NATO through Standard Operating Procedures / SOP and STANAG 6001.

Observing all these benefits, we deduce that by using this kind of support, certain constraints and limitations also appear, which can be summed up in two categories:

• *availability and capability* – the provision of support services by a nation may not be up to an acceptable standard or with a sufficient guarantee of availability to meet the requirements of a beneficiary nation. Lack of confidence or failure of a supplier nation to meet standard requirements will reduce the benefits of multinational solutions provided to the force and may increase operational risks;

• *national constraints* – access to appropriate support for a beneficiary nation depends on the priorities of the providing nation. Political pressure, some restrictive legal provisions, or the need to support one's own forces may limit access to key elements of previously agreed support. To eliminate deficits and to have the capacity to generate sufficient reserve capabilities, a close link between NATO, its subordinate logistics staff and the contributing nations is essential.

In many cases, certain national legislative limitations may slow down or even block certain support operations. Here we refer in particular to the activities related to public procurement from national funds, not being the shared budget present within the NATO units (lege [5].ro 2015).

In the case of multinational military actions, military leaders conduct their actions in interconnected and global environments. Operations are conducted and distributed simultaneously in several areas of operations, most of which are often alert. "These operations can involve a wide variety of forces and techniques, government organizations and multinational forces, which makes the current logistics environment encompass all these conditions and circumstances, resulting in several levels: strategic, operational and tactical (Pawelczyk 2018, 32)".

The strategic level defines the quality of the military campaign and should meet certain basic characteristics such as the industry and its capability to be able to support military actions, followed by streamlining the processes, services and agencies involved and ending with process optimization. with the required results (G4 2014).

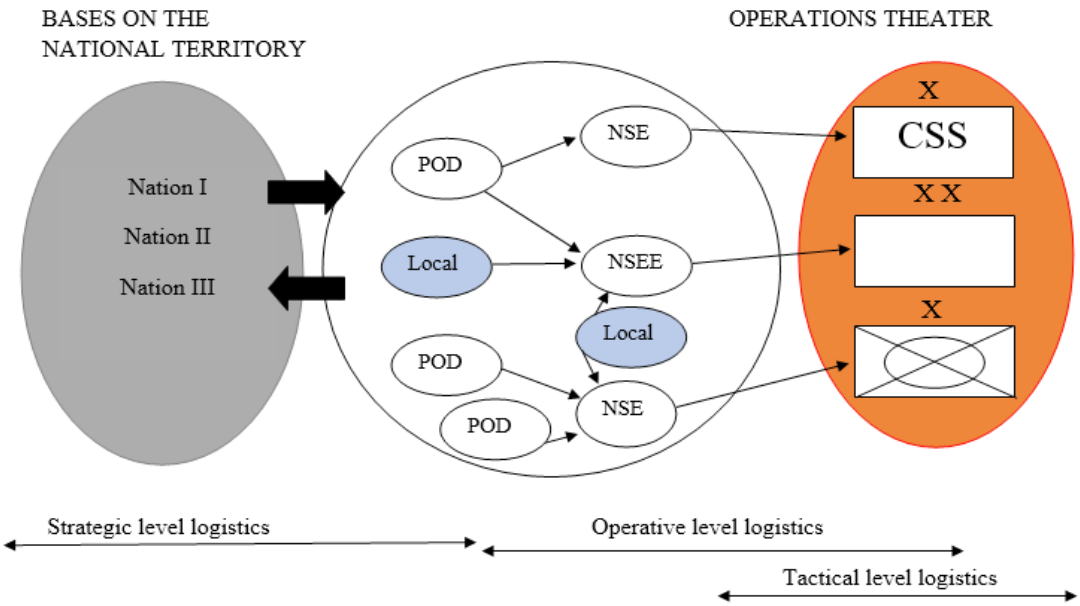

Figure 3 *Concept of joint multinational logistical support*

The operational level of this type of joint logistics support is coordinated, integrated and synchronized. The integration of common requirements by the commander into the national framework but also the optimization of support capabilities in line with the requirements of the upper echelon is the basic requirement of this level. At the same time,

it should be noted that the operational level is the most common in military operations, but also the one with the greatest impact for the multinational forces engaged in combat.

The tactical level is defined and expected to be predisposed to effectiveness. It has as its general characteristics the freedom of action, the measurement of the results and it is the bridge through which the optimization of the necessary results at the operative and especially strategic levels is conducted.

Today, after many transformations and reorganizations, the logistics are trying to be adapted to the requirements of the military body, interoperable with similar structures in the NATO armies.

The dynamics of security architecture requires the continuous improvement and adaptation of specialists in this field. Scientific developments and technological advances in the field of equipment and technical means constantly bring changes in the military endowment, and the logistical support specialist must keep up with various branches of the economy to meet the maintenance needs of troops as needed.

Conclusions

The crisis in Ukraine at the beginning of 2014 would bring the Alliance into the de facto reality of a new security environment, a reality characterized by the assertive behavior of the Russian Federation and the unpredictability of China and which, as a pressing necessity, required reconsideration of support from a threatened Member State, to discourage peacetime and, if necessary, collective defence against a deliberate attack.

In addition, recent challenges to the regional and global security environment have highlighted the need for the Alliance to be able to respond effectively to deter and counter the full spectrum of threats, both domestic and international, which equate to the ability and capacity to deploy and sustain, simultaneously, operations and missions, both for collective defence and crisis management, and the design of stability and the fight against terrorism, beyond its borders.

Noting the importance of logistical support for multinational operations (NATO 2012), we can draw some conclusions about the mode of operation and the future of these actions. We believe that the future of logistical support of NATO-led multinational operations must be exclusively multinational with support funding, but especially specialized expertise from countries that have conducted operations in those areas or with the expertise of the state in which the operation takes place. Multinational support must be standardized, even to the tactical level, so that there is a clear overview of the operational or strategic level command. Standardization of logistical support units must be one of the priorities of NATO Member States, as in some situations there are discrepancies and discomfort on the part of multinational structures supported by certain host nations, a discomfort that occurs from the waiting level of the beneficiary structures to the level of insufficient budget from the state of the structure providing logistical support.

U.S. Marines Admiral Henry E. Eccles stated, in his 1959, *National Defence Logistics Manual*, that "The essence of flexibility is in the mind of the commander the substance of flexibility is in logistics" (Eccles 1959, 64). We note, therefore, that any action, no matter how well it is organized and executed, no matter how motivated the troops may be, and no matter how well-performing the technique may be, the pace of the battle cannot go faster than the logistical support can provide. Any schism in the actions of logistics and combat troops can in most cases lead to the loss of combat, with enough relevant examples in World War II.

However, it is important to emphasize that such a level of capability, credibility and relevance depends mainly on the Alliance's ability to make available and deploy promptly the support needed to strengthen the forces/elements put forward, deliberate decision-making, deliberate contingency planning and preparation and, last but not least, through the effective capacity to project and support the full response force that NATO can generate.

Logistics is and will remain one of the basic elements and pillars of military action (NATO 2022), and by understanding its limitations we can distinguish between victory or defeat, from an action that failed due to insufficient logistical support or a victory in which the limited approach has allocated enormous financial, material and human resources and the benefits that the victory has generated are insignificant compared to them.

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RETRO RUNNING – A TREND IN THE PHYSICAL TRAINING OF THE MILITARY

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Running is one of the simplest and most practical ways to keep your body fit. Retro running is an excellent way of training that must be introduced in the process of systematic physical training of the military, being remarkable for the development of the conditioned and coordinative abilities necessary to improve their physical performance. It will develop the cardiovascular system, tone the muscles and strengthen the bones and ligaments throughout the body.

Keywords: military physical education; retro running; treadmill; training; exercise; physical training.

There are many types of running practiced by the military, regardless of their level of fitness. These have emerged over time, following a process called generically *trial and error*, which involves discovering the best way to achieve a desired result or a correct solution by trying one or more ways and means and by scoring / eliminating errors or causes of failure. If you want to get the best results from the workouts you use, you will need to try to use all these types of running. You can diversify them according to your preferences, combining two or more in one workout, but in the end and performed separately in their basic form, these types of running will help you become a better runner.

Retro running has a number of significant applications in military physical activity, both as a system of action in military physical education sessions and as a tool for recovery in the management of various lower limb injuries. Retro running is a powerful sport-specific training tool. The military must be able to move quickly and resolutely, using all means of running. Training programs, such as shuttle running exercises, in which the soldier has to move back and forth at high speed in a short period of time, are effective in developing retro running skills.

Incorporating retro running into an interval or intermittent running program has a positive effect on both the musculoskeletal system and the cardiovascular system. In addition, retro running stimulates the fast-twitch fibers present in the muscles of the lower limbs, suitable for explosive movements, based on strength and power. Through its research programs, sports science confirms that the introduction of new movements that are a variation of regular training, tend to reduce the likelihood of injuries during physical training.

At first glance it seems an unusual form of movement, but running backwards is more used than it seems. In fact, there are many sports (such as football, handball, basketball, etc.) that use it in daily training programs, especially in the sequence of preparing the body for effort. Referees are also the ones who use retro running very often during a match, because they have to be constantly facing the player who has the ball.

Retro running – let us try to run back and forth

Retro running, also known as back running or reverse running, is simply a backward run. It is not as well-known as barefoot running (also called natural running) and should not be confused with the running in which retro footwear is used, which takes over the lines and style of the past decades and has become widely used in recent years. By learning to systematically alternate running back and forth in your training, you will gain several benefits, such as reducing the aggressive impact that normal running has on your joints.

The pioneers in this new training method were the Americans. At the beginning of the last century, big names in American sports, such as William Muldoon (Greco-Roman wrestling champion, pillar of New York sport for over 50 years), Gene Tunney (professional boxer) or step dancer Bill Robinson (who was claimed to be able

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to run back faster than most men could normally run) used backstroke in their fitness programs. But this method gained full recognition, gaining some popularity among athletes only in the 80's. During this period, the Gray Institute specializing in research, development and innovation in applied functional science, used the technique of walking and running backwards for physical recovery of the sick. Professor Barry Bates was among the first to publish his research, mentioning some of the benefits that this running technique brings to the human body (University of Oregon 2022). Dr. Robert K. Stevenson published a book on the subject for the general public (Stevenson, 2014), and the Frenchman Christian Grolle tried, in his writings, to convince athletes and coaches of the many benefits of this type of running (Grolle, Carole, Ahau and Christian Ahau 2009).

Retro running is a skill that needs to be learned, and when you are able to understand the biomechanics of this way of running, you will be able to evaluate your own style of running and observe other ways to improve it. Using the retro running technique, you should move while keeping the lower limbs parallel to the direction of travel, and the shoulders and head should be twisted (left or right) to see the surface to be run, even if the experienced retro runners get to perform this movement very rarely. Because the head is facing forward, in running back a runner will see very little of what is on the ground in his path. Unlike normal running, if you stumble, it is much more difficult to recover or cope with a fall on your back. Turning your head while running can generally eliminate visual impairment, although this limits speed and can cause tension in the neck. Exercising backwards by performing specific movements of the arms and legs during exercise (such as crab walking, backward running, crawling back, etc.) can help prevent injuries that can occur in the event of a back fall. Today, retro running has become a well-established discipline, thanks to teams of researchers who have demonstrated the validity of its safe practice (Technogym 2022).

To demonstrate the effectiveness of retro running, a research study conducted by the University of Milan found that in retro running there is more pushing force (when detached from the ground) and less braking force (when landing on the ground), which has a positive impact on the joints. Compared to normal running, in a retro run there are more muscle fibers involved that are subjected to less effort (with more energy consumption and less physical performance), but which are less prone to injuries (Cavagna, Legramandi and La Torre 2010, 339-346). Some athletes who are passionate about running also include the retro version in their training, because this way of running will improve their ability to run forward, being an effective aid for both conditioning and rehabilitation, being recommended for those with knee medical problems. A study conducted in 2012 showed that retro running has a lower impact on the knees and burns more calories when performed at a moderate and even tempo. Students at an American university who introduced their retro running to the training program, which they practiced for 15-45 minutes / three times a week / for six weeks, lost a percentage at the end of the experiment, namely 2.5% of body fat (Morton 2016, 149-152).

The human body is designed to move more efficiently forward rather than backward and the maximum speed of the retro runner cannot exceed 80% of the maximum normal running speed, even though investigations have suggested that runners perceive the same intensity of effort in both cases (Williams, 2020). If the goal of retro running is to improve your cardio fitness, a good indicator of your overall physical health, and a predictor of your long-term health, then this may be an important alternative running technique. Here are some of its benefits:

- *it improves posture*. Running with your back foreward involves a natural change of posture, causing you to adopt a vertical posture (with your shoulders pulled back and your back straight), promoting realignment of the vertebrae and relieving pressure on the nerves, thus correcting posture during normal running;
- *the level of maximum aerobic capacity* (the maximum amount of oxygen that the body can use during exercise – VO_2Max) is about 20% higher than the anaerobic threshold of classical running;
- *weight loss results are better.* If the goal of your workout is to lose extra pounds, then retro running is the fitness regimen you have been looking for. It helps you burn about 30% more calories than normal running, with great effects on increasing your basal metabolic rate;
- *it reduces the impact with the ground* and, implicitly, the probability of injuries to the knee

joint (sprains, torn ligaments, meniscus injuries, dislocations, etc.). The running technique focuses on the heel that first comes in contact with the ground, while the knees act as shock absorbers. Retro running minimizes the transmission of the impact with the ground on the knee joint, allowing the development of muscles on its both sides, which will lead to strengthening the joint over time;

• *physical performance is improved.* When you run backwards, you need more physical effort in terms of movement, because it is more difficult to move from one point to another. This will increase cardiovascular and muscular endurance, two of the basic components of physical fitness that include flexibility, muscle strength and body composition, ultimately improving the body's overall endurance;

• *it reduces boredom.* Long distance running can be a tiring and tedious activity, and adding retro running to your workout can turn it into a fun, exciting and varied activity. To overcome the stagnation period or to get out of a runner's work routine, running back incorporates a new and varied element in every workout, especially if it is practiced in a group. Thus, you will have health benefits, and your mind will be busy throughout the running session;

• *it increases muscle mass.* Running backwards not only strengthens your muscles, but also makes certain muscles of the lower limbs (such as the calf, tibia and quadriceps and femoral muscles) more toned as you reach greater muscle strength;

• *it stimulates brain activity.* Any change in your daily workout routine by activating other muscle groups is good for your brain health, as it causes you to think differently and react differently;

• *it improves vision and peripheral vestibular sense.* Retro running involves movement that is partially independent of the perception of the path through sight, which allows the development of other senses (such as the auditory sense), although this will also help to improve the quality of vision and peripheral balance.

Running with backwards is a less natural movement, but it can be done with some speed after a few specific training sessions. At first, to get used to the sensation, it is recommended to start practicing reversing, which is relatively easy to perform, and then gradually increase the distance and speed of movement. Once you feel comfortable with this, try an easy run. Every time you feel used to it, try to move a little faster or farther, and soon you will find it almost as comfortable to run backwards as you run forward. Looking where you are going during the retro runs is essential to stay on track and avoid injuries. But looking too much is not good either, because every time you look back you have to turn your head and body, and your posture will be compromised, having a negative impact on your retro running technique. The more you practice running backwards, the more confident you will become and the less you will feel the need to look back.

Starting this way of running in a safe area where the ground is level, such as an athletics track, is the perfect way to gain confidence in retro running, as there are fewer obstacles and there are color markers useful to help you stay in the right direction without having to constantly look behind you. To avoid this, you could easily run with a partner to guide you on the path, so that you can focus only on running. Another piece of advice, of course, is that you need to be careful when running backwards and practicing controlled falls (martial arts fall techniques, such as: falling backwards, falling sideways and rolling backwards). If you feel you are losing your balance, do not panic and try to land smart, cushioning the shock of the fall (remember the school of judo fall - ukemi), to disperse the impact with the ground and to protect the joints and head more affected by uncontrolled falls). Alternatively, you can wear a helmet if you are worried that you will fall or if you practice on hard surfaces or uneven terrain. Just like normal running, running on hills (uphill or downhill) can add an extra degree of difficulty (Marathon Handbook 2022).

Technically speaking, running backwards is a whole new kind of exercise for your body. You should definitely make sure that when you run backwards you will put the weight mainly on the front of the foot and the heels should almost never touch the ground when you run. It is also a good idea not to lift your feet too high from the ground, as this saves energy and does not put too much pressure on your hip and knee joints. Retro running, if done incorrectly, can quickly lead to stiff neck muscles. To avoid this, you should change your line of sight as often as possible, that is, alternately looking back over your left shoulder and over your

right shoulder. In this way, a good balance will be created and you will avoid neck pain at the end of the run.

The first step you need to take to start running backwards is, of course, to take a step back. But this is not enough, because running with your back is an unnatural activity, at least in the beginning, and it is necessary to use each part of the body very well in order to maintain a constant balance and to avoid falling. Therefore, it is very important to keep your back straight, not to bend your knees too much and to touch the ground more with the tip of your feet, which must always move in unison with your arms, as in a normal run. The movement of the arms is really essential, because in addition to maintaining balance, it contributes to increasing the propulsive force (at least as much as the legs). Once you have found your center of gravity, the second step is to get rid of the urge to turn around and look where you are going, which will allow you to run faster and be more stable (Cuore 2022).

Running backwards is a completely new form of exercise for most soldiers. So the most important thing is to start gradually. For example: at the beginning you can start with a 200-meter retro run, twice a week, during or at the end of an endurance run. Then this distance can be slowly increased by 100-200 meters every week. The immediate goal (medically established and certainly feasible) should be to be able to run at least 1000 meters backwards without muscle pain or anything like that (Thomas Dold 2022).

In 2005, a group of Austrian, German, Italian, Swiss, and French athletes formed the *International Retro Running Association (IRRA)* to promote this practice, which is still unknown to many, and to organize sports competitions. The first edition of the World RetroRunning Championship took place in Rotkreuz, Switzerland, in 2006 and had only 4 competition events (100 meters, 400 meters, 3,000 meters and the 4 x 100 meter relay), and since then they have been organized periodically, every two years. In addition to this world competition, the Retro Challenge is held every year (a circuit divided into twenty competitions that take place in different locations in Italy), Backwards Mile (an annual competition that takes place in Central Park in Manhattan, New York), the Championship Central America and more national races. Retro runners from all over the world gather at these competitions to compete in back-running all traditional athletic distances (currently the events are: 100 meters, 200 meters, 400 meters, 800 meters, 1,500 meters, 3,000 meters, 5,000 meters, 10,000 meters, 4 x 100 meters and 4 x 400 meter relays, half marathon) (Wegner, 2010).

The rules of retro running are the same as those of the classic athletics events, very well known by those who work in the field of sports, plus some specific clarifications:

- before the start of a race, the ankles must be behind the line marking the starting line;
- for speed racing, the use of the block start is optional. It will be placed in the same way as in athletics, and when used, one leg should be supported only on the front support;
- in the same test, at the first wrong start the athlete in question receives only a warning, and at the second false start the athlete will be disqualified;
- the whole toe should be positioned at the back of the heel towards the heel while running;
- in tests where you do not run down the aisle, competitors who are moving faster than you must be allowed to overtake you, as a hindrance is prohibited;
- crossing the finish line is counted at shoulder level.

Reverse running is not a new concept, but it seems to be one of the biggest fitness trends, in a continuous increase in popularity, probably due to the benefits it offers to complete the classic running. In the pursuit of optimizing physical performance, athletes typically use a variety of training methods designed to reduce injuries and improve athletic performance. Running backwards, which has been used to prepare athletes for the requirements of the competition or in the programs of reintegration into the physical activity of those who return after an injury, is such a method.

Retro walking and running on the treadmill

Walking backwards on the treadmill or even running backwards on it offers multiple benefits to the body. In addition to the fact that this type of movement will tone your various muscle groups, it will also help you to improve your balance, and your heart rate will increase, making it a good option for interval training (Masumoto, Galor, Craig-Jones, Mercer 2019, 269-275).

If you exercise regularly, research has shown that running backwards can reduce the risk of injury and improve physical performance, as mentioned in the previous chapter. This works by developing strength, the ability to generate strength and speed and to coordinate movements (muscle strength), especially the muscles of the lower body, while also improving the ability to safely change direction and direction running (Uthoff, Oliver, Cronin, Harrison, Winwood 2018, 1083-1096).

If this is your first time running on a treadmill, then you need to start at a low speed. You may find that it is a challenge at first to just go the other way, and increase your speed in future training sessions as you begin to feel more comfortable.

Most treadmills have a relatively low starting speed (about 1 km/h), and in order to get a good posture and a technically correct joint movement, you need to start with the lowest possible speed. The moment you feel that you have adapted and you can easily maintain that pace, you will gradually increase your speed by 1 km/h. You should allow at least a few minutes for each speed of the treadmill before increasing to the next step, to allow the body to fully adjust to the pace, before increasing the intensity and asking it to move faster.

As you begin to move at higher speeds, you will probably feel that certain muscles are being used more intensely than you are physically stressed while moving forward. These include the quadriceps muscles (located in the front of the thigh, responsible for the extension of the knee and the flexion of the thigh), as well as the muscles of the hind leg (located behind the tibia, being responsible, in particular, for the flexion of the leg on the calf). Therefore, establish short series of retro walks when you start. Also, at the beginning it is better to vary either the duration of a series or the speed of movement, meaning you have to add intensity either going faster or more, but do not change both in the same training (Verywellfit 2022).

Of course, the side handles of the treadmill should be used at the beginning, the backwards being done with the hands supported by them, until the moment when you are sure enough that you can keep your balance. Walking backwards keeps the body active, requiring more abdominal and postural muscles to support the body in an upright position, and if they are not strong enough, you will risk falling off the treadmill. Also, the legs, hips, and muscles that control your ankles should work harder to maintain a coordinated movement while walking or running backwards. So, if you notice a weakness in any of these areas, which could make you stumble, it would be advisable to continue using the handles. First use one hand for support, as an intermediate step in moving backwards, without the help of the side handles of the treadmill.

You do not have to spend a lot of time going back and forth to reap the benefits. Therefore, aim to include only a few sets of backtracking in a training session in which you use the treadmill. Even if your ability to perform coordinated and precise movements in time and space is a developed one, it is recommended to stop the strap and use the handles for balance, every time you want to turn to move in the opposite direction.

You can also change your routine when you turn your back on a treadmill by varying your inclination. As in the case of speed, start gradually, first tilting the treadmill to the lowest level, because going this way, you will probably feel a burning sensation in the thighs. As you get stronger and you start to feel comfortable, you can increase the inclination of the belt as well as the speed, but not both at the same time, because the probability of unbalancing increases considerably. Increase the tilt or speed at a time, so that you can return to the original settings if you think it is too much for you.

Another option would be to vary the position of the body while walking backwards on the treadmill. As you go back, lower your center of gravity so that you are in a partially squat position, with your back straight and your body leaning forward. This will increase the tension in the quadriceps muscles and, as a result, this activity should be limited to about 30-60 seconds and omitted if you have medical problems in your knees.

Once you get used to this backward movement, you may find that you are ready to run backwards on the treadmill. In the structure of the first training sessions, which include running backwards on the treadmill, it is recommended to alternate the periods of running backwards with those of walking forward (or light running forward) for a few minutes. If you notice that it is difficult to maintain your balance, slow down until you reach a pace that suits you. As your body adjusts, you can increase your speed to increase the intensity of the effort, and when you feel really comfortable, you can add a certain inclination to the treadmill.

Walking or running backwards can be used to diversify the daily routine of treadmill training sessions, being a recommended exercise for those with an average level of physical training and experience in exercising. If you are having fun and starting to feel the benefits of it, it may be easier for you to maintain this type of long-term workout, which will eventually lead to better results.

Conclusions

Any soldier who is seriously interested in improving their athletic performance, fitness and outlook on life would do well to look more closely at retro running and its benefits. Running backwards may seem like an unreliable method and a waste of time for exercise enthusiasts, but it is not a bad thing to introduce a little fun into the training sessions, and if the research done was correct, then this change of approach could it also boosts the physical performance of the military.

Given the rigors of military physical education, instructors are constantly looking for effective training strategies to improve the physical performance of the military, while minimizing the dynamic load on the joints. Retro running could be a means of aerobic, anaerobic and neuromuscular training that does not overload the tendons and ligaments as much as normal running. The purpose of this article is to show that reverse running is not the lifeline for injury prevention or athletic performance, but rather an alternative method available to those in the field.

Similar to other methodological procedures for the development of various forms of motor skills, retro running (endurance or speed) should be practiced and developed accordingly. Depending on the competence and training objectives of the military and the current stage of training, different modes of retro running can be used to apply the principles of variation, specificity and overload. The integration of retro running, as part of a general program of physical training of the military, offers a new stimulus that brings physiological adaptations, completing the capacity of physical effort, which serves to increase the variability of training and avoids the monotony of traditional training.

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ORIENTEERING – A NECESSARY SPORTS DISCIPLINE FOR TRAINING THE MILITARY

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Today, the complexity of tactical operations and deployments is such that the body is essential for all military personnel, who must be able to interpret a map and be able to use a compass to move quickly and efficiently on the battlefield. Orienteering can be used to develop many of the qualities that are essential to a loyal, dignified, and honest military man. Finding your way to your destination gives you the guidance you need to navigate a complex and rugged terrain, while moving fast, combining orienteering skills and aerobic exercise capacity. To be competitive at this level, he must train regularly, not only to increase motor skills (such as speed and endurance), but also to acquire cognitive (mental) skills. Soldiers who engage in specific physical activity benefit from an increase in cardiovascular capacity, power, and energy that allow them to sustain physical or mental exertion for long periods of time, builds a certain level of self-awareness and develops a sense of team cohesion.

Keywords: military physical education; orienteering; land navigation; map; sports competition.

Field orientation has been an indispensable quality in human evolution. Without this capacity, primitive man would have found it impossible to survive in the immense unknown, in his eternal search for food. The construction of trade routes in antiquity also required thorough topographical knowledge, and the strategies of medieval wars involved the use of rudimentary "orientation maps" depicting settlements, massifs, and the water network.

Orienteering and the army have a long association over time. The history of orienteering begins in the late 19th century in Sweden. The current term "orientation" (derived from a root of a Swedish word meaning "to find direction or location") was first used in 1886 at the Karlberg Military Academy in Sweden, designating the activity of traversing an unknown terrain with the help of a map and a compass (Försvarsmakten 2022). In Sweden, the orienteering has evolved from military training to land navigation, to a competitive sport for military officers, and later for civilians. The Swedish military used specific orientation activities as methods of training the military to learn and improve their navigational skills, skills that were also applicable in a number of military scenarios.

Developed rapidly in the early twentieth century and spread rapidly throughout the world, orienteering is a competitive physical activity that combines the qualities of an athlete with the movement practiced in nature, bringing the sport much closer to the role it played at the beginning of its history: that of making strong characters in full harmony with the environment. Orienteering is the sport that consists in traversing a route, in an unknown terrain, materialized by a succession of control stations to be reached, the competitors choosing the route to move between the control stations, with the help of a map and a compass. Performance is determined by evaluating the two components, namely: reaching all control stations on the route (in the order established by the organizer) and the time in which the athlete travels the route.

Arriving in our country after the Second World War, orienteering gradually developed as a sport, now being known in the army, especially among military students. The military institutions to which they belong must form a representative orienteering team with which they have to participate in a Military Orienteering Championship, organized by the higher echelons. However, this does not mean that this sport is practiced organized by all military students, but only by a small group. Even if this competition is organized separately for the military within the military units, usually the groups of participating teams are mainly composed of graduates of military educational institutions, who have gained experience or obtained results when they were cadets/students. Orienteering is very suitable for use in military educational

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institutions, as the sport not only stimulates cadets' enthusiasm for physical training, but can also be used as an additional means to diversify practical military topography or military physical education sessions (especially those related to running in various terrains).

The benefits of orienteering

Orienteering offers many benefits, but its real attraction is that it is a fun physical activity. It is a joy to walk or run through the woods or across the fields. If you like to compete, there are many age groups and skill levels to fulfill this desire. The ultimate goal of the orienteer is to find the balance between mental and physical effort, to know how fast to move, in order to continue to interpret the terrain around him and to successfully choose the best route to the finish line.

Orienteering is a sport that can be practiced throughout life and that constantly challenges your mind. This provides obvious development of individual navigation skills as you solve problems in locating each checkpoint. Decision making is paramount: should I go left or right? Should I go up that hill or bypass a longer road? These choices, which must be made and which appear constantly during the competition, call for more thought than quick reaction speed or instinct; that is why orienteering is also called the sport of the mind. Moreover, these decisions are made under conditions of competitive stress and pronounced fatigue, which will help you in the future to become mentally tougher in other stressful situations. Orienteers learn to be autonomous, they are mostly individual orienteering competitions, but also in the forms of team organization, colleagues in that group of athletes usually practice individually to establish their soft skills.

Orienteering builds self-esteem, taking courage to walk alone through unfamiliar areas, especially unfamiliar forests. There are so many beautiful, easily accessible outdoor areas in our country and in the rest of the world that feeling comfortable outdoors triples the pleasure of being there. Every time you discover a checkpoint or reorient yourself so as not to miss the wrong route, your confidence will increase. The spatial-temporal relations help us to coordinate the action in a certain direction, to report the events in time and space. These become more developed as the guide needs to plan how to get from one place to another, how to figure out if the chosen route goes up or down and how far the chosen landmark is. Experienced guidance counselors have learned to be aware of their surroundings while planning what they will see along the way to the checkpoint, a talent that is also useful in everyday life. But how do you plan what you are going to see? Conventional signs and contours represented on the map will make this description for your imagination. Orienteering learners learn to recognize and use new resources, such as material resources (map and compass), individual physical resources (level of fitness), or mental agility (Healthfitnessrevolution 2022).

In addition to the fact that it is very enjoyable to run through parks and forests or to leave the trails to experience nature, being a trained and experienced orienteer can obviously be a useful thing that can sometimes save lives. In short, we could say that it would not be good to go the wrong way (direction) and not know where you are on the map. A complete definition of wandering has two parts. First of all, you do not know where you are, and secondly, you do not know how to get to a known location. Even if the orienteers temporarily move in the wrong direction, they have the skills and techniques to reorient and continue on their way to their destination. If you get lost, go straight back to the last checkpoint you went to. Even if you do not know where you are, if you manage to do this, then you are not lost. You can throw the word "lost" out of your vocabulary because, as an orienteer, you will never need it again (Living Healthy, Wealthy&Wise 2022).

Another important result of guidance is increased self-confidence. You may be lacking in boldness, but if you want to be confident and become the best at a sport in your group of friends, or you may simply want to feel comfortable outdoors, when orienteering can be a good option in this regard. Acquiring skills and guidance techniques to always be able to find a way out of the forest builds and improves self-confidence and self-esteem with impact in all aspects of your life.

Athletes, who have cleaned up to run on an athletics track or along paved roads, to see that running on the field, to revive yourself, but at the same time is very good for developing endurance and muscular strength. Most areas where orienteering competitions are organized tend to be

hilly, the terrain configuration providing the right environment for both athletes and people with physical abilities to develop all their motor skills.

The instructors found that the orienteering also offers interdisciplinary training, establishing relationships with various sciences of education and training of the athlete, doing so in various new and interesting ways. Orienteering contests organized in historical, urban or rural areas, bring the past of the Romanian people right in your footsteps. By counting the double steps performed, measuring the distances on the map and transforming/ calculating the various values obtained, one learns to operate with the international metric system, without obviously realizing this. Monitoring the personal performance obtained, in order to set goals and improve one's own training over time, involves the use of the notions of statistics on data collection and processing, logical thinking and continuous self-improvement. The game according to the rules offers a professional ethical training and compliance with fairness standards. (Human Kinetics 2022)

Eventually, people who like orienteering become interested (sometimes even passionate) in protecting the environment, in conservation, and in sustainable practices to enhance ecosystem resilience and human well-being. Orienteers believe in the motto: "Take nothing and leave nothing behind", another way of saying that they clean their garbage and do not pick flowers. Because orienteering protects the environment, orienteers do not damage the areas they cross or enter protected areas. Orienteering cartographers make sure to mark the forbidden areas (on the maps they draw for competition and training) where endangered plants and animals are found or which are private property. Event organizers and instructors work closely with foresters in forestry areas to protect local environments and fragile habitats.

Orienteering and ground navigation of the military

Orienteering is not only a sport in which competition is possible, but also a healthy activity, based on having a basic knowledge of the use of maps and compass and a good physical condition, thus combining intelligence and physical strength. Therefore, orienteers need solid theoretical knowledge about orientation, and its development among the military should take into account both its competitive nature and social characteristics.

Over the years, the orienteering in our country has not enjoyed popularity, the main reason being the lack of teaching resources. There are few professional orienteering instructors, sports clubs to promote and develop the activity and specialized teaching materials. In addition, the development of the orienteering requires the possession of approved professional equipment (such as: large-scale topographic maps, equipment, installations and specific devices for marking a route, etc.) which require a rather expensive investment. Moreover, the orienteering is lacking in publicity and, although it is a popular movement in Western countries, it is little known in our country and, implicitly, among the military.

Orienteering can also be understood as an activity in which the basic knowledge of military topography is used, with the help of which you have to follow a route established by the organizers to discover in order all the checkpoints. Therefore, many military experts believe that the formal content of the military topography, which is taught in the military, is sufficient for military training, and orienteering as a sport is just a way to have fun, in the idea that very good results will be obtained anyway, by any military subunit that will participate in it. Judging by the performance of competitions over the years, the real situation is that most military teams that took part in such an activity (including cadets) were unable to achieve outstanding results in orienteering competitions organized by the federation or by the specialized sports clubs. This may reflect a problem with the military's lack of mastery of orientation techniques, which means that in order to better meet effective combat requirements; the military can develop this indicator with guidance. Analyzing this wide gap between skill levels, in terms of understanding and using maps within and outside the military, we conclude that the examination (in all respects) of the training methods used in orienteering and their application to surveying meetings military service can be a useful and necessary thing.

Many orienteers have practiced orienteering as a hobby since childhood, and through repetition they have perfected their skills. After much preparation in this regard, the use of maps and the compass, the sense of the map and the ability to understand a map

are obviously much stronger than those who know only a few basic notions. The thematic content of the military topography discipline within the military educational institutions is usually taught in a single school/university year. After teaching this course, there are few practical moments in which to apply the assimilated theoretical knowledge, as a result, even if they learned during teaching, most soldiers do not use it for a long time and forget everything when they need it.

The orienteering competition is one of the internationally recognized competitive events. Through its sports clubs, more and more military schools in NATO member countries are organizing their own orienteering competitions with a competitive character. Therefore, there are many methods of training in this regard, which instructors and athletes learn from orientation coaches or create themselves. With a wide variety and strong relevance, these training methods can be applied directly in the teaching of military topography, and can significantly improve the process of training military personnel in unknown terrain (Yunda 2011, 161).

The distance covered during an orientation training is generally between 3 - 15 km, in an area where there are between 6 - 15 checkpoints. When running in various terrains, it is necessary to look at the map image from time to time and stop at each checkpoint to validate it. Often, they run for a few minutes, then make stops, then accelerate again for a while, making it impossible for a long distance runner to cover the entire route without worry. Therefore, during the whole cross-country route, it is necessary for the body to perform a movement for a long time, with a certain number of repetitions, in a given rhythm (long distance endurance) and to perform motor acts and actions with the whole body, in the shortest possible time, with maximum speed, depending on the existing conditions (speed over short distances).

The sport itself is actually a run in various terrain combined with a long-distance run. Research has shown that orienteering is a traditional exercise of moderate intensity based on aerobic endurance, and improving endurance depends on the number of workouts, their intensity and duration, and the methodological procedures used (https://www.dpi-proceedings.com 2022). Therefore, in the long-term, orienteering training can fully mobilize the circulatory and respiratory systems of the human body and can have a beneficial impact on the body by improving orienteering skills. The more educated the skill of recognizing the images on the map in the field, the faster the speed of travel and the shorter the duration. As long as systematic training is done for a long time, they will have a positive effect on cardio-pulmonary functions; will effectively develop aerobic and anaerobic exercise capabilities, thus improving the level of physical training of the military.

The analysis and evaluation of the relief is not only a prerequisite, but also the key to success in running through rugged terrain. With the help of training in running in various fields, the military can deepen and consolidate their topographic knowledge, building a good theoretical basis for graphic representations. Orienteering requires participants to continuously identify conventional signs on the map, keep the map northerly, determine the station point, determine the azimuth value of a visible landmark on the ground, plan the route, remember obvious road markings and travel the distance from the point of departure to the destination, in accordance with the route marked on the map.

The competition route is defined by start, checkpoints and arrival. Among these elements, which are precisely marked on the ground and on the map, respectively, are the sections traversed by the military, along which he must orient (navigate), depending on the pros and cons of the terrain on the site. The brain must always be active, and any slight weakness can lead to failure in competition. This process is similar to the army's objectives of training commanders. The new model of the commanding officer that the army is training must learn to keep an active mind and formulate the next battle plan, despite the hard physical effort to which it is subjected (Jinming 2014, 82 - 85).

Orienteering usually takes place on unfamiliar terrain in deserted areas, places not often walked by people. Before the start in an orienteering competition, the landforms, the hydrographic network, the vegetation, the roads, etc. they will only be understood through maps, as on-site reconnaissance cannot be performed. Once the competitors leave the starting point, they face the overcoming of the adverse effects of hills, forests, bushes, thorns, weeds, rivers, valleys,

depressions, steep slopes and moving on rough roads. These natural obstacles are encountered in various sections of running in various terrains, impeding the ability to maintain a certain speed and sometimes causing damage to bones, joints, skin or other parts of the body. This whole process is about combating various natural obstacles in the environment in order to minimize their impact on the movement in various terrains. In addition to the physical condition of the military, the movement will also depend on their abilities and willingness to overcome the obstacles encountered (terrain and vegetation).

Orienteering is a fun way to learn different land navigation methods and techniques. Military physical education sessions (with orienteering topics) are a fun way to learn and put into practice how to use a map and compass to navigate from one point to another. As this knowledge is assimilated, it will be applied to more advanced map reading skills (such as: navigation and terrain analysis) and can even reach competitive orientation. While orienteering can be a fun pastime, the map-reading and land-orientation skills that have been developed can be important skills in the military life of the military (University of Akron 2022).

Orienteering can be used as a training tool for the military in order to form the practical and theoretical knowledge obtained from military topography, and orienteering competitions can be activities to improve the skills of fast navigation in different missions. The implementation of sports orienteering topics in military physical education classes can be a solution, at the same time, for the development of motor skills and abilities, the capacity of physical and intellectual effort of the military and the acquisition of topographic knowledge necessary to carry out combat actions (Ciapa 2015, 27).

Land navigation (field orientation) is an important skill for the military, because in carrying out their missions, they are often put in the position of navigating through unknown areas, often in difficult terrain under cover of darkness. As a soldier, one of the most important pieces of equipment is the map, and knowing how to read that map and where you are and where you need to go on the map will allow you to ask for artillery support by indirect fire, close air support from military aviation or medical evacuation. The use of that map is critical to the survival of the military, even to the survival of a subunit, and the success of the mission will largely depend on it.

Orienteering helps military personnel to develop and practice at least two important transferable skills (those professional qualities acquired in a particular field, which are relevant in other fields as well) (ejobscariera 2022):

- the ability to move confidently and accurately in the field, without having to stop constantly to consult the map;
- the skills of reading a map and analyzing and interpreting the relief, to use these skills to your advantage from a tactical point of view.

You can never have too much practical experience in orienteering, and it is constantly being improved. Land navigation skills need to be systematically learned and practiced regularly to ensure that they will work reliably and under stress.

Undertaking activities (physical or intellectual) in an unknown operating environment, making difficult choices, having incomplete information available, adjusting the action plan to the middle of the mission, to adapt to changes, are just some of the challenges faced by a commander leading a subunit on a mission in unknown terrain. At first glance, it may seem that navigating the forest, using a compass and a map, has little in common with the efficient management of a military operation. However, there are striking similarities between the perspective and the tactics needed to navigate from point A to point B and those needed to succeed in military action.

In the military, moving on a route to a particular location is an essential part of a successful operation. The military must constantly improve their ability to find the direction of travel on a given route, using land navigation, activities similar to those used in orientation. In both cases, participants find several locations along the way, using only a compass and a map, as well as the human ability to guide themselves through unknown areas (orientation or intuition / instinct). Then, in most cases, there is a deadline to complete the activity, and not completing the route on time can lead to defeat. Finally, the route can be done individually or in a team, to the latter form adding the basic difficulty of the exercise and all the adaptive changes that occur in the overall structure of a group (group dynamics).

Although the details of each orienteering route are different, there are some basic principles that can improve the performance of any participant. Surprisingly, they can be translated into practical sessions, which all military instructors could use to improve their skills (Thayer 2022).

There is a tendency in a timed orienteering event to start from the starting line as if it were a speed race. Although time is a key factor, it is just as important to take a moment at the beginning to understand where you are (to be in tune with the environment), to know where you want to go, and to determine where you are the best way to get there. Military leaders must also take the time to reflect and gain an overview of how their subunit will operate.

A map is a great tool, as long as you know how to read it and understand its imperfections. A compass can be a lifesaver, but relying too much on it (consulting it too often) could cause you to lose sight of certain forms of relief you pass by. The technology is good, but imperfect if you do not know how to use it. Commanders, who realize both the best way to use emerging technologies and their limitations, can maximize the potential of subordinates and the fighting power of the subunit (https://ro.wikipedia.org 2022).

Each section of an orienteering path is an opportunity to build the path to victory, to solve certain problems, or to confirm a better way of doing things. A poorly run section should not spoil your morale for the rest of the route, as no one is moving perfectly the first time or every time. Faced with ever-changing situations in military operations, a commander cannot allow a wrong decision to derail the entire subunit. Therefore, constantly evaluate the plan as you move, learn from mistakes, build on your strengths, and dare to make changes to your system.

The error can occur at any time on an orienteering route. A few fallen trees after a storm, a stream coming out of its womb and pouring it over the banks after a heavy rain, etc. can cause good minutes of delay, forcing you to change your route. An intersection of paths, which is shown on the map, may not be as easy to see in the field (due to fallen leaves). For military leaders, understanding and covering these uncontrollable but predictable variables can make the difference between success and failure.

Before leaving on a section of the route, look at the map, analyze the surrounding terrain and establish a route. Along the way, however, moments of doubt begin to appear and you begin to ask yourself questions such as: is that intersection the one on the map?; have I already covered the 200 meters or do I still have to walk about 50?; all these hilltops look alike, am I heading for the right one? The best way to deal with hesitation is to not panic. Rely on your own plan, use the tools at your disposal, trust your instincts, and keep moving toward your goal. In the same way, military leaders must continue to personally go through those moments of doubt and inspire confidence in their subordinates in times of uncertainty.

Conclusions

After all, due to the comprehensive effects of orienteering training, the military can observe, analyze, and judge the various forms of the earth's crust at any time during rapid maneuvers and accurately determine their current position in a very short time. In addition, given the location to be reached, they will determine the relationship between the enemy's situation, the relief in the area, the direction of maneuver and the combat target, so as to select the best route of maneuver and the most effective plan action, preventing long consultation of maps, misdirection or loss of direction. Thus, the military will improve its ability to make quick and correct decisions in new situations when operating in unknown areas.

The growing popularity of the orienteering is closely linked to military topography. Awareness of the importance of guidance for the military system and the promotion of the implementation of specific training for guidance in topography courses in military educational institutions will mobilize the enthusiasm of instructors and the military for involvement in training sessions. Knowing how to use maps and a compass, moving quickly through unknown areas with the individual weapons provided, survival in isolation are activities of great importance for improving the general military training of cadets.

Today's military leader, like the commander who leads his subunit to a goal, needs to know not only where he wants to go with it, but also what the best way to get there is; orienteering is just one of many interactive activities and challenging, experiential learning.

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