

BULLETIN

OF "CAROL I" NATIONAL DEFENCE UNIVERSITY

<https://buletinul.unap.ro/index.php/en/>

Fire preparation for the offensive – the need to update the planning algorithm

LTC Adrian MIREA, Ph.D. Student*

*"Carol I" National Defence University, Bucharest, Romania

e-mail: mirea.adrian82@gmail.com

Abstract

The purpose of this paper is to highlight the relevance of fire preparation in offensive operations and to argue for the need to update the current algorithm for planning such an action. The article presents the national and allied perspectives on the concept of fire preparation, aiming, on the one hand, to emphasise the relevance of this action in the current battlefield, including examples from the ongoing Russian-Ukrainian conflict, and, on the other hand, to highlight similar aspects of the characteristic elements and purpose of this action, found both in the presented normative framework and in relevant examples from the conflict. The differences between the two perspectives presented are not significant, as the same main ideas regarding the relevance and purpose of fire preparation are addressed, but the level of equipping with modern military equipment together with the availability of high-performance striking systems with diversified possibilities of target engagement are what allow for a different approach to preparatory fires at group force level. In the last section, the article argues for the need to revise and update the fire preparation planning algorithm to include current and future changes in the organisation, manning and equipping of national armed forces structures.

Keywords:

offensive fire preparation; preparatory fire; fire support; offensive.

Article info

Received: 15 August 2024; Revised: 10 September 2024; Accepted: 24 September 2024; Available online: 15 October 2024

Citation: Mirea, A. 2024. "Fire preparation for the offensive – the need to update the planning algorithm. *Bulletin of "Carol I" National Defence University*, 13(3): 210-221. <https://doi.org/10.53477/2284-9378-24-40>



© „Carol I” National Defence University Publishing House

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY-NC-SA)

Russia's special military operation in February 2022 has set the context for unfolding a large-scale armed conflict where the Ukrainian military is waging a generally conventional fight against invading forces. Thanks to multiple open sources of information, we could observe how, for example, drone strikes, anti-tank missiles or anti-aircraft missile attacks aided the Ukrainian army in achieving success in the operation to defend the national territory, the conflict becoming over time one of attrition. Thus, the artillery fire duels and the difficulty of capturing fortified positions came to the fore, to which the limited action of air platforms contributed due to the increased density of existing air defence systems. The Russo-Ukrainian conflict is under the attention of military analysts and the scrutiny of doctrinal confrontation in the use of different military equipment and fire systems. In Russian conception, force structures manoeuvre in order to be able to engage with fire, while in Western conception fire engagement facilitates maneuver (Cranny-Evans 2023). The different conceptual perspectives on the employment of fire support systems may be one of the reasons why the quantities of artillery rounds fired by Russian forces are considerably higher in comparison to Ukrainian forces.

I have set out, through this article, to highlight the importance of revising the fire preparation planning algorithm to incorporate current and future changes in the organization and equipping of national armed forces structures. At the same time, my intention was to emphasize that this concept of preparatory fires – extensively detailed in older combat manuals – is still topical, its characteristic elements being present even today, including in the approach to attacks in the ongoing Russo-Ukrainian conflict.

In this paper, I have used documentary analysis as a method to systematically select, review and evaluate sources of information in the field of fire support with the aim of understanding and synthesizing those relevant aspects of fire preparation and the current national perspective of this concept. In order to argue for the need to revise and update the algorithm for planning preparatory fires, I brought into focus aspects describing the current perspective of the allied militaries as well as relevant examples from the ongoing Russo-Ukrainian conflict. For this purpose, I have taken into consideration the national regulations in force, as well as certain existing regulations at the level of the allied armies, which, in turn, are also implemented at the level of the Romanian Army. As an example, I mention *SMG-18/2014 - Doctrine for joint Operations of the Romanian Army*, which implements aspects of NATO doctrines for land, maritime and aerospace operations – *AJP-3.2, Allied Joint Doctrine for Land Operations*, *AJP-3.1, Allied Joint Doctrine for Maritime Operations* and *AJP-3.3, Allied Joint Doctrine for Air and Space Operations*.

An important aspect from the thematic perspective of this article is the fact that the same approach can also be observed in the field of fire support, as the most recent national regulations in force integrate the vision expressed at the alliance level. Thus, *F.T.-6/2018 – Fire support manual for Force Group Operations* implements at national level aspects of NATO fire support doctrine – *AArtyP-05, NATO Fire Support*

Doctrine, as well as some NATO technical tactics and procedures for providing joint fire support, according to *AArtyP-01, NATO Joint Fire Support (JFS) Procedures for Land Operations*. Another example relevant to the topic of the paper is *E.A. 1. 3/2016 – Doctrine for Close Air Support and Air Interdiction Operations* which implements at national level relevant aspects in the field of fire support from both NATO doctrines such as *AJP-3.3.2, Allied Joint Doctrine for Close Air Support and Air Interdiction* and from regulations in force at Allied Army level such as *AFDD 2-1.3 Counterland Operations* and *JP 3-09 Close Air Support* of the US Army.

The Russo-Ukrainian conflict is an invaluable source of lessons learned in all areas of contemporary armed conflict, including the area of interest for this paper. We can observe here, including from open sources of information, a growing worldwide interest in the efficiency and effectiveness of the striking systems of the warring parties, whether owned at the outset of the conflict or subsequently received as aid or support from third parties. Thus, attacks executed with SHAHED drones, the destruction of armoured vehicles with JAVELIN missiles or the striking of various targets with HIMARS systems, etc., have become the focus of public interest, all of which have become subjects of analysis for the parties concerned and have subsequently been included in their own lessons learned ([Deveraux 2024](#), 160).

At the national level, fire support for an offensive operation is usually provided in two main stages: ***offensive fire preparation*** and ***offensive fire support***. The specific lethal tasks planned and executed by the fire support systems available in these phases are similar to those specific to other armies. Differences in their approach are essentially due to the level of equipment and technologization of the armed force structures, however, the common element is the purpose for which these specific lethal tasks are planned and executed in an offensive operation.

What is the current perspective on fire preparation in the allied armies?

NATO Fire support doctrine – *AArtyP-05, NATO Fire Support Doctrine* mentions *preparatory fires*, along with *covering fires* and *defensive fires*, as an offensive-specific activity that can be conducted in close, rear and deep areas of operations ([NATO 2015](#), 6-7). In NATO, fire preparation involves the intense and concentrated execution of fire, usually indirect fires, with all available fire support systems, prior to the attack and in its initial stages. The purpose of the fire preparation is to neutralize or partially destroy the intended targets in order to assist the manoeuvre element in executing the assault. The opportunity for executing a fire preparation before and in the initial stages of the attack depends on a multitude of factors such as the need to achieve surprise, the available information about the enemy and its elements, the availability of sufficient munitions and fire systems to engage all targets, and the desired effects of executing such a fire preparation.

An interesting aspect, from my point of view, is that NATO doctrine also mentions the concept of counter-preparation, executed by the enemy with the aim of denying freedom of movement to attacking forces. I find it interesting from the perspective of conducting command-post exercises, where conceiving a counter-preparation can be challenging for staff members in the operations structures, who have to develop the concept of operation with the associated fire support. It can also be challenging to conceive a fire preparation or counter-preparation by staff members in intelligence structures, those that “think red” and develop courses of action for the fictitious enemy’s force structures.

From another perspective, NATO fire support procedures refer to fire preparation as a major fire engagement event (NATO 2021, 3-7) that requires deliberate planning for logistic support. Fire support planners must identify effective ways to build up and maintain the necessary quantities of munitions in close proximity to the fire support systems that will use them during fire preparation without also providing high-value targets for enemy fire systems. The NATO AArtyP-01 procedures emphasize the importance of accurate implementation of the target engagement matrix to avoid waste of resources and to reduce the “signature” of forces likely to be engaged by counterbattery fire.

Missions planned for the fire support system in offensive operations, established at both the joint and tactical levels, (Department of the Army 2014, 6-13) are accomplished through executing specific tasks of counterbattery fire, direct support, covering fires, preparatory fires, interdiction fires, suppression of enemy air defences, electronic attack or offensive cyberspace operations. In addition, the fire support elements in force group headquarters have similarly established specific responsibilities in offensive operations:

- conducting intense and concentrated fire preparation before and in the early stages of the attack;
- conducting covering fires to isolate the objective for decisive operations and supporting the shaping of the operational environment;
- augmenting brigade level fire support capabilities to execute continuous covering fires in order to ensure that friendly forces close in with the enemy;
- suppressing enemy air defence capabilities;
- conducting counterbattery fires to deny or limit enemy employment of fire support systems;
- producing destruction of high-value and time-sensitive targets designated by the higher echelon commander;
- prohibiting by electronic attack the enemy’s use of critical command and control, intelligence or fire support systems;
- ensuring coordination and integration of offensive cyberspace operations.

An important point, from my point of view, is that in NATO’s understanding fire preparation, no matter how intense or concentrated, cannot be sufficient

to annihilate or dislodge a determined enemy from defended positions (NATO 2021, 21). We have as an example in this regard the resistance of the Ukrainians in Bahmut despite the multitude of artillery barrages and relentless attacks by Russian forces (Patrick 2023). We have thus observed that the intervention of ground force structures is absolutely necessary because terrain, especially that which is considered a strategic or operational level objective, such as localities or critical infrastructure elements, must be physically occupied in order to be truly secured. Fire preparation is thus considered an important enabler in seizing land targets, especially those of operational or strategic value.

To emphasize the importance of the above, I bring to your attention the Russian forces' attempt to implement in 2024 an old interwar strategy to "reanimate" the front line. By conducting frontal attacks on several sections of the front while concurrently hitting targets (with artillery and aviation) from the operational and tactical depth of Ukrainian combat formation, the Russian forces attempted to breach the defensive system (Grace, *et al.* 2024) Important factors that apparently contributed to the failure of this strategy were the limited ability of the Russian forces to execute counterbattery fire, hit targets from the operational depth of Ukrainian combat formation and achieve surprise (Ivashkin 2024). I have chosen this example because it addresses aspects and elements presented in this article, which are also characteristic of fire preparations.

What is the current national perspective on fire preparation?

According to *F.T.-6 – Fire Support Manual in Force Group Operations*, the responsibility for fire support planning at the force group level rests with the fire support coordinator (FSCOORD) – the commander of the highest artillery echelon at the force group level. Fire support planning is based on planning field artillery fire support, (SMFT 2018, Annex 3) into which the fire support systems of other components participating in the operation are subsequently integrated. In line with the above, the fire preparation planning algorithm is described and detailed in *F.T./Art.R.T.-1.3 - Artillery Fire Control Manual* developed at the Land Forces level in 2010 (SMFT 2010, Annex 4). Based on this algorithm, the fire support coordinator at all hierarchical levels will determine the duration and structure for fire preparation and will allocate the targets to be engaged to the fire support systems available. Before briefly outlining the aspects entailed by this algorithm, I will present a few aspects describing the current national perspective on fire preparation.

The Land Forces' general tactics manual mentions preparatory fires as one of the specific offensive activities carried out during the approach and embarkation of assault forces (SMFT 2020, IV-24) The manual points out that insufficient fire preparation may jeopardize surprise or temporary neutralization of the enemy, and

recommends alternating fire missions executed as harassing fire with those executed as intense fire on planned targets as part of fire preparations.

Fire preparation is a necessity in order to neutralize/destroy as much as possible enemy forces in hardened positions, directly before their assault. The main purpose of fire preparation is presented as the destruction or neutralization of enemy fire support systems, command posts (brigade level and above), forward positions used for resupplying with ammunition, fuel, etc. (those Forward Ammunition and Resupply Point/FARP), as well as elements of the logistic support system. The conflict in Ukraine provides a multitude of examples in this regard as intensive firing, especially with indirect fire, prior to attacks is a common practice of Russian forces (Cranny-Evans 2023). This can also be observed in the Ukrainian forces as the physical and psychological effects on the defending enemy cannot be denied or ignored (Patrick 2023).

Another purpose ascribed to the execution of fire preparation, according to the general tactics manual, is to limit or prohibit enemy observation by the use of smoke and illumination of the battlefield. I consider this perspective to be limited and, in my opinion, this is due to the level of arming and equipping of the national armed forces structures in the sense that most fire support systems have a limited variety of ammunition available, usually explosive or special-purpose ammunition – smoke, incendiary, illumination or for distributing printed materials.

The current and future equipping of national force structures opens up the possibility of using a wider range of munitions (including various sub-munitions) which can be fired by modern fire support systems that have been or are being acquired, such as, for example, 155 mm self-propelled howitzers or HIMARS multiple rocket launchers. Concerning the aforementioned purpose of fire preparation, if we consider the multitude and diversity of sensors available to an enemy on the modern battlefield, limiting or prohibiting observation can be effectively achieved by “blinding” all types of sensors used by the enemy, which may be optoelectronic, acoustic, radar, infrared and electromagnetic sensors. Firing smoke rounds or illuminating certain parts of the battlefield is designed to blind certain sensors, but access to new types of munitions can open up the prospect of blinding other types of sensors available to the enemy, for example by disrupting radar activity, the electromagnetic or the infrared spectrum.

Fire preparation is also employed, according to the same manual, in order to neutralize the enemy’s anti-air defences when their own air platforms are expected to act, but the important aspect in my view is the integration of strike capabilities belonging to the naval and air components of the joint force into the fire preparation. Naval Forces can contribute to fire preparation mainly with artillery-carrying ships – similar guns to Land Forces, while the Air Forces participate by executing their characteristic missions of air interdiction and close air support.

With regard to the tactical level, the infantry division's combat manual mentions that preparatory fires (SMFT 2019, III-20) are a necessity during the forward movement of force structures towards the contact line from the moment they are in range of the enemy's major artillery systems, thus implicitly aiming to ensure force protection and freedom of movement. This perspective is also found in the mechanized brigade's combat manual, as being specific to a dynamic (in-stride) offensive (SMFT 2005, 131).

Fire preparation involves concentrating the effort of striking systems available to a force group in order to inflict losses and incapacitate the enemy so that he cannot influence or prevent attacking friendly forces from assaulting the defended positions. Depending on the extent of the enemy's defensive system, on the type or value of friendly forces and assets, fire preparation can vary in duration, from a few tens of minutes (the minimum time needed to limit the vulnerability of friendly forces during the approach and assault) to several days or even weeks, if we include pre-emptive strikes on targets or initial air strikes aimed at shaping the operation environment. In fact, the use of air strikes prior to major ground operations became common practice after World War II (Kugler, Baranick and Binnendijk 2009, 31).

The differences between the two perspectives presented, regarding the concept of fire preparation, are not significant in my view, as the same main ideas are addressed regarding the relevance and purpose of preparatory fires. One aspect that I find interesting is the implementation at the national level, through the general tactics manual, of the concepts of covering fires and defensive fires alongside fire preparation, as described in the NATO fire support doctrine AArtyP-5. The mentioned concepts of covering fires and defensive fires were not found (so far) at the national level included in the specialized manuals, their purpose and implicit tasks being grouped and detailed in a classical manner.

It is the level of arming and equipping with modern military equipment together with the availability of high-performance fire systems, with diversified target engagement possibilities, that enable a different approach to fire preparation at the force group level. The specific arming and equipping of a potential enemy are described in A/23 The Generic Enemy Forces Handbook developed by the General Directorate for Defense Intelligence in 2018. This facilitates the exploration, during command post exercises, of the possibility of using systems and munitions that are different from those in service with national armed forces structures, some of which are even banned - such as those with a chemical payload.

Why the fire preparation planning algorithm needs to be updated

As I mentioned in the previous section, the algorithm for fire preparation planning is detailed in Annex 4 of F.T./Art.R.T.-1.3 - Artillery Fire Control Manual from

2010. The central element of fire preparation is field artillery fire, which is planned to take into account aspects such as the commander's intent, the scheme of manoeuvre or available information about the enemy. According to the manual, fire preparation for the offensive at a force group level consists of three stages: (SMFT 2010, Annex 4)

- shaping the area of operations;
- securing friendly forces approaching contact;
- preparatory fires for the attack.

The first stage, *shaping the area of operations*, comprises all actions and activities aimed at ensuring favourable conditions for the offensive operation by engaging enemy high-value targets such as fire systems, command, control and communications systems or forces structures that could intervene and influence actions in the area of operations. One of the purposes is to isolate the group of forces (objective) targeted by the offensive operation, which is generally accomplished by executing interdiction fires.

For planning actions and activities at this stage of shaping the area of operations, the force group's fire support coordinator takes into account, in addition to the essential aspects mentioned – commander's intent, scheme of manoeuvre or available information about the enemy – also the particular aspects of using artillery systems at disposal, such as the number and type of sensors and firing system necessary to engage targets, the desired effects or the possibility of providing logistical support for the planned actions and activities.

The second stage, *securing friendly forces approaching contact*, is specific to dynamic (in-stride) offensive operations and involves calculating the possibilities of striking enemy targets in order to cover friendly forces during their movement from assembly areas to the line of contact (forward line of enemy troops). This line of contact marks the transition to a third stage, preparatory fires for the attack, and its exact determination depends on several factors, among which I mention the type of assault conducted – embarked/disembarked, and the time needed to execute fire missions on the first offensive fire support phase line, which will begin immediately after the completion of preparatory fires. *Securing friendly forces approaching contact* is aimed at force protection and ensuring freedom of movement, especially from the moment friendly forces come within range of most of the enemy's available (artillery) firing systems.

Preparatory fires for the attack, the third stage of the fire preparation, is planned directly before assaulting enemy-defended positions which consist of determining the number of artillery systems needed to breach the defences and establishing the concrete way of its accomplishment in the form of a graph containing the time and structure of preparatory fires.

Determining the amount of artillery systems required to breach defences involves

determining the number of platoon-size strong points that can be neutralized simultaneously with other targets usually engaged with preparatory fires – artillery batteries, command posts, radiolocation systems, etc. An important aspect is that, in order to be able to engage as many platoon-size strong points as possible with preparatory fires, some of the targets mentioned are allocated to be engaged with aerial platforms or with direct fire systems.

I consider this aspect to be problematic today and, in my view, it is the subject of some updating in terms of the algorithm used for fire preparation planning and, implicitly, in determining the time and structure of preparatory fires for the attack. Current and future equipping of force structures, along with organizational changes implemented at various tactical echelons make it difficult to optimize target engagement resources in a fire preparation using the current algorithm. For example, the fire control manual specifies that targets engaged with aerial platforms, missiles or direct fire systems are not taken into account in determining fire requirements, but at the national level, there is no basis for determining the allocation of various targets to concrete striking capabilities of this sort, while and direct fire strikes can no longer be performed according to the manual because of existing differences in current organization and equipping of force structures.

At this time, we do not have detailed calculation bases showing the possibilities of striking targets, especially surface targets, in relation to the weaponization variants and the number of aircraft/helicopter sorties, type F-16 or IAR-330 PUMA SOCAT, that Land Forces would have available for fire preparation (or for any other action). The necessity of compiling these databases can also be argued by the fact that according to *F.A. 1.3/2016 - Doctrine for Close Air Support and Air Interdiction Operations*, the supported commander must know the type and impact of munitions used by air platforms conducting fire support for his mission ([SMFA 2016](#), 26). Similarly, I consider it to be unclear at this time how to plan the engagement of targets, especially surface targets, with rockets fired by HIMARS systems, as there are no detailed instructions with their concrete possibilities and there is no detailed association of munitions with all types of targets feasible to be engaged with these systems.

If for classic fire support systems, we have at our disposal the calculation bases developed to determine their optimal use, exploiting modern fire support systems, newly acquired or in the process of being acquired, demands, in my view, the creation and implementation of a guide at every headquarter level of armed forces structures, which would contain how to determine the type and quantity of ammunition needed to effectively engage various targets. The generic data contained in the instructions used by other states, such as the US Army's "*ATP 3-09.32 JFIRE Multi-service Tactics, Techniques, and Procedures for the Joint Application of Firepower*", are not sufficient, in my view, to plan the judicious engagement of targets with the new systems available or to be able to draw up the fire support concept for the offensive operation concept, as it also involves clearly determining the requirements for munitions of all types by phase/stage/action.

Another argument for the need to update the fire preparation planning algorithm is the current possibility of engaging targets using direct fires. Considering the disappearance or replacement from current armed structures of fire systems traditionally designed to execute these fire missions – 100 mm anti-tank guns and A.G.-9 type grenade launchers – together with the prospect of equipping national armed forces structures with SPIKE missiles, 155 mm self-propelled howitzers, attack drones of various types or with loitering munitions, updates are required, including in terms of assigning targets to be engaged by direct fire systems to the available fire support systems and, implicitly, in terms of planning the fire preparation.

From my point of view, command post exercises are very useful regarding the theme of this paper, as they provide the framework for visualizing and understanding fire preparation. Command post exercises allow training the staff in running the algorithm for fire preparation planning, whereas in a war game framework, they can analyze the viability of actions and activities specific to the three stages of fire preparation, but also discover some effective ways to combat them – from the enemy's perspective.

Conclusions

Fire preparation is a necessity and a reality of offensive operations in the modern battlefield, its planning and execution being used both to assist friendly force structures in attacking the enemy's hardened positions in a given sector of the battlefield and to mislead the enemy regarding the place and time of the actual attack. A further argument for this is that the purposes for which fire preparation is carried out are found and pursued in all types of armed confrontations, with examples in the use of fire support systems for shaping the area of operations, providing freedom of movement or force protection.

Updating the fire preparation planning algorithm is absolutely necessary in my view, on the one hand, to include newly-entered or prospective fire support systems - SPIKE missiles, HIMARS systems, 155 mm self-propelled howitzers, drones, loitering ammunition, etc., and on the other hand to review the engagement of targets with direct fire as part of preparatory fires, in the light of the disappearance or replacement of classical systems designed for direct fire – 100 mm anti-tank guns and A.G.-9 type grenade launchers.

The integration of aerial platforms that can doctrinally execute air interdiction or close air support missions within the fire preparation implies, as I have shown, acknowledgement of munitions' impact on land forces missions. In this respect, the commander of the supported structure and his staff must have at their disposal information or substantiated bases of calculation that they can use in planning a specific action, such as fire preparation, to be able to exploit the aviation resources

available for a phase of the operation in the form of aircraft/helicopter sorties, or simply to understand the type of fire support provided by aerial platforms that they can benefit from at a given moment. It is appropriate, in my view, to implement at the national level a guide for allocating or assigning targets to the appropriate strike system, which would be available to all military planners in command posts, regardless of hierarchical level.

The new military equipment, which has entered and will enter the equipping of national armed forces structures, such as F-16 aerial platforms, HIMARS systems or 155 mm self-propelled howitzers, can facilitate military planners' access to a wide range of munitions, some conventional with which we are familiar (explosive, illuminating or smoke) and others modern, high-performance – in terms of maximum range, destructive power, etc., but also very diversified – in terms of payload or type of potential submunitions.

Until the full range of these munitions is acquired, we can build the framework for their use through command post exercises. These are useful in practising fire support planning related to Blue Forces' courses of action and the use of a full range of munitions existing at the NATO level, which strike systems recently introduced in national armed forces structures could fire, thus exploiting in the operation the effects produced by various submunitions, some potentially controversial, such as anti-personnel and anti-tank mine type submunitions or flechette type submunitions. Moreover, during command post exercises, we have the opportunity – provided by the *A/23 The Generic Enemy Forces Handbook developed by the General Directorate for Defense Intelligence* in 2018 – to consider including the possibility of employing chemical airstrikes and artillery strikes in support of the Red Forces' courses of action. Under these conditions, fire preparation and counter-preparation can be explored by responsible staff members in command post exercises with the full range of potential munitions available to national force structures as well as to a potential enemy.

References

- Cranny-Evans, Sam.** 2023. "Russia's Artillery War in Ukraine: Challenges and Innovations." <https://rusi.org/explore-our-research/publications/commentary/russias-artillery-war-ukraine-challenges-and-innovations>.
- Department of the Army.** 2014. *Division Operations ATP 3-91*. Washington: Army Techniques Publication.
- Deveraux, Brennan S.** 2024. *Lessons learned & unlearned the drivers of US indirect-fire innovation*. Kansas: Army University Press.
- Grace, Mappes, Harward Christina, Bailey Riley, Wolkov Nicole, Barros George, and W. Kagan Frederick.** 2024. "Russian Offensive Campaign." <https://www.understandingwar.org/backgroundunder/russian-offensive-campaign-assessment-february-13-2024>.

- Ivashkin, Olena.** 2024. *Russian forces employ Soviet deep battle theory – ISW.* <https://www.pravda.com.ua/eng/news/2024/02/14/7441770/>.
- Kugler, Richard L, Michael Baranick, and Hans Binnendijk.** 2009. *Operation Anaconda Lessons for Joint Operations.* Case study, Washington DC: National Defense University Center for Technology.
- NATO.** 2021. *Allied Joint Doctrine for Land Operations AJP-3.2.* NATO: NATO Standardization Office.
- . 2015. *NATO Fire Support Doctrine AArtyP-5.* NATO: NATO Standardization Office.
- . 2021. *NATO Joint Fire Support (JFS) Procedures for Land Operations AArtyP-01.* NATO: NATO Standardization Office.
- Patrick, Hinton.** 2023. "Lean on the Barrage: The Role of Artillery in Ukraine's Counteroffensive." <https://rusi.org/explore-our-research/publications/commentary/lean-barrage-role-artillery-ukraines-counteroffensive>.
- SMFA.** 2016. *Doctrine for Close Air Support and Air Interdiction Operations F.A. 1.3.* Bucharest: MOD.
- SMFT.** 2010. *Artillery Fire Control Manual F.T./Art.R.T.-1.3.* Bucharest: MOD.
- . 2020. *Land Forces General Tactics Manual F.T.-3. B* Bucharest: MOD.
- . 2005. *Mechanized Brigade's Combat Manual F.T./I. - 1.* Bucharest: MOD.
- . 2019. *Infantry Division's Combat Manual F.T./I.-1.1.* Bucharest: MOD.
- . 2018. *Fire support manual for Force Group Operations F.T.-6.* Bucharest: MOD.